

VOLUME 1

**GS# 385-001 BUILDING RENOVATIONS**  
**660 NORTH STREET**  
OFFICE OF CAPITOL FACILITIES  
DEPARTMENT OF FINANCE AND ADMINISTRATION

JACKSON, MISSISSIPPI

BID DOCUMENTS  
AR PN 20-003



**P R O J E C T M A N U A L**

19 APRIL 2024





PROJECT MANUAL

FOR

**GS# 385-001 BUILDING RENOVATIONS**  
**660 NORTH STREET**  
OFFICE OF CAPITOL FACILITIES  
DEPARTMENT OF FINANCE AND ADMINISTRATION

JACKSON, MISSISSIPPI

BID DOCUMENTS  
A R P N 20-003



**ARCHITECTURAL**

ALBERT & ROBINSON ARCHITECTS, PLLC  
PO BOX 1567  
HATTIESBURG, MS 39403  
601.544.1970 VOICE  
[www.ar-architects.com](http://www.ar-architects.com)

**CIVIL**

DUNGAN ENGINEERING  
1574 US HIGHWAY 98 EAST  
COLUMBIA, MS 39429  
601.731.2600 VOICE  
[www.dunganeng.com](http://www.dunganeng.com)

**STRUCTURAL**

STRUCTURAL DESIGN GROUP  
220 GREAT CIRCLE ROAD, STE. 106  
NASHVILLE, TN 37228  
615.255.5537 VOICE  
[www.sdg-structure.com](http://www.sdg-structure.com)

**MECHANICAL**

ENGINEERING RESOURCE GROUP  
350 EDGEWOOD TERRACE DRIVE  
JACKSON, MS 39206  
601.362.3552 VOICE  
[www.ergms.com](http://www.ergms.com)

**ELECTRICAL**

THE POWER SOURCE  
305 HIGHWAY 51  
RIDGELAND, MS 39157  
601.605.4820 VOICE  
[www.thepowersource.us](http://www.thepowersource.us)



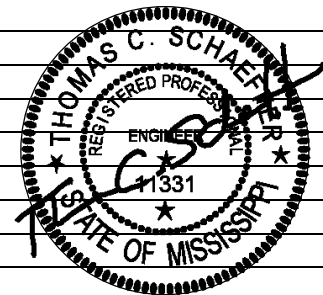
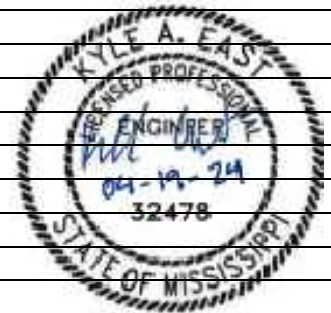
**INDEX**

COVER  
 TITLE SHEET  
 INDEX TO SPECIFICATIONS  
 INDEX TO DRAWINGS  
 DIVISION 0 INDEX  
 DIVISION 1 INDEX

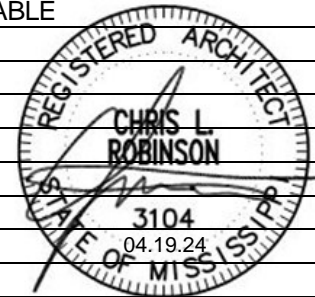
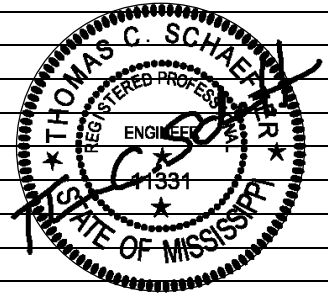


**INDEX TO SPECIFICATIONS**

<b>VOLUME 1 OF SPECIFICATIONS</b>	
<b>DIVISION 0</b>	<b>PROCUREMENT AND CONTRACT REQUIREMENTS (SEE SEPARATE INDEX)</b>
<b>DIVISION 1</b>	<b>GENERAL REQUIREMENTS (SEE SEPARATE INDEX)</b>
<b>DIVISION 1</b>	<b>GENERAL REQUIREMENTS (STRUCTURAL)</b>
01 33 24	STRUCTURAL SUBMITTALS
01 45 00	PROJECT QUALITY CONTROL
01 45 24	STRUCTURAL SPECIAL INSPECTIONS
01 91 00	GENERAL COMMISSIONING REQUIREMENTS
01 91 10	FUNCTIONAL PERFORMANCE REQUIREMENTS
01 91 15	BUILDING EXTERIOR ENCLOSURE COMMISSIONING
<b>DIVISION 2</b>	<b>EXISTING CONDITIONS</b>
02 41 00	BUILDING AND STRUCTURE DEMOLITION
02 41 19	DEMOLITION (CIVIL)
02 82 00	HAZARDOUS MATERIALS REMEDIATION
<b>DIVISION 3</b>	<b>CONCRETE</b>
03 05 16	UNDERSLAB VAPOR BARRIER
03 10 00	CONCRETE FORMING AND ACCESSORIES
03 15 16	EXPANSION AND CONSTRUCTION JOINTS (CIVIL)
03 20 00	CONCRETE REINFORCEMENT
03 30 00	CAST-IN-PLACE CONCRETE
03 30 00	CAST-IN-PLACE CONCRETE (CIVIL)
03 30 53	INCIDENTAL CONCRETE
03 35 11	CONCRETE FLOOR FINISHES
03 45 00	ARCHITECTURAL PRECAST CONCRETE
03 62 00	NON-SHRINK GROUT

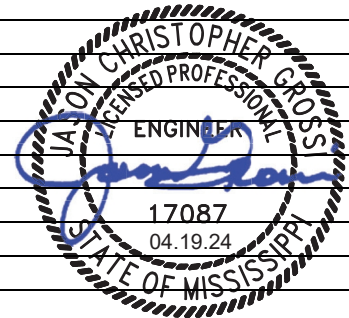


<b>DIVISION 4</b>	<b>MASONRY</b>
04 22 00	CONCRETE UNIT MASONRY
<b>DIVISION 5</b>	<b>METALS</b>
05 12 00	STRUCTURAL STEEL FRAMING
05 31 00	STEEL DECKING
05 41 00	COLD-FORMED EXTERIOR STEEL STUD FRAMING
05 50 00	METAL FABRICATIONS
05 51 00	METAL STAIRS
05 51 33	INCLINED METAL LADDERS
05 52 13	HANDRAILS AND RAILINGS
05 73 00	DECORATIVE METAL RAILINGS
<b>DIVISION 6</b>	<b>WOOD &amp; PLASTICS</b>
06 10 00	ROUGH CARPENTRY
06 20 00	FINISH CARPENTRY
06 41 00	ARCHITECTURAL WOOD CASEWORK
<b>DIVISION 7</b>	<b>THERMAL &amp; MOISTURE PROTECTION</b>
07 16 16	CRYSTALLINE CONCRETE WATERPROOFING
07 21 00	THERMAL INSULATION
07 21 19	FOAMED-IN-PLACE INSULATION
07 27 26	FLUID-APPLIED MEMBRANE AIR BARRIERS, VAPOR PERMEABLE
07 52 16	SBS MODIFIED BITUMEN MEMBRANE ROOFING
07 62 00	SHEET METAL FLASHING AND TRIM
07 72 33	ROOF HATCHES
07 84 00	FIRE STOPPING
07 92 00	JOINT SEALANTS
<b>DIVISION 8</b>	<b>OPENINGS</b>
08 11 13	HOLLOW METAL DOORS AND FRAMES
08 14 16	FLUSH WOOD DOORS
08 14 33	SOLID WOOD DOORS
08 43 13	ALUMINUM STOREFRONT
08 45 13	STRUCTURED-POLYCARBONATE-PANEL ASSEMBLIES
08 71 00	DOOR HARDWARE
08 80 00	GLAZING
08 87 00	WINDOW FILMS



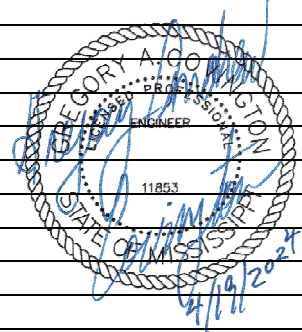
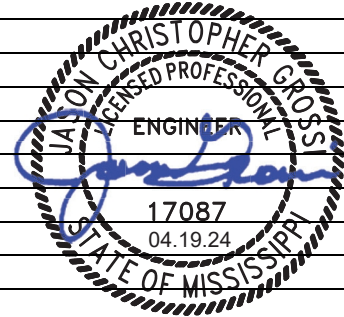
<b>DIVISION 9</b>	<b>FINISHES</b>
09 05 61	COMMON WORK RESULTS FOR FLOORING PREPARATION
09 21 16	GYPSUM BOARD ASSEMBLIES
09 22 36	LATH
09 24 00	CEMENT PLASTERING
09 30 00	TILING
09 51 00	ACOUSTICAL CEILINGS
09 51 26	SUSPENDED WOOD PLANK CEILING
09 65 00	RESILIENT FLOORING
09 66 23.16	EPOXY-RESIN TERRAZZO FLOORING
09 68 13	TILE CARPETING
09 69 00	ACCESS FLOORING
09 84 53	SOUND BARRIER MULLION TRIM CAP
09 91 13	EXTERIOR PAINTING
09 91 23	INTERIOR PAINTING
<b>DIVISION 10</b>	<b>SPECIALTIES</b>
10 11 00	VISUAL DISPLAY UNITS
10 14 00	SIGNAGE
10 21 13.19	PLASTIC TOILET COMPARTMENTS
10 28 00	TOILET, BATH AND LAUNDRY ACCESSORIES
10 44 00	FIRE EXTINGUISHERS AND CABINETS
<b>DIVISION 12</b>	<b>FURNISHINGS</b>
12 21 13	HORIZONTAL LOUVER BLINDS
12 24 00	WINDOW SHADES
12 36 00	COUNTERTOPS
	

<b>VOLUME 2 OF SPECIFICATIONS</b>	
<b>DIVISION 21</b>	<b>FIRE SUPPRESSION</b>
21 13 00	FIRE SUPPRESSION SYSTEMS
<b>DIVISION 22</b>	<b>PLUMBING</b>
22 00 90	PLUMBING SYSTEM COMMISSIONING
22 11 16	DOMESTIC WATER PIPING
22 13 16	SANITARY WASTE AND VENT PIPING
22 13 19	SANITARY WASTE PIPING SPECIALTIES
22 13 19.13	SANITARY DRAINS
22 14 16	STORM DRAINAGE PIPING
22 14 23	STORM DRAINAGE PIPING SPECIALTIES
22 14 29	SUMP PUMPS
22 33 00	ELECTRIC, DOMESTIC WATER HEATERS
22 40 00	PLUMBING FIXTURES
<b>DIVISION 23</b>	<b>HEATING, COOLING AND AIR CONDITIONING</b>
23 00 10	MECHANICAL GENERAL PROVISIONS
23 00 20	MECHANICAL CLOSE-OUT REQUIREMENTS
23 00 30	DEMONSTRATION AND TRAINING FOR MECHANICAL SYSTEMS
23 00 90	HVAC SYSTEM COMMISSIONING
23 05 00	BASIC MECHANICAL MATERIALS AND METHODS
23 05 13	MOTORS AND CONTROLLERS
23 05 19	METERS AND GAUGES
23 05 23	VALVES
23 05 29	HANGERS AND SUPPORTS
23 05 33	HEAT TRACING
23 05 48	MECHANICAL SOUND AND VIBRATION CONTROL
23 05 53	MECHANICAL IDENTIFICATION
23 05 93	TESTING, ADJUSTING AND BALANCING
23 07 13	DUCT INSULATION
23 07 19	PIPING AND EQUIPMENT INSULATION
23 09 00	ENERGY MANAGEMENT AND CONTROL SYSTEM-GENERAL
23 09 13	EMCS BASIC MATERIALS AND DEVICES
23 09 16	EMCS OPERATOR INTERFACES
23 09 19	EMCS FIELD PANELS
23 09 23	EMCS COMMUNICATION DEVICES
23 09 26	EMCS SOFTWARE AND PROGRAMMING
23 09 33	EMCS COMMISSIONING
23 11 23	FACILITY NATURAL GAS PIPING
23 21 13	HYDRONIC PIPING





23 21 16	HYDRONIC PIPING SPECIALTIES
23 21 23	HYDRONIC PUMPS
23 25 00	HVAC WATER TREATMENTS
23 31 13	METAL DUCTS
23 33 00	AIR DUCT ACCESSORIES
23 34 23	HVAC POWER VENTILATORS
23 36 00	AIR TERMINAL UNITS
23 37 00	AIR OUTLETS AND INLETS
23 37 23	HVAC GRAVITY VENTILATORS
23 40 00	AIR CLEANING DEVICES
23 52 16	CONDENSING BOILERS
23 64 23.21	AIR-COOLED, SCROLL WATER CHILLERS
23 73 13	MODULAR CENTRAL-STATION AIR-HANDLING UNITS
23 80 60	BAS SYSTEM COMMISSIONING
23 81 23	COMPUTER ROOM AIR CONDITIONERS
23 81 43	DUCTLESS SPLIT-SYSTEM HEAT PUMPS
23 82 39.23	ELECTRIC UNIT HEATERS
<b>DIVISION 26 ELECTRICAL</b>	
26 00 90	ELECTRICAL SYSTEM COMMISSIONING
26 05 00	ELECTRICAL GENERAL
26 05 11	WORK IN EXISTING FACILITIES
26 05 19	CONDUCTORS
26 05 26	GROUNDING
26 05 33	RACEWAYS
26 05 33	OUTLET BOXES AND JUNCTION BOXES
26 05 36	CABLE TRAY
26 05 73	ELECTRICAL STUDIES
26 09 23	SWITCHES AND RECEPTACLES
26 09 25	OCCUPANCY SENSORS
26 22 00	TRANSFORMERS
26 24 00	PANELBOARDS
26 28 00	DISCONNECTS & SEPARATELY-MOUNTED CIRCUIT BREAKERS
26 32 14	GENERATOR
26 36 23	AUTOMATIC TRANSFER SWITCHES
26 43 00	LOW VOLTAGE AC SURGE PROTECTION FOR ELECTRICAL DISTRIBUTION SYSTEMS
26 51 00	LIGHTING
<b>DIVISION 27 COMMUNICATION</b>	
27 05 28	TELEPHONE AND DATA SYSTEMS
27 51 16	INTERCOM SYSTEM



<b>DIVISION 28</b>	<b>ELECTRONIC SAFETY AND SECURITY</b>	
28 13 01	DOOR LOCKING CONTROL SYSTEM	
28 16 00	INTRUSION DETECTION SYSTEM	
28 23 13	CLOSED CIRCUIT TELEVISION (CCTV) SYSTEM	
28 31 00	FIRE ALARM SYSTEM	
<b>DIVISION 31</b>	<b>EARTHWORK</b>	
31 11 00	CLEARING AND GRUBBING	
31 20 00	EARTHWORK	
31 23 18	EARTHWORK FOR STRUCTURES	
31 23 00	EXCAVATION, TRENCHING & BACKFILLING	
31 23 19	DEWATERING	
31 25 00	EROSION AND SEDIMENT CONTROL MEASURES	
<b>DIVISION 32</b>	<b>EXTERIOR IMPROVEMENTS</b>	
32 12 16	FLEXIBLE ASPHALT PAVEMENT	
32 15 40	CRUSHED LIMESTONE	
32 92 23	SODDING	
<b>DIVISION 33</b>	<b>UTILITIES</b>	
33 05 33.13	CORRUGATED SMOOTH BORE HDPE PIPE	
33 14 16	WATER DISTRIBUTION	
33 31 11	GRAVITY FLOW SANITARY SEWER	
33 42 13	REINFORCED CONCRETE PIPE	
33 49 23	STORM DRAINAGE WATER RETENTION STRUCTURES	

**END OF INDEX TO SPECIFICATIONS**

## INDEX TO DRAWINGS

### GENERAL

G0	COVER SHEET
G1.1	TITLE SHEET & GENERAL NOTES
G1.2	GENERAL NOTES (cont.)
G2.1	LIFE SAFETY PLANS
G3.1	AMERICANS WITH DISABILITIES ACT (ADA)
G3.2	ADA REQUIREMENTS

### CIVIL

C1.00	EXISTING CONDITIONS
C1.01	DEMOLITION & EROSION CONTROL
C2.00	OVERALL SITE PLAN
C2.01	SITE PLAN ZOOMED (NORTH)
C2.02	SITE PLAN ZOOMED (SOUTH)
C2.03	CROSS SECTIONS WEST TO EAST
C2.04	CROSS SECTIONS NORTH TO SOUTH
C2.05	SITE DETAILS
C2.06	SITE DETAILS
C2.07	STRUCTURAL NOTES
C2.08	DRAINAGE DETAILS & SCHEDULES
C2.09	DRAINAGE RETENTION DETAILS
C2.10	CURB RAMP DETAILS
C2.11	CURB RAMP DETAILS
C2.12	CURB RAMP DETAILS
C3.00	OVERALL UTILITY PLAN
C3.01	SANITARY SEWER PLAN & PROFILE
C3.02	UTILITY DETAILS

### STRUCTURAL

S0.1	STRUCTURAL NOTES
S0.2	STRUCTURAL NOTES (CONT.)
S0.3	STRUCTURAL QUALITY ASSURANCE PLAN
S0.4	STRUCTURAL QUALITY ASSURANCE PLAN (cont.)
S1.1	EXISTING FOUNDATION PLAN
S1.2	EXISTING SECOND FLOOR FRAMING PLAN
S1.3	EXISTING ROOF FRAMING PLAN
S1.4	ALTERNATE PLANS
S2.0	FOUNDATION SECTIONS AND DETAILS
S2.1	FOUNDATION SECTIONS AND DETAILS
S2.2	FOUNDATION SECTIONS AND DETAILS
S3.0	SECTIONS AND DETAILS

### ARCHITECTURAL

D1.1	EXISTING + DEMO FIRST FLOOR PLAN
D1.2	EXISTING + DEMO SECOND FLOOR PLAN
D3.1	EXISTING + DEMO ROOF PLAN
D4.1	EXISTING + DEMO BUILDING ELEVATIONS
D5.1	EXISTING BUILDING SECTIONS
D7.1	EXISTING + DEMO FIRST FLOOR RCP

D7.2	EXISTING + DEMO SECOND FLOOR RCP
A0.1	ARCHITECTURAL SITE PLAN
A0.2	ENLARGED SITE PLANS
A0.3	DUMPSTER YARD ELEVATIONS AND DETAILS
A0.4	MECHANICAL YARD ELEVATIONS
A0.5	EXTERIOR 3D RENDERINGS
A0.6	COVERED CANOPY DETAILS
A0.7	ENLARGED SITE PLAN & ELEVATIONS
A1.1a	FIRST FLOOR - DIMENSIONED PLAN
A1.1b	FIRST FLOOR - NOTED PLAN
A1.2a	SECOND FLOOR - DIMENSIONED PLAN
A1.2b	SECOND FLOOR - NOTED PLAN
A1.3a	INTERIOR 3D RENDERING - LOBBY
A1.3b	ENLARGED PLAN & DETAILS
A1.4a	LOBBY STAIRS DETAILS
A1.4b	LOBBY STAIRS DETAILS
A1.5	LOBBY INTERIOR ELEVATIONS
A1.6	LOBBY INTERIOR ELEVATIONS
A1.7	ENLARGED RESTROOM PLAN & ELEVATIONS
A1.8a	INTERIOR 3D RENDERING
A1.8b	ENLARGED PLANS & INTERIOR ELEVATIONS
A1.9a	INTERIOR 3D RENDERING
A1.9b	ENLARGED PLANS & INTERIOR ELEVATIONS
A1.10	ENLARGED PLANS & INTERIOR ELEVATIONS
A1.11	ENLARGED PLANS & INTERIOR ELEVATIONS
A1.12	INTERIOR 3D RENDERING
A1.13	STAIR PLANS AND SECTIONS
A2.1	DOOR SCHEDULE AND ELEVATIONS
A2.2	WINDOW SCHEDULE AND ELEVATIONS
A2.3	STOREFRONT DETAILS
A2.4	WINDOWS & DOOR DETAILS
A3.1	ROOF PLAN
A3.2	ROOF DETAILS
A4.0	EXTERIOR 3D RENDERINGS
A4.1	BUILDING ELEVATIONS
A5.1	BUILDING SECTIONS
A5.2	BUILDING SECTIONS
A5.3	WALL SECTIONS
A5.4	WALL SECTIONS
A5.5	WALL DETAILS
A6.1	FFP & FINISH SCHEDULES
A6.2	ROOM SIGNAGE
A7.1	FIRST FLOOR RCP
A7.2	SECOND FLOOR RCP
A7.4	RCP DETAILS
A7.5	RCP DETAILS
A7.6	RCP DETAILS
A8.1	LOBBY MILLWORK PLAN & ELEVATIONS
A8.2	MILLWORK DETAIL
A8.3	MILLWORK DETAIL
A8.4	MILLWORK DETAIL

A8.5 MILLWORK DETAIL

ARCHITECTURAL (REFERENCE)

REF11.1	ORIGINAL REF. FIRST FLOOR LOBBY & DEMO PLAN (2009)
REF11.2	ORIGINAL REF. REFLECT. CEILING PLANS (2009)
REF11.3	ORIGINAL REF. BLDG. SECTION & ELEVS. (2009)
REF11.4	ORIGINAL REF. SECTIONS AT ELEVATOR (2009)
REF11.6	ORIGINAL REF. ELEVATOR SECTION (2009)
REF11.7	ORIGINAL REF. WALL SECTIONS (2009)
REF11.8	ORIGINAL REF. WALL SECTIONS & DETAILS (2009)
REF11.9	ORIGINAL REF. FINISH SCHEDULE (2009)
REF11.10	ORIGINAL REF. DOOR SCHEDULE & DETAILS (2009)
REF11.11	ORIGINAL REF. WINDOW SCHED. & DETAILS (2009)
REF11.12	ORIGINAL REF. STAIR PLANS & DETAILS (2009)
REF11.13	ORIGINAL REF. ENLARGED PLANS INT. ELEVS. (2009)
REF11.14	ORIGINAL REF. 1ST FL. PLUMBING (2009)
REF11.15	ORIGINAL REF. 2ND FLOOR PLUMBING (2009)
REF11.16	ORIGINAL REF. 1ST FL. HVAC (2009)
REF11.17	ORIGINAL REF. 2ND FL. HVAC (2009)
REF11.18	ORIGINAL REF. ROOF PLAN HVAC (2009)
REF11.19	ORIGINAL REF. SCHEDULES MECHANICAL (2009)
REF11.20	ORIGINAL REF. LEGEND & LIGHT FIXT. SCHEDULE (2009)
REF11.21	ORIGINAL REF. 1ST FL. LIGHTING (2009)
REF11.22	ORIGINAL REF. 2ND FL. LIGHTING (2009)
REF11.23	ORIGINAL REF. 1ST FL. POWER & AUXILIARY (2009)
REF11.24	ORIGINAL REF. 2ND FL. POWER & AUXILIARY (2009)
REF11.25	ORIGINAL REF. MECHANICAL CONNECTIONS (2009)

FIRE PROTECTION

FP0.1	FIRE PROTECTION ABBREV., SYMBOLS, AND NOTES
FP2.1	FIRST FLOOR TENANT SPACE FIRE PROTECTION
FP2.2	SECOND FLOOR TENANT SPACE FIRE PROTECTION
FP3.1	FIRE PROTECTION DETAILS AND SCHEDULES

PLUMBING

P0.1	PLUMBING LEGEND, ABBREV., SYMBOLS AND NOTES
P1.1	FIRST FLOOR TENANT SPACE PLUMBING DEMO
P1.2	SEOND FLOOR TENANT SPACE PLUMBING DEMO
P1.3	ROOF FLOOR TENANT SPACE PLUMBING DEMO
P2.1	FIRST FLOOR TENANT SPACE PLUMBING
P2.2	SECOND FLOOR TENANT SPACE PLUMBING
P2.3	FIRST FLOOR PLAN - PLUMBING SUPPLY
P2.4	SECOND FLOOR PLAN - PLUMBING SUPPLY
P2.5	ROOF PLAN - PLUMBING SANITARY
P3.1	PLUMBING DETAILS
P4.1	PLUMBING SCHEDULES

MECHANICAL

M0.1	HVAC LEGEND AND ABBREVIATIONS
M0.2	MECHANICAL BUILDING ISOMETRIC
MS.1	SITE PLAN - MECHANICAL

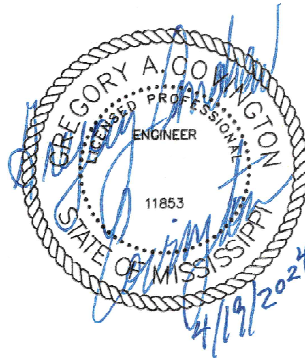
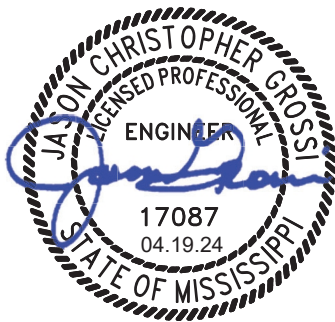
MD1.1 FIRST FLOOR PLAN - HVAC DEMOLITION  
MD1.2 SECOND FLOOR PLAN - HVAC DEMOLITION  
MD1.3 ROOF PLAN - HVAC DEMOLITION  
M1.1 FIRST FLOOR PLAN - HVAC  
M1.2 SECOND FLOOR PLAN - HVAC  
M1.3 ROOF PLAN - HVAC  
M2.1 FIRST FLOOR PLAN - HVAC PIPING  
M2.2 SECOND FLOOR PLAN - HVAC PIPING  
M3.1 ENLARGED MECHANICAL ROOM HVAC PLANS  
M3.2 ENLARGED MECHANICAL ROOM HVAC PIPING PLANS  
M3.3 MECHANICAL SECTIONS  
M4.1 DETAILS OF MODULAR AHU'S  
M4.2 DETAIL OF AIR-COOLED CHILLERS  
M5.1 HVAC DETAILS  
M5.2 HVAC DETAILS  
M5.3 HVAC DETAILS  
M6.1 HVAC SCHEDULES  
M6.2 HVAC SCHEDULES  
M6.3 HVAC SCHEDULES  
M7.1 HVAC CONTROLS  
M7.2 HVAC CONTROLS  
M7.3 HVAC CONTROLS  
M7.4 HVAC CONTROLS  
M7.5 HVAC CONTROLS  
M8.1 HVAC FLOW DIAGRAMS

#### ELECTRICAL

E0.0 ELECTRICAL LEGEND  
E0.1 ELECTRICAL DETAILS  
E0.2 ELECTRICAL DETAILS  
E0.3 ELECTRICAL DETAILS  
E0.4 ELECTRICAL PANEL SCHEDULES  
E0.5 ELECTRICAL PANEL SCHEDULES  
E0.6 ELECTRICAL SITE PLAN  
E0.7 ELECTRICAL SINGLE LINE DIAGRAM  
E0.8 TELECOMM RISER DIAGRAM  
ED101 FIRST FLOOR LIGHTING DEMOLITION PLAN  
ED102 FIRST FLOOR POWER DEMOLITION PLAN  
ED201 SECOND FLOOR LIGHTING DEMOLITION PLAN  
ED202 SECOND FLOOR POWER DEMOLITION PLAN  
E101 FIRST FLOOR CORE + LIGHTING PLAN  
E102 SECOND FLOOR TENANT IMPROVEMENT LIGHTING PLAN  
E201 FIRST FLOOR CORE + SHELL POWER PLAN  
E202 SECOND FLOOR TENANT IMPROVEMENT POWER PLAN  
E301 FIRST FLOOR MECHANICAL CONNECTIONS PLAN  
E302 SECOND FLOOR MECHANICAL CONNECTIONS PLAN  
E303 ROOF MECHANICAL CONNECTIONS PLAN  
E304 ENLARGED MECHANICAL CONNECTIONS PLAN  
E401 FIRST FLOOR CORE + SHELL FIRE ALARM & AUXILIARY PLAN  
E402 SECOND FLOOR TENANT IMPROVEMENT FIRE ALARM & AUXILIARY PLAN  
E501 FIRST FLOOR CABLE TRAY PLAN

E502 SECOND FLOOR CABLE TRAY PLAN

END OF INDEX OF DRAWINGS







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**DIVISION 0: PROCUREMENT AND CONTRACT REQUIREMENTS**

<b>Section</b>	<b>Description</b>	<b>Page</b>
00 1100	Advertisement for Bids.....	1
00 2100	Instructions to Bidders .....	2
00 4200	Proposal Form .....	7
00 5200	Standard Form of Agreement Between the Owner and the Contractor.....	9
00 6100	Contract Bond .....	12
00 6216	Certificate of Insurance.....	14
00 6217	Certificate of Insurance Instructions .....	15
00 6300	Affidavit Certifying Payment to all Subcontractors .....	16
00 7200	General Conditions .....	19
00 7300	Supplementary Conditions.....	20
00 7339	Minority Participation.....	42
00 7343	Labor Requirements.....	45
00 8000	Special Conditions .....	46
00 9000	Addenda .....	47



**DEPARTMENT OF FINANCE AND ADMINISTRATION  
BUREAU OF BUILDING, GROUNDS AND  
REAL PROPERTY MANAGEMENT  
JACKSON, MISSISSIPPI**

**ADVERTISEMENT FOR BIDS**

Sealed bids will be received electronically via MAGIC or physically delivered to the office of the Bureau of Building, Grounds and Real Property Management, 501 North West Street, Suite 1401 B, Jackson, Mississippi, 39201, until 2:00:00 p.m. (14:00:00 Military Time) on Thursday, 05/30/2024 , for:

RE:      GS# 385-001 Building Renovations (660 North Street)  
          (Office of Capitol Facilities) (Department of Finance and  
          Administration)  
RFx #:    3160006574

at which time they will be publicly opened and read. Contract documents may be obtained from:

Professional:    The Johnson-McAdams Firm, P.A., dba Albert & Robinson Architects, PLLC  
Address:        Post Office Box 1567  
                  Hattiesburg, Mississippi 39403

Phone:           601-544-1970

Email:           chrisr@ar-architects.com

A deposit of \$175.00 is required. Bid preparation will be in accordance with Instructions to Bidders bound in the project manual. The Bureau of Building, Grounds and Real Property Management reserves the right to waive irregularities and to reject any or all bids. **NOTE: Telephones and desks will not be available for bidders use at the bid site.**

Bureau of Building, Grounds and Real Property Management

**Dates of Publication:**

04/30/2024  
05/07/2024

Note: Whenever reference is made, in any document or meeting, to 2:00:00 p.m., it shall also mean, and be the same as, 14:00:00 Military Time.



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# INSTRUCTIONS TO BIDDERS

## SECTION 00 2100

### PART 1 - GENERAL

- 1.01 **QUESTIONS:** Questions should be directed to the Professional. Should a Bidder find discrepancies in, or omissions from, the procurement documents, or be in doubt as to their meaning, the Bidder should immediately notify the Professional. The Professional will send written instruction(s) or interpretation(s) to all known holders of the documents. Neither the Owner, nor the Professional, will be responsible for any oral instruction or interpretation.
- 1.02 **BIDDER'S QUALIFICATIONS:**
- A. **Certificate of Responsibility:** The Mississippi State Board of Contractors is responsible for issuing Certificates of Responsibility to Contractors. To be awarded a Contract for public work, Sections 31-3-15 and 31-3-21 of the **Mississippi Code of 1972, Annotated** requires a Contractor to have a current Certificate of Responsibility at bid time and during the entire length of the job. The Certificate of Responsibility number issued becomes a significant item in all public bidding.
  - B. **Bid Under \$50,000:** If a Bidder submits a bid not exceeding \$50,000, no Certificate of Responsibility number is required; however, a notation stating the *bid does not exceed \$50,000* shall appear on the face of the envelope, or a Certificate of Responsibility number.
  - C. **Bid Over \$50,000:** Each Bidder submitting a bid in excess of \$50,000 shall show its Certificate of Responsibility number on the bid and on the face of the envelope containing the bid.
  - D. **Joint Venture Bid:** When multiple Contractors submit a joint venture bid in excess of \$50,000, a *joint venture* Certificate of Responsibility number shall be shown on the bid and on the face of the envelope containing the bid. If the Multiple-Contractor joint venture has no *joint venture* Certificate of Responsibility number, each of the Contractors participating in the bid shall indicate their individual Certificate of Responsibility numbers on the bid and on the face of the envelope.
- 1.03 **NON-RESIDENT BIDDER:** When a non-resident Bidder (a Contractor whose principal place of business is outside the State of Mississippi) submits a bid for a Mississippi public works project, one of the following is required and shall be submitted with the Proposal Form: (Code 31-3-21(3))
- A. **Copy of Law:** If the non-resident Bidder's state has a resident Bidder preference law, a copy of that CURRENT law shall be submitted with the Proposal Form.
  - B. **Statement:** If the state has no such law then a statement indicating *the State of (Name of State) has no resident Contractor preference law* shall be submitted with the Proposal Form.
- 1.04 **DISQUALIFICATION OF BIDDER:** A Bidder may be disqualified for any of the following reasons:
- A. Failure to comply with the bid requirements.
  - B. Bidder is in arrears on existing Contracts with the Bureau or another state agency, university, community college, or junior college.
  - C. Bidder is involved in an ongoing dispute related to the Bidder's execution, workmanship, or timely performance of a previous Contract with the Bureau or another state agency, university, community college, or junior college.
  - D. Bidder has defaulted on a previous Contract with the Bureau of another state agency, university, community college, or junior college.
- 1.05 **CONDITIONS OF WORK:** Each Bidder must fully inform himself of all conditions relating to the construction of the Project and employment of labor thereon. Failure to do so will not relieve a successful Bidder of obligations to furnish all material and labor necessary to carry out the provisions of the Contract. Insofar as possible, the Bidder must employ methods, or means, which will not cause interruption of, or interference with, the work of any other Bidder, or Contractor.
- 1.06 **EXAMINATION OF SITE:** All Bidders, including the general Contractor and Subcontractors, shall visit the building site, compare the Drawings and Project Manual with any work in place and be informed of all conditions. Failure to visit the site will in no way relieve the successful Bidder from furnishing any materials or performing any work required to complete work in accordance with Drawings and Project Manual without additional cost to the Owner.

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### Division 0

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- 1.07 **LAWS AND REGULATIONS:** The Bidder's attention is directed to the fact that all applicable Mississippi state laws, rules and regulations of all authorities having jurisdiction over construction of the Project apply to the Contract.
- 1.08 **OBLIGATION OF BIDDER:** At the bid opening, each Bidder will be presumed to have inspected the site, read and become thoroughly familiar with the Drawings and the Project Manual, including all addenda.
- 1.09 **BID DOCUMENT DEPOSIT AND RETURN:** The deposit amount, if any, shall be established as the estimated actual cost of copying and reproduction plus shipping via USPS standard Ground Transportation, is shall be indicated in the Advertisement for Bids. Bidders may request shipping via express carrier or expedited delivery at their own additional cost. Upon returning the documents to the Professional within ten (10) working days of the bid date and in good condition, all document holders will be refunded the full deposit amount. Further, any document holder who is awarded the contract, related subcontracts and/or vendor agreements may elect to retain their documents and request refund of the full deposit amount upon execution of the construction contract and approval of general contractor, however; such documents shall be counted toward the total number of copies furnished free of charge to the general contractor. No partial sets of documents will be issued. Selected trade organizations, plan rooms and web-based distribution networks will be issued one (1) set of documents without charge.

## PART 2 - PROPOSAL FORM

- 2.01 **METHOD OF BIDDING:** Lump sum, single bids received on a general contract will include general, mechanical and electrical construction and all work shown on Drawings or specified in the Project Manual.
- 2.02 **PROPOSAL FORMS:** The Bidder shall make all proposals on forms provided and shall fill all applicable blank spaces without interlineations or alteration and must not contain recapitulation of the work to be done. No oral or telegraphic proposals will be considered.
- 2.03 **TIME OF COMPLETION:** The Bidder shall agree to commence work on, or before, a date specified in a written *Notice to Proceed* and fully complete the Project within the calendar days indicated on the Proposal Form.
- 2.04 **BASE BID AND ALTERNATES:**
- A. On the Proposal Form, the Bidder shall write out the Base Bid amount in words and include the numerical amount. The written word shall govern.
  - B. The Proposal Form shall contain a brief description of each alternate modifying the scope. The Bidder shall write out the amount in words and include the numerical amount for each alternate. The written word shall govern.
- 2.05 **SUBSTITUTIONS:** No substitutions, qualifications or redefining of the Specification requirements are allowed to be marked on the Proposal Form, unless specifically required by the Bid Documents.
- 2.06 **ADDENDA:** Any addenda to the Drawings or Project Manual issued before or during the time of bidding shall be included in the proposal and become a part of the Contract. The Proposal Form will have ample space to indicate the receipt of addenda. When completing the Proposal Form, the Bidder shall list the Addendum number in spaces provided.
- 2.07 **BIDDER IDENTIFICATION:**
- A. **Signature:** The Proposal Form shall be signed by any individual authorized to enter into a binding agreement for the Business making the bid proposal.
  - B. **Name of Business:** The name appearing on the Proposal Form should be the complete spelling of bidder's name exactly as recorded at the Secretary of State, which should also be the same as at the Mississippi State Board of Contractors.
  - C. **Legal Address:** The address appearing on the Proposal Form should be the same address as recorded at the Secretary of State, which should also be the same as at the Mississippi State Board of Contractors.
  - D. **Certificate of Responsibility Number(s):** The Certificate of Responsibility Number(s) appearing on the Proposal Form should be the same number appearing in the current Mississippi State Board of Contractors Roster.
- 2.08 **BID SECURITY:** The Bid Security shall be in the form of a Bid Bond, or a Certified Check:
- A. **Bid Bond:** The Bidder may submit a Bid Bond by a Surety licensed in Mississippi in the amount of five percent (5%) of the base bid. The Bid Bond shall be duly executed by the Bidder, a Mississippi Licensed Agent for said Surety approved by the Mississippi Insurance Department OR signed by the Surety AND countersigned by a Mississippi

### Division 0

Licensed Agent for said Surety approved by the Mississippi Insurance Department <https://www.mid.ms.gov> (or most up-to-date link) (No standard form is required for the Bid Bond.) Where bid is to be submitted electronically, a scanned copy of bid bond is acceptable.

B. **Certified Check:** The Bidder may submit a certified check made out to the *Bureau of Building, Grounds and Real Property Management* in the amount of five percent (5%) of the base bid. All checks received from Bidders will be returned upon request, unless a Bidder is one (1) of the three (3) apparent low Bidders. The three (3) apparent low Bidder's checks will be held for forty-five (45) days, unless a Contract is awarded and executed in less time. Where bid is to be submitted electronically, certified check must be physically delivered to the address indicated on the Advertisement for Bids prior to the time and date stated.

2.09 **POWER OF ATTORNEY:** Each bid security must be accompanied by an appropriate Power of Attorney. No Power of Attorney is necessary with a certified check.

### PART 3 - SUBMITTING THE PROPOSAL FORM

3.01 **SUBMITTAL:** A bid must be either submitted electronically via MAGIC or physically delivered to the address indicated on the Advertisement for Bids prior to the time and date stated.

A. **Physical Submittal:** If physically submitted, only one original of Bid Proposal shall be submitted which should be sealed in an opaque envelope marked, mailed or hand-delivered as shown below. If the Bid is mailed, the bid envelope shall be placed inside a second envelope to prevent inadvertent premature opening of the Proposal.

*(In upper left hand corner)*

**Name of Firm** (complete spelling of bidder's name and address – exact as recorded at the Secretary of State which should be the same as you applied for at the Mississippi State Board of Contractors)

*(Bid shall be addressed and delivered to)*

Bureau of Building, Grounds and Real Property Management  
501 North West Street, Suite 1401B [Woolfolk Building]  
Jackson, Mississippi 39201

*(In lower left hand corner)*

Bid for Project # \_\_\_\_\_

Title \_\_\_\_\_

Using Agency \_\_\_\_\_

Certificate of Responsibility # \_\_\_\_\_ (for over \$50,000.00)

Under \$50,000.00 (add statement)

B. **Electronic Submittal:** Bidders must be registered prior to submitting bids electronically. It is the responsibility of the Bidder to allow sufficient time to complete or confirm such registration before the date and time established to receive bids. Information on registration and bidding electronically may be found at [www.dfa.ms.gov/dfa-offices/mrms/mississippi-suppliers-vendors](http://www.dfa.ms.gov/dfa-offices/mrms/mississippi-suppliers-vendors). For further assistance e-mail [mash@dfa.ms.gov](mailto:mash@dfa.ms.gov) OR call (601) 359-1343, Option 2. If a Bidder desires to receive system generated Construction Bid Notices for future Bureau of Building, Grounds and Real Property Management opportunities, use Product Code 90922.

3.02 **MODIFICATION TO BID:** A bidder may only modify the bid prior to the scheduled closing time indicated in the Advertisement for Bids in the following manner:

A. **Physical Bid:** A modification may be written on the outside of the sealed envelope containing the bid.

B. **Electronic Bid:** Information and attachments may be modified and re-submitted via MAGIC.

3.03 **WITHDRAWAL OF BID:** Any bid may be withdrawn prior to the scheduled time for opening of bids. However, after the scheduled opening, bids may not be withdrawn until forty-five (45) calendar days after bid opening.

## Division 0

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## PART 4 - BID OPENING AND AWARD OF CONTRACT

- 4.01 **OPENING OF BIDS:** Bids will be publicly opened shortly after the time stated in the Advertisement for Bids. Bidder representatives are invited; however, attendance is not mandatory. Closure of agency preventing the opening of bids at the advertised date and time due to Force Majeure Event reasons will result in bids being received and publicly opened by the next business day that the agency shall be open and at the previously advertised time unless an Addendum is issued. Physical Bids without a Certificate of Responsibility on the outside of the envelope, or a statement indicating bid is under \$50,000.00, will not be opened. Electronic Bids where Certificate of Responsibility or statement indicating bid is under \$50,000.00 is not entered as response to required question, will not be considered.
- 4.02 **IRREGULARITIES:** The omission of any information requested on the Proposal Form may be considered as an informality, or irregularity, by the awarding public body when in their opinion the omitted information does not alter the amounts contained in the submitted bid proposal, or place other Bidders at a disadvantage.
- 4.03 **PROTEST:** Any protest must be delivered in writing to the Owner within twenty-four (24) hours after the bid opening.
- 4.04 **ERRORS:** Any claim of error and request for release from bid must be delivered in writing to the Owner within twenty-four (24) hours after the bid opening. The Bidder shall subsequently and promptly provide sufficient documentation with the written request clearly proving an error was made. Failure to provide such documentation adequate to prove an error may result in forfeiture of Bid Security to the Owner.
- 4.05 **AWARD OF CONTRACT:** The Owner reserves the right to reject any or all bids. A Contract will be awarded (subject to receipt of an executable contract) on the basis of the lowest, responsive, responsible base bid, or lowest combination of base bid and those alternates selected by the Owner generally in the order listed unless a different order is determined to be in the best interest of the Using Agency and/or Owner and which produces a total within available funds. Where such bidder fails to enter into a contract, the Owner reserves the right to award to the next lowest responsive, responsible bidder or resolicit the project.
- 4.06 **FAILURE TO ENTER INTO A CONTRACT:** The Bidder shall forfeit the Bid Security to the Owner as liquidated damages for any of the following reasons:
- A. Prior to award, failure, or refusal, to furnish the names, classifications and COR #s of Sub-Contractors over Fifty Thousand Dollars (\$50,000.00) as well as entities who are to furnish materials or equipment fabricated to a special design within three (3) working days after receipt of Notice of Intent to Award the Contract.
  - B. Prior to award, failure, or refusal, to furnish substitute acceptable Sub-Contractors or entities within five (5) working days of when the Owner or Prime Professional has made reasonable objection to those initially submitted.
  - C. Following Notice of Award (subject to executable contract), failure, or refusal, to execute and deliver the Form of Agreement Between the Owner and the Contractor, the Performance and Payment Bond, and the Certificate of Insurance within ten (10) working days after receipt of same from the Professional.
- 4.07 **SECURITY FOR FAITHFUL PERFORMANCE:** Simultaneously, with delivery of the executed Contract, the Contractor will furnish a Surety Bond, or Bonds, as security for faithful performance, the payment of all persons performing labor on the project, and furnishing materials in connection with this Contract. The Surety on such Bond, or Bonds, will be a duly authorized surety company satisfactory to the Owner and meeting all of the following requirements:
- A. Licensed at the time of award by the State of Mississippi's Commissioner of Insurance for the purpose of providing surety. <https://www.mid.ms.gov> (or most up-to-date link)
  - B. Listed at the time of award in the Department of the Treasury's **Federal Register** as a company holding certificates of authority as acceptable sureties on Federal Bonds, commonly referred to as the Treasury List.
  - C. All Bonds shall be executed on the form provided in the Project Manual under Section 00 6100 entitled *Contract Bond*.
  - D. The Contract Bond shall be duly executed by the Bidder, a Surety licensed in Mississippi signed by a Mississippi Licensed Agent for said Surety approved by the Mississippi Insurance Department OR signed by the Surety AND countersigned by a Mississippi Licensed Agent for said Surety approved by the Mississippi Insurance Department with the name and address typed (or lettered legibly), and Surety Seal (preferably embossed). <https://www.mid.ms.gov> (or most up-to-date link)
  - E. All Bonds must be accompanied by an appropriate Power of Attorney dated same as Contract Bond and sealed (preferably embossed seal).

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### Division 0



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**PART 5 - BIDDER'S CHECKLIST**

The following checklist is for the Bidder's assistance only. It is not inclusive and does not have to be included with the Proposal Form when submitting a bid proposal.

- 5.01     **PROPOSAL FORM:** (only one original proposal form to be submitted)  
          **Base Bid**  
          ( ) Write in the amount of the base bid in words and numbers. In the case of a conflict, the written word shall govern.
- Alternates**  
          ( ) Write in each alternates amount in words and numbers. In the case of a conflict, the written word shall govern.
- Addenda**  
          ( ) Acknowledge the receipt of each addendum by writing in the number of the addendum.
- Acceptance**  
          ( ) Proposal is signed by authorized person  
          ( ) Name of Business - complete spelling of bidder's name and address - exact as recorded at the Secretary of State [<http://www.sos.state.ms.us/busserv/corp/soskb/csearch.asp> ] which should be the same as you applied for at the Mississippi State Board of Contractors [<http://www.msbc.us/Search2.CFM> ]  
          ( ) Legal address of the business listed above (at SOS and Contractor's Board)  
          ( ) Correct Certificate of Responsibility Number(s) as it appears in the current MS State Board of Contractors Roster
- Certificate of Responsibility Number(s)**  
          ( ) Base Bid is under \$50,000 and no number is required AND the statement "bid does not exceed \$50,000" is on the outside of the sealed envelope or statement included with electronic bid  
**OR** ( ) Base Bid is \$50,000 or more and number is required and is on the outside of the sealed envelope or included with electronic bid  
          ( ) Joint Venture and *joint venture* number is required  
**OR** ( ) Joint Venture participants' numbers are required
- 5.02     **BID SECURITY:**  
          ( ) Included Bid Bond  
**OR** ( ) Included Certified Check
- 5.03     **POWER OF ATTORNEY:**  
          ( ) Included Power of Attorney
- 5.04     **NON-RESIDENT BIDDER:**  
          ( ) Attached a Copy of Non-Resident Bidder's Preference Law  
**OR** ( ) Attached a Statement
- 5.05     **SUB-CONTRACTORS NAME:**  
          ( ) List any Mechanical, Plumbing, and/or Electrical Sub-Contractors regardless of cost.  
          \* List name even for under \$50,000 (see 5.06 regarding COR)  
          \* Fire Protection Sprinkler Contractors do not have to be listed  
          \* If there is a separate HVAC/Plumbing Sub-Contractor, so notate as mentioned herein  
          \* If Mechanical, Plumbing, and/or Electrical Sub-Contractor is performed by the General, be sure the General has a COR for said discipline  
          \* If there is no Mechanical, Plumbing, and/or Electrical Sub-Contractor listed, then use of Sub-Contractor to perform such scope will not be permitted.
- 5.06     **SUB-CONTRACTORS' COR NUMBER**  
          ( ) \* List Certificate of Responsibility Number for any listed Sub-Contractor over \$50,000.00

\*\*\* END OF SECTION \*\*\*

**Division 0**



**PROPOSAL FORM**  
**SECTION 00 4200**

To: Bureau of Building, Grounds and Real Property Management  
501 North West Street, Suite 1401B [Woolfolk Building]  
Jackson, Mississippi 39201

Re: Project # \_\_\_\_\_  
Project Title \_\_\_\_\_  
Location \_\_\_\_\_

I propose to complete all work in accordance with the Project Manual and Drawings within \_\_\_\_\_ consecutive calendar days for the sum of: (Professional must specify number of days)

**BASE BID:** (Write in the amount of the base bid in words and numbers. In case of conflict, the written word governs.)

Words: \_\_\_\_\_ Dollars (\$ \_\_\_\_\_)

**ALTERNATES:** (Write in the amount of all of the alternates in words and numbers. In case of conflict, the written word governs.)

**Alternate #1** ( ) Adds ( ) Deducts  
Words: \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_)  
Description \_\_\_\_\_

**Alternate #2** ( ) Adds ( ) Deducts  
Words: \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_)  
Description \_\_\_\_\_

**Alternate #3** ( ) Adds ( ) Deducts  
Words: \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_)  
Description \_\_\_\_\_

**Alternate #4** ( ) Adds ( ) Deducts  
Words: \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_)  
Description \_\_\_\_\_

**Alternate #5** ( ) Adds ( ) Deducts  
Words: \_\_\_\_\_ Dollars  
(\$ \_\_\_\_\_)  
Description \_\_\_\_\_



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**ADDENDA ACKNOWLEDGMENT:** (modified dates August 2016)

No. \_\_\_\_\_ No. \_\_\_\_\_ No. \_\_\_\_\_  
No. \_\_\_\_\_ No. \_\_\_\_\_ No. \_\_\_\_\_

**ACCEPTANCE:**

I certify that I am authorized to enter into a binding contract, if this Proposal is accepted.

Signature \_\_\_\_\_ Date \_\_\_\_\_  
Name and Title \_\_\_\_\_  
Name of Business \_\_\_\_\_

Complete spelling of bidder's name and address - **exact as recorded at the Secretary of State**

[<http://www.sos.state.ms.us/busserv/corp/soskb/csearch.asp> ] which should be the same as you applied for at the Mississippi State Board of

Contractors [<http://www.msdoc.us/Search2.CFM> ] (see 2.07, 3.01, 5.01) **PLEASE LOOK IT UP at SoS. SoS rules when the 2 are different.**

Address \_\_\_\_\_ (mailing)  
Address \_\_\_\_\_ (physical)  
City/State/Zip Code \_\_\_\_\_ County \_\_\_\_\_  
Phone \_\_\_\_\_ Fax \_\_\_\_\_ Email \_\_\_\_\_

- **BIDDER'S CERTIFICATE OF RESPONSIBILITY NUMBER(S):** \_\_\_\_\_
- **MINORITY BUSINESS ENTERPRISE?** Yes \_\_\_\_\_ No \_\_\_\_\_ (to assist with Code 57-1-57)

- 
- Attach copy of Non-Resident Bidder's Preference Law (5.04 of Bidder's Checklist)

- 
- **Mechanical / Plumbing / Electrical Contractors:** (modified Dec 2013 SoS per 10/17/12 Addendum 1 & Feb 2014; 021219 sub over \$50,000.00; modified 04/06/2020)

Regarding said Divisions of the Specifications of the BoB Standard Form of Agreement Between The Owner and The Contractor: List any Mechanical/Plumbing and/or Electrical Sub-Contractors that will perform work of this contract; regardless of cost even for under \$50,000.00. COR must be included where sub-contract exceeds \$50,000.00. If no sub-contractor is listed, and such work is within scope of contract and over \$50,000.00, bidder's own COR classification(s) must be sufficient to self-perform any such work. If no sub-contractor is listed, then use of sub-contractor to perform such scope will not be permitted. This is in accordance with 5.05 and 5.06 of the Bidder's Checklist.

Mechanical Contractor: \_\_\_\_\_ Certificate of Responsibility No. \_\_\_\_\_  
Plumbing Contractor: \_\_\_\_\_ Certificate of Responsibility No. \_\_\_\_\_  
Electrical Contractor: \_\_\_\_\_ Certificate of Responsibility No. \_\_\_\_\_

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**STANDARD FORM OF AGREEMENT BETWEEN  
THE OWNER AND THE CONTRACTOR SECTION  
00 5200**

This Agreement made the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ between the Owner,

Bureau of Building, Grounds and Real Property Management  
501 North West Street, Suite 1401B [Woolfolk Building]  
Jackson, Mississippi 39201

created by Section 7-1-451 et seq., and Section 31-11-1, et seq., **Mississippi Code of 1972, Annotated**, and acting for the State of Mississippi;  
and between the Contractor:

Business Name \_\_\_\_\_  
Address \_\_\_\_\_  
City/State/Zip \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

The Contractor is a (check and complete one of the following):

\_\_\_\_\_  CORPORATION or  LLC solely organized and existing under the laws of the State of \_\_\_\_\_  
and having its principal office in \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_  
(City) (County) (State)

\_\_\_\_\_ PARTNERSHIP of the following (list all partners):  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_ SOLE PROPRIETORSHIP

For the following Project:

GS#

This Agreement entered into as of the day and year first written above:

OWNER: BUREAU OF BUILDING, GROUNDS AND  
REAL PROPERTY MANAGEMENT

CONTRACTOR:

By: \_\_\_\_\_  
(Signature)

By: \_\_\_\_\_  
(Signature)

Adrian Massey, Director  
(Name and Title)

\_\_\_\_\_  
(Name and Title)

APPROVED AS TO FORM:

By: \_\_\_\_\_  
(Signature of Attorney)

THE OWNER AND THE CONTRACTOR AGREE AS SET FORTH IN PAGES ONE THROUGH THREE, ARTICLES ONE THROUGH FIVE, AS FOLLOWS:





**ARTICLE 1: THE WORK AND CONTRACT DOCUMENTS**  
**THE WORK**

1.1.1 The Contractor will perform all the work required by the Contract Documents for the Project indicated above.

**1.2 THE CONTRACT DOCUMENTS**

1.2.1 The Contract Documents which constitute the entire Agreement between the Owner and the Contractor, are enumerated as follows:

1.2.2 Project Manual dated \_\_\_\_\_

**BIDDING REQUIREMENTS**

- Advertisement for Bids
- Instructions to Bidders
- Proposal Form

**STANDARD FORM OF AGREEMENT BETWEEN THE OWNER AND THE CONTRACTOR**

**CONTRACT BOND**

**POWER OF ATTORNEY**

**CERTIFICATE OF INSURANCE**

**CONDITIONS OF THE CONTRACT**

- General Conditions
- Supplementary Conditions
- Labor Requirements
- Addenda

**SPECIFICATIONS (check the specs listed on the contents and included in the manual)**

- |  |  |
|--|--|
| <input type="checkbox"/> Division 1: General Requirements            | <input type="checkbox"/> Division 26: Electrical   |
| <input type="checkbox"/> Division 2: Existing Conditions             | <input type="checkbox"/> Division 27: Communications   |
| <input type="checkbox"/> Division 3: Concrete                        | <input type="checkbox"/> Division 28: Electronic Safety and Security                                       |
| <input type="checkbox"/> Division 4: Masonry                         | <input type="checkbox"/> Division 31: Earthwork  |
| <input type="checkbox"/> Division 5: Metals                          | <input type="checkbox"/> Division 32: Exterior Improvements  |
| <input type="checkbox"/> Division 6: Wood, Plastics and Composites   | <input type="checkbox"/> Division 33: Utilities  |
| <input type="checkbox"/> Division 7: Thermal and Moisture Protection | <input type="checkbox"/> Division 34: Transportation   |
| <input type="checkbox"/> Division 8: Openings                        | <input type="checkbox"/> Division 35: Waterway and Marine Construction                                     |
| <input type="checkbox"/> Division 9: Finishes                        | <input type="checkbox"/> Division 40: Process Interconnections   |
| <input type="checkbox"/> Division 10: Specialties                    | <input type="checkbox"/> Division 41: Material Processing and Handling Equipment                           |
| <input type="checkbox"/> Division 11: Equipment                      | <input type="checkbox"/> Division 42: Process Heating, Cooling, and Drying Equipment                       |
| <input type="checkbox"/> Division 12: Furnishings                    | <input type="checkbox"/> Division 43: Process Gas and Liquid Handling, Purification, and Storage Equipment |
| <input type="checkbox"/> Division 13: Special Construction           | <input type="checkbox"/> Division 44: Pollution and Waste Control Equipment                                |
| <input type="checkbox"/> Division 14: Conveying Equipment            | <input type="checkbox"/> Division 45: Industry-Specific Manufacturing Equipment                            |
| <input type="checkbox"/> Division 21: Fire Suppression               | <input type="checkbox"/> Division 46: Water and Wastewater Equipment                                       |
| <input type="checkbox"/> Division 22: Plumbing                       | <input type="checkbox"/> Division 48: Electrical Power Generation  |
| <input type="checkbox"/> Division 23: HVAC                           |  |
| <input type="checkbox"/> Division 25: Integrated Automation          |  |

**1.2.3 Addenda**

- Addendum No. 1, dated \_\_\_\_\_
- Addendum No. 2, dated \_\_\_\_\_
- Addendum No. 3, dated \_\_\_\_\_
- Addendum No. 4, dated \_\_\_\_\_
- Addendum No. 5, dated \_\_\_\_\_

**1.2.4 Drawings dated \_\_\_\_\_**

- |                                |                                |
|--------------------------------|--------------------------------|
| Sheets No. _____ through _____ | Sheets No. _____ through _____ |
| Sheets No. _____ through _____ | Sheets No. _____ through _____ |
| Sheets No. _____ through _____ | Sheets No. _____ through _____ |
| Sheets No. _____ through _____ | Sheets No. _____ through _____ |
| Sheets No. _____ through _____ | Sheets No. _____ through _____ |
| Sheets No. _____ through _____ | Sheets No. _____ through _____ |

1.2.5.1 Other documents, dated \_\_\_\_\_  
\_\_\_\_\_



**ARTICLE 2: CONTRACT SUM**

**2.1 CONTRACT SUM**

2.1.1 The Owner will pay the Contractor in current funds for the performance of the work, subject to additions and deductions by Change Order as provided in the Contract Documents, the Contract sum of \_\_\_\_\_ Dollars

(\$ \_\_\_\_\_). The Contract sum is determined as follows:

Base Bid		\$ _____
Modifications	( ) Adds ( ) Deducts	\$ _____
Negotiations		\$ _____
Alternate No. _____	( ) Adds ( ) Deducts	\$ _____
Alternate No. _____	( ) Adds ( ) Deducts	\$ _____
Alternate No. _____	( ) Adds ( ) Deducts	\$ _____
Alternate No. _____	( ) Adds ( ) Deducts	\$ _____
Alternate No. _____	( ) Adds ( ) Deducts	\$ _____
<b>Total Contract Sum</b>		\$ _____

**2.2 LIQUIDATED DAMAGES**

2.2.1 The stipulated liquidated damages described in Paragraph 9.11 of the *Supplementary Conditions* are in the amount of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) for each calendar day.

**ARTICLE 3: CONTRACT TIME**

**3.1 TIME**

3.1.1 The work to be performed under this Contract shall be commenced upon the date stated in the *Notice to Proceed*. The work is to be substantially complete, subject to approved Change Orders, no later than \_\_\_\_\_ calendar days from the date stated in the *Notice to Proceed*.

**ARTICLE 4: PAYMENTS AND FINAL PAYMENTS**

**4.1 PROGRESS PAYMENTS**

4.1.1 Based upon applications for payment submitted to the Professional by the Contractor and *Certificates for Payment* issued by the Professional, the Owner will make progress payments on account of the Contract sum to the Contractor as provided in the Contract Documents.

**4.2 FINAL PAYMENT**

4.2.1 Final payment constituting the entire balance of the Contract sum will be paid by the Owner to the Contractor when the work has been completed, the Contract fully performed and a final Certificate for Payment has been issued by the Professional and approved by the Owner.

**ARTICLE 5: MISCELLANEOUS PROVISION**

**5.1 DEFINITION OF TERMS**

5.1.1 Terms used in this Agreement which are defined in the General, Supplementary, and Special Conditions of the Contract will have the meanings designated in those Conditions.

**5.2 CONTRACTOR'S INTEREST IN AGREEMENT**

5.2.1 The Contractor will not assign, sublet, or transfer the interest in this Contract agreement without the written consent of the Owner. The Owner and Contractor hereby agree to the full performance of the covenants contained herein.

**5.3 PROFESSIONAL**

5.3.1 The Professional assigned to this Project is as follows:

Name \_\_\_\_\_  
Address \_\_\_\_\_  
Telephone \_\_\_\_\_ Fax Number \_\_\_\_\_ E-Mail Address \_\_\_\_\_

\*\*\* END OF SECTION \*\*\*



**CONTRACT BOND**  
**SECTION 00 6100**

**I. PREAMBLE**

KNOW ALL MEN BY THESE PRESENTS: THAT \_\_\_\_\_,  
Principal, a \_\_\_\_\_, residing at \_\_\_\_\_,  
authorized to do business in the State of Mississippi under  
the laws thereof, and \_\_\_\_\_ Surety, a corporation of the State of  
\_\_\_\_\_, authorized to do business in the State of Mississippi under the laws thereof, are held and firmly bound  
unto the Bureau of Building, Grounds and Real Property Management of the State of Mississippi, Obligee, hereinafter referred to as "Owner," for the  
use and benefit of the Owner and those claimants and others set forth hereinbelow and described in Sections 31-5-51 and 31-5-3, **Mississippi Code  
of 1972, Annotated**, as amended, in the amount of \_\_\_\_\_  
Dollars (\$ \_\_\_\_\_), lawful  
money of the United States, for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and  
assigns, jointly and severally, firmly by these present.

WHEREAS, Principal has by written agreement dated \_\_\_\_\_, 20\_\_\_\_\_, entered into a Contract with the  
Owner for the following:

\_\_\_\_\_  
\_\_\_\_\_

as provided in said Contract and in accordance with the Contract Documents. All of the terms and provisions of the above mentioned Contract,  
drawings, Project Manual, and addenda are by reference made a part hereof and fully incorporated herein, and are hereinafter referred to as "the  
Contract." All of the terms and provisions of Sections 31-5-51, 31-5-3, supra, Section 31-5-53 of the **Mississippi Code of 1972, Annotated**, as  
amended, and all other code sections cited herein are also by reference made a part hereof and fully incorporated herein.

**II. PERFORMANCE BOND**

NOW, THEREFORE, the condition of this Performance Bond is such that if Principal shall promptly and faithfully perform said Contract, then this  
obligation shall be null and void; otherwise, it shall remain in full force and effect, subject however, to the following conditions:

Whenever the Owner has performed its obligation but the Principal has defaulted under the terms of the Contract, or any portion thereof, and the  
Owner has declared the Principal to be in default, the Surety shall promptly:

1. Remedy the default, or
2. Complete the Contract in accordance with its terms and conditions, or
3. Procure the completion of the Contract in accordance with its terms and conditions.

Even if there should be a succession of defaults, the Surety is responsible for completion of the Contract. The Surety shall provide sufficient funds to  
pay the cost of completion of the Contract in its entirety including other costs and damages for which the Surety may be liable thereunder, less the  
balance of the Contract price. The term "balance of the Contract price," as used in this paragraph, shall mean the total amount payable by Owner to  
Principal under the Contract and any Change Orders thereto, less the amount paid by Owner to Principal.

**III. LABOR AND MATERIAL PAYMENT BOND**

NOW, THEREFORE, the condition of this Labor and Material Payment Bond is such that if Principal shall promptly make payments to all persons  
supplying labor or material used in the prosecution of the work under said Contract, then this obligation shall be null and void; otherwise, it shall  
remain in full force and effect; however, the Owner shall not be liable for the payment of any costs or expenses of any suit described in Subsection (2)  
of Section 31-5-51, supra.



**IV. BOND FOR PAYMENT OF TAXES AND OTHER ASSESSMENTS**

NOW THEREFORE, the condition of this Bond for Payment of Taxes and Other Assessments is such that if Principal shall promptly make payment of all taxes, licenses, assignments, contributions, damages, penalties, and interest thereon, when and as the same may lawfully be due the State of Mississippi, or any County, Municipality, Board, Department, Commission, or political subdivision thereof, by reason of and directly connected with the performance of said Contract or any part thereof as provided by Sections 27-65-1, 27-65-21, 27-67-1, and 31-5-3, **Mississippi Code 1972, Annotated**, or any other applicable statute or other authority, then this obligation shall be null and void; otherwise, it shall remain in full force and effect.

**V. GENERAL CONDITIONS**

The following conditions apply to all three (3) of the above-mentioned Bonds:

1. The Performance Bond is for an amount equal to the full amount of said Contract.
2. The Labor and Material Payment Bond is for an amount equal to the full amount of said Contract.
3. If any changes are made in the work, or any extensions of time are granted, or any increases in the total dollar amount of the Contract are made, such changes, extensions, increases, or other forbearance on the part of either the Owner or the Principal will not, in any way, release the Principal and Surety, or either of them, from their liability hereunder, or any portion thereof, notice to the Surety of any such change, extension, increase, or forbearance being expressly waived.
4. These Bonds are governed by and shall be construed in accordance with Mississippi law. Any inconsistency with these Bonds and any provision of Mississippi law shall be remedied by deleting the inconsistent portion of these Bonds and leaving the remaining consistent portions in full force and effect.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

SURETY \_\_\_\_\_  
Mississippi NAIC number: \_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
Attorney-in-Fact  
(Typed Name) (Title)

Surety Agent MS Ins Dept License Number: \_\_\_\_\_  
(Leave blank if you do not have a Mississippi #)

\_\_\_\_\_  
(Surety Address)

\_\_\_\_\_  
(Surety City/State/Zip/Phone)

MISSISSIPPI LICENSED AGENT COMPANY NAME

\_\_\_\_\_  
(add MS Licensed Agent address below)

COUNTERSIGNED: (if Surety Agent above is NOT MS Licensed)

(Signature) \_\_\_\_\_

\_\_\_\_\_  
Licensed Mississippi Agent  
(Typed Name) (Title)

Countersignature Agent MS License Number: \_\_\_\_\_

\_\_\_\_\_  
(MS Licensed Agent Address)

\_\_\_\_\_  
(MS Licensed Agent City/State/Zip/Phone)

PRINCIPAL \_\_\_\_\_

By: \_\_\_\_\_  
(Signature) (same person on Bond and Contract page)

\_\_\_\_\_  
(Typed Name and Title)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(City/State/Zip/Phone)

Surety Company, Surety Agent's Name, Address, etc. should be typed and with seal (preferably embossed seal) on Bond and P/A. The P/A should be for the Attorney-in-Fact with seal (preferably embossed seal).

The Contract Bond shall be duly executed by the Bidder AND a MS Licensed Agent said Surety approved by the MS Ins Dept  
OR  
signed by the Surety's Agent AND countersigned by a MS Licensed Agent for said Surety approved by the MS Ins Dept.

Countersignature, when signed, can be the same as the Attorney-in-Fact when the Attorney-in-Fact and/or Surety IS licensed in Mississippi. Countersignature will be different when the Attorney-in-Fact and/or Surety is "not" licensed in Mississippi. P/A will be for the Attorney-in-Fact.

Check the Surety Company AND the Surety Agent  
AND/OR the Countersignature Company and/or Agent at MS Ins Dept web:  
<https://www.mid.ms.gov> (or most up-to-date link)

Easier to locate Agent at MID when name agrees with MID licensed name.)

(Bond Agent MID or Code requirements are different from the Ins Cert Agent MID or Code requirements.)





# CERTIFICATE OF INSURANCE

## SECTION 00 6216

This certificate of insurance neither affirmatively nor negatively amends, extends, or alters the coverage afforded by the policies below.

<b>INSURED:</b> (Contractor's Name & Address)				<b>COMPANIES PROVIDING COVERAGE w/ MID Lic or NAIC #</b>			
				<b>A</b>	#		
				<b>B</b>	#		
				<b>PROJECT:</b> (Number, Name & Location)		<b>C</b>	#
						<b>D</b>	#
						<b>E</b>	#
				<b>OWNER:</b> Bureau of Building, Grounds & Real Property Management		<b>F</b>	#
<b>G</b>	#						
				Companies above must be approved by the MS Ins Dept at <a href="https://www.mid.ms.gov">https://www.mid.ms.gov</a> (or most up-to-date link) per Code & WComp at <a href="http://www.mwcc.ms.gov">http://www.mwcc.ms.gov</a> (MID mod'd 041615)			
Type Insurance	Co	Policy Number	Policy Period	Coverage and Minimum Amount			
General Liability Commercial General Liability				General Aggregate	\$ 1,000,000		
				Products Comp/Ops (Aggregate)	\$ 1,000,000		
				Personal Injury (Per Occurrence)	\$ 500,000		
				BI & PD (Per Occurrence)	\$ 1,000,000		
				Fire Damage (Per Fire)	\$ 50,000		
				Medical Expense (Per Person)	\$ 5,000		
Owners/Contractors Protective Liability				General Aggregate	\$ 1,000,000		
				Per Occurrence	\$ 500,000		
Automobile Liability				Bodily Injury/Property Damage Combined Single Limit (Per Occurrence)	\$ 500,000		
				<b>OR</b> Bodily Injury (Per Person)	\$ 250,000		
				Bodily Injury (Per Accident)	\$ 500,000		
				Property Damage (Per Occurrence)	\$ 100,000		
* Excess Liability (Umbrella on projects over \$500,000)				Aggregate	\$ 1,000,000		
				Per Occurrence	\$ 1,000,000		
MS Workers' Compensation (As required by Statute) Employers' Liability				Accident (Per Occurrence)	\$ 100,000		
				Disease-Policy Limit	\$ 500,000		
				Disease-Per Employee	\$ 100,000		
Property Insurance (not required when project is demolition ONLY – required for ALL other projects including paving)				<b>OR</b> Builders' Risk	Must be equal to		
				Installation Floater	Value of Work		
Other							
Certification: I certify that these policies (subject to their terms, conditions and exclusions) have been (1) issued to the Insured for the coverages and at least the amounts as indicated by companies licensed in Mississippi; (2) countersigned by a Mississippi Licensed Agent; and (3) endorsed to require the company to give thirty (30) days written notice to the Owner prior to cancellation or non-renewal of above.							
<b>Producing Agent:</b> (Name, Address and Telephone)				(Signature) (Date) MID Lic # or countersign below			
				(Name and Title of Authorized Representative) (typed)			
				Agent must be approved by the MS Ins Dept or countersign <a href="https://www.mid.ms.gov">https://www.mid.ms.gov</a>			

Check if Mississippi Licensed Agent  
OR Countersign by Mississippi Licensed Agent      MID Lic # \_\_\_\_\_

### Division 0



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# CERTIFICATE OF INSURANCE INSTRUCTIONS

## SECTION 00 6217

1. The *Certificate of Insurance* is a tabulation of insurance required for this Project as specified in Article 11 entitled *Insurance and Bonds* in the General Conditions (AIA Document A201, Sixteenth Edition, 2007).
2. The *Certificate of Insurance* must be completed, certified by the original signature of a Mississippi Licensed Insurance Agent and/or countersignature, dated, and bound in each set of the Contract Documents. Insurance Companies providing coverage and Agent and/or Countersignature Agent must be approved by the Mississippi Insurance Department on their web at . [http://www.mid.state.ms.us/licapp/search\\_main.aspx](http://www.mid.state.ms.us/licapp/search_main.aspx) <https://www.mid.ms.gov> (or most up-to-date link). (Agent does not have to be on the MID web “for providers necessarily” – but must be an approved Agent on MID web. Easier to locate Agent at MID when name agrees with MID licensed name.)
3. Indicate Insured, Project, Companies providing coverage, policy numbers and policy periods in the blanks as applicable.
4. If the "OWNERS/CONTRACTORS PROTECTIVE LIABILITY" insurance is part of the Commercial General Liability Insurance Policy, or included by endorsement, indicate the policy number and period of the CGL policy in the "OWNERS/CONTRACTORS PROTECTIVE LIABILITY" blank spaces.
5. Automobile Liability Insurance may be provided which covers Bodily Injury and Property Damage in one (1) Combined Single Limit, or may be provided with separate minimum limits as shown on the Certificate of Insurance and specified in Article 11 of the Supplementary Conditions. The person signing the Certificate of Insurance should show which option the Contractor has selected by marking out the coverage that is not provided under the policies indicated.
6. OTHER INSURANCE (if required) will be indicated by typing in the "OTHER" block and detailed in Article 11 of the Supplementary Conditions.
7. CERTIFICATION wording may not be changed without specific written approval from the Owner. (nor on any other Owner documents herein, even beyond Insurance Certificate)
8. "Riders", Binders, TBA, TBD, or other unsolicited attachments, are not allowed as part of the *Certificate of Insurance* unless specifically requested in writing by the Owner, or specified as part of the requirements for this Project. (nor on any other Owner documents herein, even beyond Insurance Certificate)
9. CAUTION: The *Certificate of Insurance* is intended to be used for all Projects. The Contractor must provide all insurance specified in the Contract Documents for this Project, whether indicated on this form, or not. The Contractor must verify all insurance has been provided as required.
10. In accepting the Insurance Certificate by Owner, it would be helpful if some indication is given when, and if, the Provider is a Surplus Line Carrier, a Broker, or Self Insured (because they may not be on the MID web list referenced herein). (The Owner will have to ask MID (or know) at some point.)
11. The Workers Comp insurance provider must be approved and show up on the Workers Comp web at <http://www.mwcc.state.ms.us> / Services / Proof of Coverage Inquiry / accept / etc. and at the last step – enter the “contractor’s name”.

Note: Regarding #2 and #11. At the MID web – you enter the Surety Company / Provider / Agent. At the MWCC web - You enter the Vendor’s name, then click on the policy number to see the MWCC Ins Provider.

\*\*\* END OF SECTION \*\*\*

### Division 0



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**AFFIDAVIT CERTIFYING  
PAYMENT TO ALL SUBCONTRACTORS  
SECTION 00 6300**

Department of Finance and Administration  
Bureau of Building, Grounds and Real Property Management

I acknowledge that, pursuant to Miss. Code Ann. §31-5-25 and H.B. 1562, Laws of 2002, that I am required to submit monthly certification indicating payments to subcontractors on prior payment requests. I, the undersigned Contractor, do hereby certify that I have paid the following amounts to subcontractors for Work which has been performed and incorporated into previous Applications for Payment which were issued and payment received from the Owner on the project listed below. I understand that this document must be submitted on a monthly basis after the submittal, approval and payment of Application for Payment #1. I understand that the Bureau of Building reserves the right to require me, the undersigned, to provide verification of payment and/ or additional information.

Project Number: \_\_\_\_\_

Project Name: \_\_\_\_\_

Using Agency: \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

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Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

Subcontractor: \_\_\_\_\_ Amount: \$ \_\_\_\_\_

(Attach additional list of subcontractors and amounts, if necessary)

Contractor Name and Title: \_\_\_\_\_

Contractor Certificate of Responsibility Number: \_\_\_\_\_

Contractor Signature: \_\_\_\_\_ Date: \_\_\_\_\_

---

STATE OF MISSISSIPPI

COUNTY OF \_\_\_\_\_

SWORN TO AND SUBSCRIBED BEFORE ME, the undersigned notary public,

this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

---

NOTARY PUBLIC

My Commission Expires:

\_\_\_\_\_





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**GENERAL CONDITIONS**  
**SECTION 00 7200**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. **SCOPE:** The **General Conditions of the Contract for Construction**, AIA Document A201, Seventeenth Edition, 2017, Articles 1 through 15 inclusive, is a part of this Contract and is incorporated herein.
- B. **BIDDING COPY:** For the purpose of bidding, Contractors are presumed to be familiar with AIA Document A201, a copy of which may be obtained from the Professional, or examined in the Professional's office.

**\*\*\* END OF SECTION \*\*\***

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**Division 0**



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**SUPPLEMENTARY CONDITIONS**  
**SECTION 00 7300**  
**PART 1 – GENERAL**

1.01 **Description**

- A. **Owner:** These supplements are necessary because the Owner is an agency, or political subdivision, of the State of Mississippi and occupies a different position from that of the usual Owner.
- B. **Document:** The following supplements modify, change, delete from, or add to the **General Conditions of the Contract**, AIA Document A201, Seventeenth Edition, 2017. When any Article of the **General Conditions** is modified, or deleted, by these *Supplementary Conditions*, the unaltered provisions of that Article, Paragraph, Subparagraph, or Clause will remain in effect.

**Article 1**  
**GENERAL PROVISIONS**

1.1 **Basic Definitions**

1.1.1 **The Contract Documents**

Change this subparagraph to read as follows:

*The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and Special Conditions), Drawings, Specifications and Addenda issued prior to the execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for minor changes in the Work issued by the Prime Professional. The Contract Documents also include the advertisement or invitation for bids or proposals, Instructions to Bidders, and the Contractor's bid or proposal.*

1.1.2 **The Contract**

Change each instance of the word "Architect" to "Prime Professional" and each instance of the word "Architect's" to "Prime Professional's".

1.1.7 **Instruments of Service**

Change the word "Architect" to "Prime Professional" and change the word "Architect's" to "Prime Professional's".

1.1.8 **Initial Decision Maker**

Change this Subparagraph to read as follows:

*The Initial Decision Maker is the person identified as the Professional in Paragraph 5.3.1 of the Standard Form of Agreement Between the Owner and the Contractor and will render initial decisions on Claims in accordance with Section 15.2.*

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**Division 0**

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- 1.1.9 Add a new Subparagraph as follows:

***Commissioning Authority Professional***

*A professional independent of the Prime Professional retained by the owner who manages a quality-focused process for enhancing the delivery of the project. The process focuses upon verifying and documenting that the facility and all of its systems are planned, designed, installed, tested, operated, and maintained to meet the Owner’s project requirements.*

- 1.2.1 Change this Subparagraph to read as follows:

*The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor and unless otherwise provided in the Contract Documents, this shall include all labor, materials, equipment, tools, machinery, water, heat, utilities, transportation, and other facilities and services, whether temporary or permanent and whether or not incorporated in the Work. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. In case of any direct conflict among the Contract Documents, the specifications shall take precedence over the drawings, supplemental or special conditions shall take precedence over more general conditions or requirements, details shall take precedence over plans, and larger scale drawings shall take precedence over smaller scale drawings.*

1.5 **Ownership and Use of Drawings, Specifications, and Other Instruments of Service**

- 1.5.1 Change each instance of the word “Architect” to “Prime Professional” and each instance of the word “Architect’s” to “Prime Professional’s” and add a new sentence at the end of this Subparagraph:

*This Paragraph in no way supersedes the Owner's document rights set forth in the separate Agreement Between the Owner and the Professional.*

- 1.5.3 Add a new Subparagraph as follows:

***Transparency***

*In accordance with the Mississippi Accountability and Transparency Act of 2008, §27-104-151, et seq., of the Mississippi Code of 1972, as Amended, the American Accountability and Transparency Act of 2009 (P.L. 111-5), where applicable, and §31-7-13 of the Mississippi Code of 1972, as amended, where applicable, a fully executed copy of this agreement shall be posted to the State of Mississippi's accountability website at: <https://www.transparency.mississippi.gov>*

1.6 **Notice**

- 1.6.1 Change this Subparagraph to read as follows:

*Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is address and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if transmitted to the government or business issued e-mail address of the respective party.*

1.7 **Digital Data Use and Transmission**

Delete the last sentence of this Paragraph.

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**Division 0**

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1.8 **Building Information Models Use and Reliance**

Change this Paragraph to read as follows:

*Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in a written documents shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.*

**Article 2**  
**OWNER**

2.1 **General**

2.1.1 Change this Subparagraph to read as follows:

*The Owner, as used in these Documents, refers to the Bureau of Building, Grounds and Real Property Management, acting for and on behalf of the State of Mississippi and for the benefit of the Institution, Agency, or Department for which the Work under this Contract is being performed. The Owner is the entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner's representative, who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization, is the individual who signed the Agreement Between the Owner and the Contractor, his successor in the case of that individual's retirement or termination, or his direct supervisor in the case of that individual's absence. Except as otherwise provided in Subparagraph 4.2.1, the Prime Professional does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.*

2.1.2 Delete this Subparagraph in its entirety.

2.2 **Evidence of the Owner's Financial Arrangements**

2.2.1 Delete this Subparagraph in its entirety.

2.2.2 Delete this Subparagraph in its entirety.

2.3.1 Delete this Subparagraph in its entirety.

2.2.3 Delete this Subparagraph in its entirety.

2.2.4 Delete this Subparagraph in its entirety.

2.3 **Information and Services Required of the Owner**

2.3.2 Add the word "or Engineer" following each instance of the word "Architect" and add the words "or engineering respectively" following each instance of the word "architecture".

2.3.3 Add the word "or Engineer" following each instance of the word "Architect".

2.3.6 Change this Subparagraph to read as follows:

*Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, such copies of Drawings and Project Manuals as are reasonably necessary, but in no instance to exceed twenty-five (25) copies, for the execution of the Work.*

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**Division 0**

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2.4 **Owner’s Right to Stop the Work**

Change this Subparagraph to read as follows:

*If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents as required by Section 12.2 or fails to carry out Work in accordance with the Contract Documents, the Owner may issue, or direct the Prime Professional to issue, a written order to the Contractor to stop the Work or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3. The rights and remedies under this Subparagraph are in addition to and do not in any respect limit any other rights of the Owner, including the right to terminate in accordance with Article 14.*

2.5 **Owner’s Right to Carry Out the Work**

Change this Paragraph read as follows:

*If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. The Prime Professional may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner’s expenses and compensation for the Prime Professional’s additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Prime Professional, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.*

**Article 3**  
**CONTRACTOR**

3.1 **General**

3.1.3 Change the word “Architect” to “Prime Professional” and change the word “Architect’s” to “Prime Professional’s”.

3.2 **Review of Contract Documents and Field Conditions by Contractor**

3.2.2 Change each instance of the word “Architect” to “Prime Professional”.

3.2.3 Change each instance of the word “Architect” to “Prime Professional”.

3.2.4 Change the word “Architect” to “Prime Professional”.

3.3 **Supervision and Construction Procedures**

3.3.1 Change each instance of the word “Architect” to “Prime Professional”.

3.4 **Labor and Materials**

3.4.2 Change each instance of the word “Architect” to “Prime Professional” and add the words “where such substitution results in a modification of the Contract Sum or Contract Time” to the end of this sentence.

**Division 0**

3.4.4 Add a new Subparagraph as follows:

**Employee Status Verification System** *If applicable, the Contractor represents and warrants that it will ensure its compliance with the Mississippi Employment Protection Act, Section 71-11-1, et seq. of the Mississippi Code Annotated (Supp 2008), and will register and participate in the status verification system for all newly hired employees. The term “employee” as used herein means any person that is hired to perform work within the State of Mississippi. As used herein, “status verification system” means the Illegal Immigration Reform and Immigration Responsibility Act of 1996 that is operated by the United States Department of Homeland Security, also known as the E-Verify Program, or any other successor electronic verification system replacing the E-Verify Program. The Contractor agrees to maintain records of such compliance and, upon request of the State and approval of the Social Security Administration or Department of Homeland Security, where required, to provide a copy of each such verification to the State. The Contractor further represents and warrants that any person assigned to perform services hereunder meets the employment eligibility requirements of all immigration laws of the State of Mississippi. The Contractor understands and agrees that any breach of these warranties may subject the Contractor to the following: (a) termination of this Agreement and ineligibility for any state or public contract in Mississippi for up to three (3) years, with notice of such cancellation/termination being made public, or (b) the loss of any license, permit, certification or other document granted to the Contractor by an agency, department or governmental entity for the right to do business in Mississippi for up to one (1) year, or (c) both. In the event of such cancellation/termination, the Contractor would also be liable for any additional costs incurred by the State due to the contract cancellation or loss of license or permit.*

3.4.5 Add a new Subparagraph as follows:

*In providing labor for the proper execution and completion of the Work, the Contractor shall comply with the provisions of Section 31-5-19 of the Mississippi Code of 1972, Annotated.*

3.4.6 Add a new Subparagraph as follows:

*In providing materials for the proper execution and completion of the Work, the Contractor shall comply with the provisions of Section 31-5-23 of the Mississippi Code of 1972, Annotated.*

3.5 **Warranty**

3.5.1 Change each instance of the word “Architect” to “Prime Professional”.

3.7 **Permits, Fees, Notices and Compliance with Laws**

3.7.1 Change this Subparagraph to read as follows:

*Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for any applicable permits, fees, licenses, and inspections by government agencies necessary for the proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.*

3.7.3 Delete the words “knowing it to be” from this Subparagraph.

3.7.4 Change each instance of the word “Architect” to “Prime Professional” and change the word “Architect’s” to “Prime Professional’s”.

3.7.5 Change the word “Architect” to “Prime Professional”.

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**Division 0**

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### 3.9 **Superintendent**

#### 3.9.2 Change this Subparagraph to read as follows:

*The Contractor, as soon as practicable after award of the Contract, and prior to commencement of any on-site Work, shall notify the Owner and Prime Professional of the name, qualifications and references of the proposed superintendent and any assistant superintendents where provided for in the Contract Documents. Within 14 days of receipt of the information, the Prime Professional shall notify the Contractor stating whether the Owner or the Prime Professional (1) has reasonable objection to the proposed superintendent based upon information provided or other requirements provided for in the Contract Documents or (2) requires additional information or time for review. Failure of the Prime Professional to respond within the 14-day period shall constitute notice of no reasonable objection.*

#### 3.9.3 Change the word “Architect” to “Prime Professional”.

### 3.10 **Contractor’s Construction and Submittal Schedules**

#### 3.10.1 Change this Subparagraph to read as follows:

*The Contractor, promptly after being awarded the Contract, and no later than fifteen days after the date established in the Notice to Proceed, shall submit for the Owner’s and Prime Professional’s information a Contractor’s construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed the time limits current under the Contract Documents. Submission of a schedule that indicates or expresses an intent to complete Work prior to the time limits established by the Contract Documents shall not make the Owner liable to the Contractor for any failure to achieve early completion or obligate the Owner to take or prevent any actions to facilitate the Contractor’s completion prior to the expiration of the Contract Time. The schedule shall be revised monthly or at more frequent intervals as required by the conditions of the Work and Project.*

#### 3.10.2 Change each instance of the word “Architect’s” to “Prime Professional’s” and change the word “Architect” to “Prime Professional”.

#### 3.10.3 Change the word “Architect” to “Prime Professional”.

### 3.11 **Documents and Samples at the Site**

Change each instance of the word “Architect” to “Prime Professional”.

### 3.12 **Shop Drawings, Product Data and Samples**

#### 3.12.4 Change each instance of the word “Architect” to “Prime Professional”.

#### 3.12.5 Change each instance of the word “Architect” to “Prime Professional”.

#### 3.12.6 Change the word “Architect” to “Prime Professional”.

#### 3.12.7 Change the word “Architect” to “Prime Professional”.

#### 3.12.8 Change each instance of the word “Architect’s” to “Prime Professional’s” and change the word “Architect” to “Prime Professional”.

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## **Division 0**



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3.12.9 Change the word “Architect” to “Prime Professional” and change the word “Architect’s” to “Prime Professional’s”.

3.12.10.1 Change each instance of the word “Architect” to “Prime Professional”.

3.12.10.2 Change each instance of the word “Architect” to “Prime Professional”.

3.15 **Cleaning Up**

3.15.2 Change this Subparagraph to read as follows:

*If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be assessed to the Contractor.*

3.16 **Access to Work**

Change this Paragraph to read as follows:

*The Contractor shall provide the Owner, Prime Professional, Commissioning Authority Professional, Separate Contractors and their authorized representatives with access to the Work in preparation and progress wherever located. This shall include the provision of lifts, ladders, scaffolding and/or equivalent for access to elevated work.*

3.17 **Royalties, Patents and Copyrights**

Change each instance of the word “Architect” to “Prime Professional”.

3.18 **Indemnification**

3.18.1 Change this Subparagraph to read as follows:

*To the fullest extent allowed by law, Contractor shall indemnify, defend, save and hold harmless, protect, and exonerate the Owner, Prime Professional, Prime Professional’s consultants, Commissioning Authority Professional, Commissioning Authority Professional’s consultants, as well as the State of Mississippi, its Commissioners, Board Members, officers, employees, agents, and representatives, from and against all claims, demands, liabilities, suits, actions, damages, losses, and costs of every kind and nature whatsoever, including, without limitation, court costs, investigative fees and expenses, and attorneys’ fees, arising out of or caused by Contractor’s and/or its partners, principals, agents, employees, and/or subcontractors in the performance of or failure to perform this Agreement. In the State’s sole discretion, Contractor may be allowed to control the defense of any such claim, suit, etc. In the event Contractor defends said claim, suit, etc., Contractor shall use legal counsel acceptable to the State; Contractor shall be solely liable for all reasonable costs and/or expenses associated with such defense and the State shall be entitled to participate in said defense. Contractor shall not settle any claim, suit, etc., without the State’s concurrence, which the State shall not unreasonably withhold.*

**Article 4**  
**ARCHITECT**

Change the title of this article from “ARCHITECT” to “PRIME PROFESSIONAL”.

4.1 **General**

4.1.1 Change this Subparagraph to read as follows:

*The Prime Professional is the person identified as the Professional in the Agreement Between the Owner and the Contractor and retained by the Owner pursuant to Section 2.3.2.*

4.1.2 Change each instance of the word “Architect” to “Prime Professional”.

**Division 0**

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## 4.2 Administration of the Contract

4.2.1 Change the first line of this Subparagraph to read as follows:

*The Prime Professional will provide administration of the Contract as described in the Contract Documents, and will be the Owner's representative during construction until the end of the period for correction of Work as described in Section 12.2.*

4.2.2 Change each instance of the word "Architect" to "Prime Professional".

4.2.3 Change each instance of the word "Architect" to "Prime Professional".

4.2.4 Change each instance of the word "Architect" to "Prime Professional" and each instance of the word "Architect's" to "Prime Professional's".

4.2.5 Change the word "Architect's" to "Prime Professional's" and change the word "Architect" to "Prime Professional".

4.2.6 Change each instance of the word "Architect" to "Prime Professional".

4.2.7 Change each instance of the word "Architect" to "Prime Professional" and each instance of the word "Architect's" to "Prime Professional's".

4.2.8 Change each instance of the word "Architect" to "Prime Professional".

4.2.9 Change the word "Architect" to "Prime Professional".

4.2.10 Change each instance of the word "Architect" to "Prime Professional" and the word "Architect's" to "Prime Professional's".

4.2.11 Change the word "Architect" to "Prime Professional" and the word "Architect's" to "Prime Professional's".

4.2.12 Change each instance of the word "Architect" to "Prime Professional".

4.2.13 Change the word "Architect's" to "Prime Professional's".

4.2.14 Change each instance of the word "Architect" to "Prime Professional".

## **Article 5 SUBCONTRACTORS**

### **5.2 Award of Subcontracts and Other Contracts for Portions of the Work**

5.2.1 Change this Subparagraph to read as follows:

*Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, prior to award of the Contract by the Owner, shall furnish in writing to the Owner through the Prime Professional, the names, classifications, and COR #'s of Sub-Contractors over Fifty Thousand Dollars (\$50,000.00) (as well as entities who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. Such list shall also include any Mechanical, Plumbing, or Electrical Sub-Contractor as listed on Proposal Form regardless of amount. Within 7 days of receipt of the information, the Prime Professional shall notify the Contractor whether the Owner or the Prime Professional (1) has reasonable objection to any such proposed Sub-Contractor or entity based upon information provided or other requirements provided for in the Contract Documents or (2) requires additional information or time for review. Failure of*

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## **Division 0**

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*the Prime Professional to respond within the 7-day period shall constitute notice of no reasonable objection. Where a Project involves a Mississippi Landmark or a building and/or site potentially eligible for such designation, the Contractor shall also furnish documentation that all Sub-Contractors, regardless of Sub-Contract amount, have at least the minimum number of years of successful experience specified by the Prime Professional in work on previous projects involving State or National Landmarks of similar type, scale and complexity and that all key personnel to be utilized to perform the Work are experienced craftsmen with not less than five (5) years of experience.*

5.2.2 Change this Subparagraph to read as follows:

*The Contractor shall not contract with a proposed Sub-Contractor or entity to whom the Owner or Prime Professional has made reasonable and timely objection. Other than the Mechanical, Plumbing, or Electrical Sub-Contractors as listed on the Proposal Form, the Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection. Only where the listed Mechanical, Plumbing, or Electrical Sub-Contractor has (1) closed their business (2) entered into bankruptcy or (3) refuses to enter into a contract with the Contractor will substitution of such Sub-Contractor be permitted prior to the execution of the Agreement Between the Owner and Contractor. Substitution for refusal to enter into contract shall not be permitted if the reason for such refusal is due to unilateral reduction by Contractor of such Sub-Contractor's bid price.*

5.2.3 Change this Subparagraph to read as follows:

*If the Owner or Prime Professional has reasonable objection to a Sub-Contractor or entity proposed by the Contractor, other than the Mechanical, Plumbing, or Electrical Sub-Contractors as listed on the Proposal Form, the Contractor shall propose another to whom the Owner or Prime Professional has no reasonable objection. Neither the Contract Sum nor Contract Time may be increased or decreased due to any change in Sub-Contractor or entity. Failure of Contractor to identify Sub-Contractors or entities to whom the Owner and Prime Professional have no reasonable objections within 10 working days of initial submission shall result in the bid or proposal being deemed non-responsible at which time the Owner may elect to award to the next lowest responsive, responsible bidder or resolicit the project.*

5.2.4 Change this Subparagraph to read as follows:

*Following the execution of the Agreement Between the Owner and Contractor, the Contractor shall not substitute a Sub-Contractor or entity for one previously selected if the Owner or Prime Professional makes reasonable objection to such substitution. In no case shall substitution of Mechanical, Plumbing or Electrical Sub-Contractors be permitted except where such Sub-Contractor has (1) closed their business (2) entered into bankruptcy (3) becomes in arrears or (4) becomes involved in an ongoing dispute with the Contractor related to the Sub-Contractor's execution, workmanship, or timely performance of their portion of the Work.*

#### **Article 6**

### **CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

6.2.2 Change each instance of the word "Architect" to "Prime Professional".

6.3 Change the word "Architect" to "Prime Professional".

#### **Article 7**

### **CHANGES IN THE WORK**

7.2 **Change Orders**

7.2.1 Change each instance of the word "Architect" to "Prime Professional".

7.2.2 Add a new Subparagraph as follows:

*The maximum mark-up included in a Change Order for profit and overhead is limited to twenty percent (20%) of the total of*

### **Division 0**

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*the actual cost for materials, labor and subcontracts. Profit and overhead include: all taxes, fees, permits, insurance, bond, job superintendent, job and home office expense. All Sub-Contractors and Sub-Sub-Contractors shall acquiesce to the same requirements when participating in a Change Order.*

7.3 **Construction Change Directives**

7.3.4 Change the word “Architect” to “Prime Professional”.

7.3.4.1 Change the word “Architect” to “Prime Professional”.

7.3.6 Change this Subparagraph to read as follows:

*Upon receipt of a Construction Change Directive signed by the Prime Professional and the Owner, the Contractor shall promptly proceed with the change in the Work and advise the Prime Professional of the Contractor’s agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.*

7.3.7 Change this Subparagraph to read as follows:

*A Construction Change Directive signed by the Contractor indicates the Contractor’s agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall become effective once signed by the Prime Professional and the Owner and will subsequently be incorporated into a Change Order.*

7.3.8 Change the word “Architect” to “Prime Professional”.

7.3.9 Change this Subparagraph to read as follows:

*Until such time that a Construction Change Directive is recorded as a Change Order, the Contractor may not request payment for Work completed under the Construction Change Directive in Applications for Payment.*

7.3.10 Change each instance of the word “Architect” to “Prime Professional”.

7.4 Change each instance of the word “Architect” to “Prime Professional” and the word “Architect’s” to “Prime Professional’s”.

**Article 8**  
**TIME**

8.1 **Definitions**

8.1.2 Change this Subparagraph to read as follows:

*The date of commencement of the Work is the date established in the Notice to Proceed.*

8.1.3 Change the word “Architect” to “Prime Professional”.

8.2 **Progress and Completion**

8.2.1 Change this Subparagraph to read as follows:

*Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work and acknowledges that such period includes time for all applicable submittals, selections, reviews, approvals, inspections, meetings, as well as discovery and investigation of any latent conditions.*

**Division 0**

8.2.2 Change this Subparagraph to read as follows:

*The Contractor shall not knowingly commence the Work prior to the date established in the Notice to Proceed or the effective dates of bond and insurance required to be furnished by the Contractor.*

8.3 **Delays and Extensions of Time**

8.3.1 Change this Subparagraph to read as follows:

*If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Prime Professional, of an employee of either, or of a Separate Contractor; (2) by labor disputes, pandemics, acts of terrorism, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions in excess of any weather days otherwise provided for in the Contract Documents that are documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (3) by delay authorized by the Owner pending dispute resolution; or (4) by other causes that the Contractor asserts, and the Owner, in consultation with the Prime Professional determines justify delay, then the Contract Time shall be extended for such reasonable time as the Owner, in consultation with the Prime Professional, may determine. Such determination shall take into consideration the critical path of the Work and will be reduced by any float in the Contractor's Construction Schedule that does not affect the overall completion of the Work. Except where such delay is due to suspension by the Owner in accordance with Article 14 or such delay has the effect of stopping all progress of the Work for 14 calendar days or more, the Contract Sum will not be increased for additional general overhead expenses; however, it may be increased for direct expenses directly related to the delay of specific portions of the Work so delayed. Any claim for loss or any delay occasioned by any Sub-Contractor or entity under contract with the Contractor, shall be settled between the Contractor and such other Sub-Contractor or entity.*

**Article 9**  
**PAYMENTS AND COMPLETION**

9.2 **Schedule of Values**

Change this Paragraph to read as follows:

*Where the Contract is based on a stipulated sum, the Contractor shall submit a schedule of values to the Prime Professional, at least 10 working days before the first Application for Payment, a schedule of values allocating the entire Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Prime Professional. This schedule, unless objected to by the Prime Professional or Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any subsequent changes to the schedule of values shall be submitted to the Prime Professional and supported by such data to substantiate its accuracy as the Prime Professional may require, and unless object to by the Prime Professional or Owner, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.*

9.3 **Applications for Payment**

9.3.1 Add a new sentence to the end of this Subparagraph:

*The form of Application for Payment will be AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet, or a computer generated form containing similar data.*

9.3.1.1 Delete this Subparagraph in its entirety.

9.3.1.3 Add a new Clause to Subparagraph 9.3.1 as follows:

*On any contract as described herein, of which the total amount is Two Hundred Fifty Thousand Dollars (\$250,000.00) or greater, or on any contract with a subcontractor, regardless of amount, five percent (5%) shall be retained until the Work is at least fifty percent (50%) complete, on schedule and satisfactory in the Prime Professional's opinion, at which time fifty percent (50%) of the retainage held to date shall be returned, subject to consent of surety, to the prime contractor for distribution to the appropriate subcontractors and suppliers; provided, however, that future retainage shall be withheld at*

**Division 0**

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*the rate of two and one-half percent (2 1/2%). When submitting request for reduction in retainage, the Contractor will include, with the application, a Consent of Surety to Reduction which is AIA Form G707A, and a Power of Attorney. (Code 31-5-33)*

9.3.1.4 Add a new Clause to Subparagraph 9.3.1 as follows:

*The Contractor must submit each month with this Application for Payment a separate letter stating that he is requesting an extension of time or that he had no need for an extension for that period of time. No payment on a monthly application will be considered due and payable until the letter is received. Complete justification such as weather reports or other pertinent correspondence must be included for each day's request for extension. A Contractor's letter, or statement, will not be considered as adequate justification. The receipt of this request and data by the Owner will not be considered as approval of the Owner or Prime Professional in any way.*

9.3.2.1 Add a new Clause to Subparagraph 9.3.2 as follows:

*Payment in an amount not greater than the documented cost paid by the Contractor for ~~on~~ materials stored at some location other than the Project site, may be approved by the Prime Professional and the Owner after the Contractor has submitted the following items:*

- .1 An acceptable Lease Agreement between the General Contractor and the owner of the land, or building, where the materials are stored covering the specific area where the materials are located.*
- .2 Consent of Surety, or other acceptable Bond, to cover the materials stored off-site.*
- .3 All Perils Insurance coverage for the full value of the materials stored off-site.*
- .4 A Bill of Sale from the Manufacturer to the General Contractor for the stored materials.*
- .5 A complete list and inventory of materials manufactured, stored and delivered to the storage site and of materials removed from the storage site and delivered to the job site.*
- .6 A review by the Prime Professional of the materials stored off-site prior to release of payment. Where the storage location is greater than 50 miles of the building site, the Contractor shall pay or reimburse reasonable travel costs of the Prime Professional and/or his Consultants for such review.*
- .7 Guarantee no storage costs, additional delivery fees, or subsequent costs to the Owner.*

9.4 **Applications for Payment**

9.4.1 Change each instance of the word “Architect” to “Prime Professional” and the word “Architect’s” to “Prime Professional’s”.

9.4.2 Change each instance of the word “Architect” to “Prime Professional” and each instance of the word “Architect’s” to “Prime Professional’s”.

9.5 **Decisions to Withhold Certification**

9.5.1 Change each instance of the word “Architect” to “Prime Professional” and the word “Architect’s” to “Prime Professional’s”.

9.5.1.7 Delete the word “repeated” from this Clause.

9.5.2 Change the word “Architect” to “Prime Professional”.

9.5.3 Delete this Subparagraph in its entirety.

9.5.4 Change each instance of the word “Architect” to “Prime Professional”.

9.6 **Progress Payments**

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**Division 0**

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9.6.1 Change each instance of the word “Architect” to “Prime Professional”.

9.6.2 Change the first line of this Subparagraph to read as follows:

*The Contractor shall pay each Sub-Contractor and material supplier, in accordance with Section 31-5-27 of the Mississippi Code 1972, Annotated, in proportion to the percentage of work completed by each less applicable retainage.*

9.6.3 Change each instance of the word “Architect” to “Prime Professional”.

9.6.4 Change the word “Architect” to “Prime Professional”.

9.6.9 Add a new Subparagraph as follows:

*The amount retained by the Contractor from each payment to each Sub-Contractor and material supplier shall not exceed the percentage retained by the Owner from the Contractor.*

9.6.9.1 Add a new Clause to Subparagraph 9.6.9 as follows:

*The Contractors shall submit monthly certification, in accordance with Section 31-5-25 of the Mississippi Code 1972, Annotated, on Owner’s “Affidavit Certifying Payment to All Subcontractors” form, to the Prime Professional indicating payments to subcontractors on prior payment request.*

9.6.10 Add a new Subparagraph as follows:

*The Owner agrees to make payment in accordance with Mississippi Law on “Time for full and final payment to contractors; exemptions; monthly submission by contractors of proof of payment to subcontractors”, Section 31-5-25 of the Mississippi Code of 1972, Annotated, which generally provides for payment of undisputed amounts within forty-five (45) days of when they are due and payable. Payments by state agencies using the statewide electronic payment and remittance vehicle shall be made and remittance information provided electronically as directed by the State. These payments shall be deposited into the bank account of the Contractor’s choice. Contractor understands and agrees that the State is exempt from the payment of taxes. All payments shall be in United States currency. No payment, including final payment, shall be construed as acceptance of defective or incomplete work, and the Contractor shall remain responsible and liable for full performance.*

## 9.7 **Failure of Payment**

Change this Paragraph to read as follows:

*The Contractor and the Owner shall be subject to the remedies as prescribed in Section 31-5-25 of the Mississippi Code 1972, Annotated.*

## 9.8 **Substantial Completion**

9.8.1 Add the following sentence to the end this Subparagraph to read as follows:

*In order to be considered occupiable or utilizable by the Owner, all life safety systems must be operable and tested and the commissioning requirements for the Work or designated portion thereof must be complete except for thermographs of electrical systems, trend log monitoring, seasonal testing, near-warranty end activities and verification of training sessions.*

9.8.3 Change this Subparagraph to read as follows:

*Upon receipt of the Contractor’s list, the Prime Professional will promptly visit the site to determine whether the Work or designated portion thereof is substantially complete. If, in the opinion of the Prime Professional, the Work or designated portion thereof is not substantially complete, the Prime Professional will not proceed with inspection and the Prime Professional will report the reasons for such determination to the Contractor. In such case, the Contractor shall then*

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## **Division 0**

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*submit a revised list and request for inspection when these reasons have been resolved.*

9.8.4 Change this Subparagraph to read as follows:

*When the Work or designated portion thereof is substantially complete and affirmed by the Owner, the Prime Professional will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the punch list accompanying the Certificate. Unless otherwise provided in the Contract Documents, warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.*

9.9 **Partial Occupancy or Use**

9.9.1 Change each instance of the word “Architect” to “Prime Professional”.

9.9.2 Change the word “Architect” to “Prime Professional”.

9.10 **Final Completion and Final Payment**

9.10.1 Change this Subparagraph and add the associated Clauses to read as follows:

*When, in the opinion of the Contractor, the Work is ready for final inspection and acceptance by the Owner, the Contractor shall make such notice to the Prime Professional.*

- 1. Upon receipt of the Contractor’s notice that the Work is ready for final inspection and acceptance by the Owner, the Prime Professional will promptly visit the site and assess the state of the Work to determine if it is ready for final inspection by the Owner. If, in the Prime Professional’s judgment, the Work is not ready for final inspection, the Prime Professional will report the reasons for such determination to the Contractor. In such case, the Contractor shall then submit a revised request for final inspection when these reasons have been resolved.*
- 2. Once the Prime determines the Work is ready for final inspection, the Prime Professional will call for final inspection of the with the Owner for the purpose of determining whether the Work is acceptable under the Contract Documents.*
- 3. The final inspection shall be conducted in the presence of the Owner and a list of defects or discrepancies, if any, will be compiled into a final punch list furnished to all parties.*
- 4. Once corrections of all final punch list items have been confirmed by the Prime Professional, the Prime Professional will provide a letter recommending final acceptance of the Work to the Owner.*

9.10.2 Change this Subparagraph to read as follows:

*Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Prime Professional (1) final application for payment, (2) consent of surety to final payment, (3) power of attorney, (4) Contractor’s affidavit of release of liens, (5) Contractor’s affidavit of payment of debts and claims, (6) Contractor’s guarantee of work, (7) Project Record Documents and (8) certificates, warranties, guarantees, bonds or documents as called for in the individual sections of the Project Manual. The final payment will be reduced by the value of any amounts assessed to the Contractor per Section 2.5 Owner’s Right to Carry Out the Work, Section 6.3 Owners Right to Clean Up, or Section 9.11 Liquidated Damages where such amounts have not been reconciled by a Change Order per Section 7.2 prior to final acceptance unless such amounts have been resolved via separate agreement(s) between the Owner and the Contractor.*

9.11 **Liquidated Damages**

9.11.1 Add a new Paragraph as follows:

*Time being of the essence and a matter of material consideration thereof, a reasonable estimate in advance is established to cover losses incurred by the Owner if the project is not substantially complete on the date set forth in the Contract*

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**Division 0**



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*Documents. The Contractor and his Surety will be liable for and will be assessed by the Owner the sums stipulated in Paragraph 2.2 of the Standard Form of Agreement Between the Owner and the Contractor as fixed and agreed as liquidated damages for each calendar day of delay until the work is substantially complete unless circumstances dictate otherwise in the discretion of the Owner. The Contractor and his Surety acknowledge that losses to the Owner caused by the delay of the Contractor are not readily ascertainable and that the amount estimated per day and established as liquidated damages is reasonable and not a penalty.*

**Article 10**  
**PROTECTION OF PERSONS AND PROPERTY**

**10.2 Safety of Persons and Property**

10.2.5 Change this Subparagraph to read as follows:

*The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Sub-Contractor, a Sub-Sub-Contractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible for Clauses 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss attributable to acts or omissions of the Owner or Prime Professional and not attributable to the fault or negligence of the Contractor. Where damage or loss is insured under property insurance required by the Contract Documents, the Contractor shall promptly report, file and facilitate the claim process so as to minimize any impacts on the timely completion of the Work. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 3.18.*

**10.3 HAZARDOUS MATERIALS**

10.3.2 Delete this Subparagraph in its entirety.

10.3.3 Delete this Subparagraph in its entirety.

10.3.4 Delete this Subparagraph in its entirety.

10.3.5 Delete this Subparagraph in its entirety.

10.3.6 Delete this Subparagraph in its entirety.

**Article 11**  
**INSURANCE AND BONDS**

**11.1 Contractor's Insurance and Bonds**

11.1.1 Add a sentence to the end of this Subparagraph as follows:

*Insurance shall be purchased to protect the Contractor from claims set forth below for not less than the limits of liability specified below or required by law, whichever coverage is greater, which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Sub-Contractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:*

Add new Clauses as follows:

*.1 GENERAL LIABILITY:  
Commercial General Liability  
(Including XCU)*

**Division 0**

General Aggregate.....	\$ 1,000,000.00 Aggregate
Products & Completed Operations.....	\$ 1,000,000.00 Aggregate
Personal & Advertising Injury.....	\$ 500,000.00 Per Occurrence
Bodily Injury & Property Damage.....	\$ 1,000,000.00 Per Occurrence
Fire Damage Liability.....	\$ 50,000.00 Per Occurrence
Medical Expense.....	\$ 5,000.00 Per Person
.2 OWNERS & CONTRACTORS PROTECTIVE LIABILITY:	
Bodily Injury & Property Damage.....	\$ 1,000,000.00 Aggregate
Bodily Injury & Property Damage.....	\$ 500,000.00 Per Occurrence
.3 AUTOMOBILE LIABILITY:	
(Owned, Non-owned & Hired Vehicles)	
Contractor Insurance Option Number 1:	
Bodily Injury & Property Damage.....	\$ 500,000.00 Per Occurrence
(Combined Single Limit)	
Contractor Insurance Option Number 2:	
Bodily Injury.....	\$ 250,000.00 Per Person
Bodily Injury.....	\$ 500,000.00 Per Accident
Property Damage.....	\$ 100,000.00 Per Occurrence
.4 EXCESS LIABILITY:	
(Umbrella on projects over \$500,000)	
Bodily Injury & Property Damage.....	\$ 1,000,000.00 Aggregate
(Combined Single Limit)	
.5 WORKERS' COMPENSATION:	
(As required by Statute)	
EMPLOYERS' LIABILITY:	
Accident.....	\$ 100,000.00 Per Occurrence
Disease.....	\$ 500,000.00 Policy Limit
Disease.....	\$ 100,000.00 Per Employee
.6 PROPERTY INSURANCE:	
Builder's Risk.....	\$ Equal to Value of Work
or	
Installation Floater.....	\$ Equal to Value of Work

11.1.5 Add a new Subparagraph to read as follows:

*Insurance shall be maintained without interruption from the date of commencement of the Work until the date of final payment unless otherwise noted on the Certificate of Substantial Completion.*

11.1.6 Add a new Subparagraph to read as follows:

*Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to final execution of the Contract and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.*

11.1.7 Add a new Subparagraph as follows:

**Division 0**

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*If the coverages are provided on a claims-made basis, the policy date or retroactive date shall predate the Contract; the termination date, or the policy, or applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after final payment.*

11.1.8 Add a new Subparagraph as follows:

*If any insurance requires deductibles, the Contractor shall pay costs not covered because of such deductibles.*

11.1.9 Add a new Subparagraph as follows:

*The Owner as fiduciary shall have power to adjust and settle a loss with Insurers unless one of the parties in interest shall object in writing within five (5) days after occurrence of loss.*

## 11.2 **Owner's Insurance**

Delete this Paragraph in its entirety and substitute the following:

*The Contractor shall purchase and maintain such insurance as will protect the Owner from his contingent liability to others for damages because of bodily injury, including death, and property damage, which may arise from operations under this Contract and other liability for damages which the Contractor is required to insure under any provision of this Contract. Certificate of this insurance will be filed with the Owner and will be the same limits set forth in 11.1.5.*

11.2.1 Delete this Subparagraph in its entirety.

11.2.2 Delete this Subparagraph in its entirety.

11.2.3 Delete this Subparagraph in its entirety.

## 11.3 **Waivers of Subrogation**

11.3.1 Delete this Subparagraph in its entirety.

11.3.2 Delete this Subparagraph in its entirety.

## 11.5 **Adjustment and Settlement of Insured Loss**

11.5.1 Delete this Subparagraph in its entirety.

11.5.2 Delete this Subparagraph in its entirety.

## **Article 12**

### **UNCOVERING AND CORRECTION OF WORK**

#### 12.1 **Uncovering of Work**

12.1.1 Change each instance of the word "Architect's" to "Prime Professional's", change the word "Architect" to "Prime Professional", and add the words "or Contract Sum" at the end of this sentence.

12.1.2 Change each instance of the word "Architect" to "Prime Professional".

#### 12.2 **Correction of Work**

12.2.1 Change the word "Architect" to "Prime Professional" and the word "Architect's" to "Prime Professional's".

## **Division 0**

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12.2.2.1 Change the word “*Architect*” to “*Prime Professional*”.

**Article 13**  
**MISCELLANEOUS PROVISIONS**

**13.1 Governing Law**

Change this Paragraph to read as follows:

*The Contract shall be governed by the laws of the State of Mississippi.*

**13.3 Rights and Remedies**

13.3.2 Change the word “*Architect*” to “*Prime Professional*”.

**13.4 Tests and Inspections**

13.4.1 Change each instance of the word “*Architect*” to “*Prime Professional and Commissioning Authority Professional*”.

13.4.2 Change the first two instances of the word “*Architect*” to “*Prime Professional*” and the second two instances of the word “*Architect*” to “*Prime Professional and Commissioning Authority Professional*”.

13.4.3 Change the word “*Architect*” to “*Prime Professional’s and Commissioning Authority Professional’s*”.

13.4.5 Change each instance of the word “*Architect*” to “*Prime Professional and/or the Commissioning Authority Professional*”.

13.5 Delete this Paragraph in its entirety.

**Article 14**  
**TERMINATION OR SUSPENSION OF THE CONTRACT**

**14.1 Termination by the Contractor**

14.1.1.3 Change the word “*Architect*” to “*Prime Professional*”.

14.1.1.4 Delete this Clause in its entirety.

14.1.3 Change the word “*Architect*” to “*Prime Professional*”.

14.1.4 Change the word “*Architect*” to “*Prime Professional*”.

**14.2 Termination by the Owner for Cause**

14.2.1.1 Delete the word “*repeatedly*” from this Clause.

14.2.1.3 Delete the word “*repeatedly*” from this Clause.

14.2.1.3 Delete the word “or” from this Clause.

**Division 0**

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14.2.1.4 Change the period to a semi-colon and add the word “or” to this Clause.

14.2.1.5 Add a new Clause as follows:

*fails to achieve Substantial Completion of the Project within the time limits established by the Contract Documents.*

14.2.2 Change the word “Architect” to “Prime Professional” and change the words “certification by” to “advice of”.

14.2.4 Change the word “Architect’s” to “Prime Professional’s”.

## **Article 15** **CLAIMS AND DISPUTES**

### **15.1 Claims**

15.1.2 Change this Subparagraph to read as follows:

#### ***Commencement of Statutory Limitation Period***

*The Owner and Contractor shall commence all claims and causes of action within the time period specified by applicable state law.*

15.1.3.1 Change each instance of the word “Architect” to “Prime Professional”.

15.1.4 Change this Subparagraph to read as follows:

*Where both the Owner and the Contractor concur with the Initial Decision Maker’s decision, the Contract Sum and Contract Time shall be adjusted in accordance with Article 7 and the Prime Professional will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.*

15.1.7 Delete this Subparagraph in its entirety.

### **15.2 Initial Decision**

15.2.1 Change this Subparagraph to read as follows:

*Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3 and 10.4, shall be referred to the Initial Decision Maker for initial decision. The Prime Professional will serve as the Initial Decision Maker. An initial decision by the Initial Decision Maker shall be required as a condition precedent to arbitration or litigation of all Claims between the Contractor and Owner arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered by the Initial Decision Maker. The Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.*

15.2.2 Change the words “approve the Claim” to “recommend approval of the Claim to the Owner”.

15.2.4 Change the words “reject or approve the Claim” to “recommend rejection or approval of the Claim to the Owner”.

15.2.5 Change the Subparagraph to read as follows:

*The Initial Decision Maker will render an initial decision to recommend approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision recommendation shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Prime Professional, if the Prime Professional is not serving as the Initial Decision Maker, of any recommended change in the Contract Sum or Contract Time or both. Where the Owner concurs with the recommendation it is binding on the parties but subject to arbitration or litigation.*

15.2.6 Delete this Subparagraph in its entirety.

## **Division 0**

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15.2..6.1 Delete this Clause in its entirety.

15.3 **Mediation**

15.3.1 Delete this Subparagraph in its entirety.

15.3.2 Delete this Subparagraph in its entirety.

15.3.3 Delete this Subparagraph in its entirety.

15.3.4 Delete this Subparagraph in its entirety.

15.4 **Arbitration**

15.4.1 Delete this Subparagraph in its entirety.

15.4.1.1 Delete this Clause in its entirety.

15.4.2 Delete this Subparagraph in its entirety.

15.4.3 Delete this Subparagraph in its entirety.

15.4.4 Delete this Subparagraph in its entirety.

15.4.4.1 Delete this Clause in its entirety.

15.4.4.2 Delete this Clause in its entirety.

15.4.4.3 Delete this Clause in its entirety.

15.5 Add a new Paragraph as follows:

***Arbitration Procedures for the Department of Finance and Administration’s Bureau of Building, Grounds and Real Property Management***

*All matters of dispute arising out of any agreement with the Department of Finance and Administration for planning, design, engineering, construction, erection, repair, or alteration of any building, structure, fixture, road, highway, utility or any part thereof, or any agreement with the Department of Finance and Administration for architectural, engineering, surveying, planning, and related professional services which provides for mediation or arbitration, shall comply with the following course for resolution. No arbitration hearing shall be granted on any claim in excess of One Hundred Thousand Dollars (\$100,000.00).*

15.5.1 Add a new Subparagraph and Clauses as follows:

***Conditions Precedent to Arbitration***

*.1 The aggrieved party must first notify opposing party in writing in detail of the matter(s) in dispute the amount involved and the remedy sought. Such writing shall include copies of any documents, writings, plans, or other matter pertinent to the resolution of the dispute. The Director of the Bureau of Building and a principal of the opposing party shall be the proper parties for such notice and shall be active parties in any subsequent dispute resolution.*

*.2 If the dispute cannot be satisfactorily resolved, within thirty (30) days of the complaint being rejected in writing by either*

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**Division 0**

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party, notice by certified mail shall be given to the Deputy Director of the Department of Finance and Administration. A copy of the notice shall be sent by certified mail to the opposing party. Such notice shall be in writing setting forth in detail the matter(s) in dispute, the amount involved, the remedy sought and state that informal resolution between the parties cannot be reached. Such writing shall include copies of any documents, writings, plans, or other matter pertinent to the resolution of the dispute. Opposing party shall have the opportunity to set forth in writing a rebuttal with pertinent documents attached. At the sole discretion of the Deputy Director, oral testimony may be had on the matter.

15.5.2 Add a new Subparagraph as follows:

***Requests for Arbitration***

*Within thirty (30) days of a claim being rejected in writing by the Deputy Director of the Department of Finance and Administration, either party may request arbitration. Notices for requests for arbitration shall be made in writing to the Executive Director of the Department of Finance and Administration, P.O. Box 267, Jackson, MS 39201. Such notice shall set forth in detail the matter(s) in dispute, the amount involved, and the remedy sought. A copy of the request shall be mailed to the opposite party. The party requesting arbitration must deposit the sum of two hundred (\$200.00) with its request as a deposit against costs incurred by the arbitrators. Each party will be notified in writing in any manner provided by law of certified mail not less than twenty (20) days before the hearing of the date, time and place for the hearing. Appearance at the hearing waives a party's right to notice.*

15.5.3 Add a new Subparagraph as follows:

***Selection of Arbitrators***

*Upon request for arbitration, a panel of three (3) arbitrators shall be chosen. One (1) member shall be appointed by the Executive Director of the Department of Finance and Administration. One (1) member shall be appointed by the executive director of a professional or trade association which represents interests similar to that of the non-state party. The third member shall be appointed by the first two.*

15.5.4 Add a new Subparagraph as follows:

***Hearings***

*All hearings shall be open to the public. All hearings will be held in Jackson, Mississippi, unless another location is mutually agreed to by the parties. The hearings shall be conducted as prescribed by **Mississippi Code 1972, Annotated**, Sections 11-15-113, 11-15-115, and 11-15-117. A full and complete record of all proceedings shall be taken by a certified court reporter. The scheduling and cost of retaining the court reporter shall be the responsibility of the party requesting arbitration. The costs of transcription of the record shall be the responsibility of the party requesting such transcript. No arbitration hearing shall be held without a certified court reporter. Deliberations of the arbitrators shall not be part of the record.*

15.5.5 Add a new Subparagraph as follows:

***Awards***

*Awards shall be made in writing and signed by the arbitrators joining in the award. A copy of the award shall be delivered to the parties by certified mail.*

15.5.6 Add a new Subparagraph as follows:

***Fees and Expenses***

*Reasonable fees and expenses, excluding counsel fees, incurred in the conduct of the arbitration shall be at the discretion of*

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**Division 0**

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*the Arbitrator except each party shall bear its own attorney's fees and costs of expert witnesses.*

15.5.7 Add a new Subparagraph as follows:

***Modifications, Confirmations, and Appeals***

*All modifications, confirmations and appeals shall be as prescribed by **Mississippi Code 1972, Annotated**, Section 11-15-123 et seq. All awards shall be reduced to judgment and satisfied in the same manner other judgments against the State are satisfied.*

15.5.8 Add a new Subparagraph as follows:

***Secretary for the Arbitrators***

*All notices, requests, or other correspondence intended for the arbitrators shall be sent to Executive Director, Department of Finance and Administration, P.O. Box 267, Jackson, MS 39201.*

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**Division 0**



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# MINORITY PARTICIPATION

## SECTION 00 7339

### PART 1 – PARTICIPATION FORM

#### 1.01 GENERAL

The Contractor will submit the following form within seven (7) days from the Notice to Proceed:

Department of Finance and Administration  
Bureau of Building, Grounds and Real Property Management  
**501 NORTH WEST STREET, SUITE 1401 B • JACKSON, MISSISSIPPI 39201**  
**TEL (601) 359-3621 • FAX (601) 359-2470**

Minority Tracking or Participation Form  
December 15, 2020

This document will serve as a tracking instrument for minority participation in publicly funded construction projects managed by the Bureau of Building, Grounds and Real Property Management. This document will aid DFA/BOB in its commitment to encourage minority participation during the bidding process. Your conscientious effort and commitment to help establish good business relations with minority subcontractors, consultants, suppliers, partners and/or joint ventures is greatly appreciated.

Any responses will be deemed public information and may be incorporated into reporting information compiled by the Bureau of Building in the following manner: Contractors that listed minority participation, Contractors that did not list minority participation and Contractors that submitted an incomplete (partially filled-out or blank) form.

The Prime General Contractor will submit to the Owner within seven (7) days from the Notice to Proceed, a completed *Minority Tracking Form* (as follows) outlining the use of minority subcontractors that will be used on the project.

Minority - A person who is a citizen or lawful permanent resident of the United States and who is the following:  
**African American, Hispanic American, Asian American, American Indian or Female**

Project Name and Number: \_\_\_\_\_

General Contractor: (Name) \_\_\_\_\_

#### Check the Following Appropriate Box

**There are NO minority participants included in this bid proposal.**

**There are minority participants included in this bid proposal.** The minority participants may be defined as: Subcontractor(s)/Consultant(s)/ Supplier(s) / Partner(s) / Joint Ventures(s).

List minority participants and their discipline/responsibility per the above or per Construction Specification Institution (CSI) forty-eight (48) divisions.

Name: \_\_\_\_\_

Division: \_\_\_\_\_

Amount \$ \_\_\_\_\_

**Division 0**



Name: \_\_\_\_\_

Division: \_\_\_\_\_

Amount \$ \_\_\_\_\_

Name: \_\_\_\_\_

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Amount \$ \_\_\_\_\_

**Division 0**



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# **LABOR REQUIREMENTS**

## **SECTION 00 7343**

### **PART 1 - EQUAL OPPORTUNITY**

#### **1.01 GENERAL**

The Contractor will maintain policies of employment as follows:

- A. The Contractor and all Subcontractors will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin or age. The Contractor will take affirmative action to insure that applicants are employed and that employees are treated during employment without regard to their race, religion, color, sex, national origin, or age. Such action will include, but not be limited to the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of non-discrimination.
- B. The Contractor and all Subcontractors will, in all solicitations or advertisements for employees placed by them or on their behalf, state that all qualified applicants receive consideration for employment without regard to race, religion, color, sex, national origin or age.

### **PART 2 – FEDERAL REQUIREMENTS**

#### **2.01 APPLICABILITY**

When project funding includes Federal funds, the applicable Federal Labor Standards Provisions will be included herein, to which the Contractor, and all Subcontractors, shall be subject to. Where no such pages are included, then no special provisions shall apply.

### **PART 3 - WAGE RATES**

#### **3.01 GENERAL**

When project funding includes Federal funds, the applicable Federal Government Wage Determinations will be included herein, to which the Contractor, and all Subcontractors, shall be subject to. Where no such pages are included, then no special wages shall apply.

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## **Division 0**



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**SPECIAL CONDITIONS**  
**SECTION 00 8000**

**PART 1 - PERFORMANCE INFORMATION**

N/A

**PART 2 – GRANT CONDITIONS**

N/A

**PART 3 – OTHER CONDITIONS**

N/A

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**Division 0**

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**ADDENDA**  
**SECTION 00 9000**

1.01 **ADDENDA**

Any Addendum issued on this Project will be included in Section 00 9000 and become a part of the *Standard Form of Agreement Between the Owner and Contractor*.

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**Division 0**



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**DIVISION 1: GENERAL REQUIREMENTS**

<b>Section</b>	<b>Description</b>	<b>Page</b>
01 1000	Summary of Work .....	1
01 2100	Allowances .....	3
01 2300	Alternates .....	3
01 2600	Change Order Procedures .....	4
01 2973	Schedule of Values .....	5
01 2976	Applications for Payment .....	6
01 3100	Project Coordination .....	6
01 3119	Project Meetings .....	8
01 3216	Progress Schedules.....	9
01 3217	Network Analysis Schedule.....	10
01 3323	Shop Drawings, Product Data, and Samples.....	12
01 4529	Testing Laboratory Services .....	14
01 5000	Construction Facilities and Temporary Controls .....	15
01 6000	Substitutions and Product Options .....	17
01 7329	Cutting and Patching.....	19
01 7400	Cleaning .....	19
01 7500	Starting of Systems .....	20
01 7700	Contract Closeout .....	21
01 7800	Project Record Documents .....	22
01 8000	Special Requirements.....	24



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# SUMMARY OF WORK

## SECTION 01 1000

### 1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. **Work Covered:** Work covered by the Contract Documents is as shown in drawings and described in words in the Project Manual. The Project Title and location is indicated on the first page of this Project Manual.
- B. **Start of Work:** Work shall be started immediately upon issuance of a *Notice to Proceed*. Prior to this, all Contracts and beginning documents will have been executed and insurance in force.
- C. **Time of Completion:** The completion of this Work is to be on, or before, the time indicated in the *Standard Form of Agreement Between the Owner and the Contractor*.
- D. **Contractor's Duties:**
  - 1. Except as specifically noted, provide and pay for:
    - a. Labor, materials and equipment.
    - b. Tools, construction equipment and machinery.
    - c. Water, heat and utilities required for construction.
    - d. Other facilities and services necessary for proper execution and completion of the Work.
  - 2. Pay legally required sales, consumer, use, payroll, privilege and other taxes.
  - 3. Secure and pay for, as necessary for proper execution and completion of work, and as applicable at the time of the receipt of the bids:
    - a. Permits.
    - b. Government fees.
    - c. Licenses.
  - 4. Give required notices.
  - 5. Comply with codes, ordinances, rules, regulations, orders and other legal requirements of public authorities which bear on performance of work.
  - 6. Promptly submit written notice to Professional of observed variance of Contract Documents from legal requirements. It is not the Contractor's responsibility to make certain that drawings and specifications comply with codes and regulations. Appropriate modifications to Contract Documents will adjust necessary changes. Assume responsibility for work known to be contrary to such requirements, without notice.
  - 7. Enforce strict discipline and good order among employees. Do not employ or work unfit persons, or persons, not skilled in assigned task.
  - 8. Provide a written safety plan.
- E. **Hazardous Materials:** The Prime General Contractor is responsible for the removal and disposal of any hazardous materials encountered in the performance of the Contract requirements. Hazardous Containing Materials [HCM] include, but are not limited to, Asbestos and Lead Paint and should be identified and removed as a part of the Contract. The absence of details does not relieve the Prime General Contractor from the responsibility of removal and disposal; but, a Change Order could be executed in the absence of identified HCM in the documents.
- F. **Coordination:** The Prime General Contractor is responsible for the coordination of the total project. All other Contractors and all Subcontractors will cooperate with the Prime General Contractor so as to facilitate the general progress of the Work. Each trade shall afford all other trades every reasonable opportunity for the installation of their work. Refer to Section 01 3100 entitled *Project Coordination*.

### 1.02 CONTRACTS

**Contracts:** Construct work under a single Prime General Contract. Refer to Section 00 5200 entitled *Standard Form of Agreement Between the Owner and the Contractor*.

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## Division One

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1.03 **WORK BY OTHERS**

Work by Others shall be described in each appropriate Project Manual section and noted on the Drawings.

1.04 **OWNER-FURNISHED PRODUCTS**

- A. **Products Furnished By Owner:** Products furnished by Owner shall be described in each appropriate Project Manual section and noted on the Drawings.
- B. **Products:** Delivered and unloaded at site.
- C. **Owner's Duties:**
  - 1. Schedule delivery date with Supplier in accordance with construction schedule.
  - 2. Obtain installation drawings and instructions.
  - 3. Submit claims for transportation damages.
  - 4. Arrange Guarantees, Warranties, etc..
- D. **Contractor's Duties:**
  - 1. Designate required delivery date for each product in construction schedule.
  - 2. Promptly inspect delivered products, report missing, damaged, or defective items.
  - 3. Handle at site, including uncrating and storage.
  - 4. Protect from exposure to elements and from damage.
  - 5. Repair or replace damaged items resulting from Contractor's operations.
  - 6. Install and make final connections.

1.05 **CONTRACTOR'S USE OF PREMISES**

- A. Confine operations at site to areas permitted by:
  - 1. Law.
  - 2. Ordinances.
  - 3. Permits.
  - 4. Contract Documents.
  - 5. Owner.
- B. Do not unreasonably encumber site with materials or equipment.
- C. Do not load structure with weight that will endanger structure.
- D. Assume full responsibility for protection and safekeeping of products stored on premises.
- E. Move any stored products which interfere with operations of Owner or other Contractors.
- F. Obtain and pay for use of additional storage or work areas needed for operations.
- G. Limit use of site for work and storage to the area indicated in the drawings.

1.06 **SPECIAL REQUIREMENTS**

- A. Refer to Section 01 8000 entitled *Special Requirements* for any Project specific summary of work requirements.

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## ALLOWANCES

### SECTION 01 2100

#### 1.01 DESCRIPTION

- A. **Related Work Specified Elsewhere:** Sections of Specifications as listed under Schedule of Allowances.
- B. **Allowances for Products:**
  - 1. Purchase products under each allowance as directed by the Professional.
  - 2. Amount of each allowance includes:
    - a. Net cost of product.
    - b. Delivery and unloading at site.
    - c. Applicable taxes.
  - 3. In addition to amounts of allowances, include in bid, for inclusion in Contract Sum, Contractor's costs for:
    - a. Handling at site, including uncrating and storage.
    - b. Protection from elements and damage.
    - c. Labor, installation and finishing.
    - d. Other expenses required to complete installation.
    - e. Overhead and profit.
- C. **Selection of Products:**
  - 1. **Architect's Duties:** Consult with Contractor in consideration of products and Suppliers; make selections, designate products to be used; and, notify Contractor in writing.
  - 2. **Contractor's Duties:** Assist Professional in determining qualified Suppliers; obtain proposals from Suppliers when requested by the Professional; and, make appropriate recommendations for consideration of the Professional. Upon notification of selection, enter into Purchase Agreement with designated Supplier.
- D. **Delivery:** The Contractor is responsible for arranging all delivery and unloading and should promptly inspect products for damage or defects and submit claims for transportation damage.
- E. **Installation:** Comply with requirements of referenced specification section.
- F. **Adjustment of Costs:** Should actual purchase cost be more, or less, than the specified allowance amount, the Contract Sum will be adjusted by Change Order equal to the amount of the difference.

#### 1.02 SCHEDULE OF ALLOWANCES

- A. Refer to Section 01 8000 entitled *Special Requirements* for Project specific Schedule of Allowances.

## ALTERNATES

### SECTION 01 2300

#### 1.01 DESCRIPTION

- A. **Scope:** This section describes the changes to be made under each alternate.
- B. **General:** The referenced Specification sections contain the pertinent requirements for materials and methods to achieve the work described herein. Coordinate related work and modify surrounding work, as required, to complete the Project under each alternate designated in the Contract.

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1.02 DESCRIPTION OF ALTERNATES

- A. Refer to Section 01 8000 entitled *Special Requirements* for Project specific description of project Alternates.

## CHANGE ORDER PROCEDURES

### SECTION 01 2600

1.01 SCOPE

- A. This Section describes the procedures for processing Change Orders to the Contract by the Owner, the Professional and the Contractor.

1.02 CHANGE ORDER PROCEDURES

- A. **Change Proposed by Professional:** The Professional may issue a Change Order Request to the Contractor which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications and a change in Contract Time for executing the change. The Contractor will prepare and submit a Change Order Proposal within ten (10) working days.
- B. **Change Proposed by Contractor:** The Contractor may propose a change by submitting a request for change to the Professional, describing the proposed change and its full effect on the Work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation and a statement describing the effect on Work by separate or other Contractors. Document any requested substitutions in accordance with Section 01 6000 entitled *Substitutions and Product Options*.
- C. **Contractor's Documentation:**
1. Maintain detailed records of Work completed on a time and material basis. Provide full information required for evaluation of proposed changes, and substantiate costs of changes in the Work.
  2. Document each quotation for a change in cost or time with sufficient data allowing evaluation of the quotation.
  3. On request, provide additional data to support computations:
    - a. Quantities of products, labor, and equipment
    - b. Taxes, insurance and bonds
    - c. Overhead and profit
    - d. Justification for any change in Contract Time
    - e. Credit for deletions from Contract, similarly documented
  4. Support each claim for additional costs, and for Work completed on a time and material basis, with additional information:
    - a. Origin and date of claim
    - b. Dates and times work was performed and by whom
    - c. Time records and wage rates paid
    - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
- D. **Construction Change Directive:** The Professional may issue a document, approved by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. The document will describe changes in the Work, and will designate method of determining any change in Contract Sum or Contract Time. The change in Work will be promptly executed.
- E. **Format:** The Professional will prepare three (3) originals of the Change Order or Change Directive using the Bureau of Building, Grounds and Real Property Management's *Change Order Form*. Where time is of the essence, and at the sole discretion of the Owner, scanned documents may be deemed acceptable to the Owner where signatures and dates are executed in blue ink.
- F. **Types of Change Orders:**
1. **Stipulated Sum Change Order:** Based on Proposal Request and Contractor's fixed price quotation, or Contractor's request for a Change Order as approved by the Professional.

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2. **Unit Price Change Order:** For pre-determined unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under a Construction Change Directive. Changes in Contract Sum or Contract Time will be computed as specified for Time and Material Change Order.
  3. **Time and Material Change Order:** Submit itemized account and supporting data after completion of change, within time limits indicated in the *Standard Form of Agreement Between the Owner and the Contractor*. The Professional will determine the change allowable in Contract Sum and Contract Time as provided in the Contract Documents. The Contractor shall maintain detailed records of Work accomplished on Time and Material basis and shall provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- G. **Execution of Change Order:** The Professional will issue Change Orders for signatures of parties as provided in the *Standard Form of Agreement Between the Owner and the Contractor*. Final execution of all Change Orders requires approval by the Owner.
- H. **Correlation of Contractor Submittals:** The Contract shall promptly revise *Schedule of Values* and the *Application for Payment* forms to record each authorized Change Order as a separate line item and adjust the Contract Sum. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust time for other items of Work affected by the change and resubmit. Promptly enter changes in Project Record Documents.

## SCHEDULE OF VALUES

### SECTION 01 2973

#### 1.01 DESCRIPTION

- A. **Scope:** Submit a *Schedule of Values* to the Professional at least ten (10) days prior to submitting the first Application for Payment. Upon the Professional's request, the Contractor will provide supportive data substantiating their correctness. Use *Schedule of Values* only as basis for Contractor's Application for Payment.
- B. **Form of Submittal:** Submit Schedule of Values on AIA Document G703, or computer generated form containing similar style, using Table of Contents of these Specifications as basis for format for listing costs of work for sections under Divisions 2-48. Identify each line item with number and title as listed in Table of Contents in these Specifications.
- D. **Preparing Schedule of Values:**
1. Itemize separate line item cost for each of the following general cost items: Performance and Payment Bonds, field supervision and layout, temporary facilities and controls.
  2. Itemize separate line item cost for work required by each Section of these Specifications. Break down installed cost with overhead and profit.
  3. Where determined to be feasible by the Owner, for each line item which has installed value of more than \$20,000, break down costs into sub-components or divisions of \$20,000 or less, rounding figures to nearest dollar. Make sum of total costs of all items listed in Schedule equal to total Contract Sum.
- E. **Preparing Schedule of Unit Material Values:**
1. Submit separate Schedule of unit prices for materials to be stored on which progress payments will be made. Make form of submittal parallel to Schedule of Values with each line item identified same as line item in Schedule of Values. Include in unit prices only: cost of material, delivery, unloading at site, and sales tax.
  2. Make sure unit prices multiplied by quantities equal material cost of that item in Schedule of Values.
- F. **Review and Resubmittal:** After Professional's review, if requested, revise and resubmit Schedule of Values in same manner.

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# APPLICATIONS FOR PAYMENT

## SECTION 01 2976

### 1.01 SCOPE

- A. This Section describes procedures for preparing and submitting Applications for Payment by the Contractor.

### 1.02 APPLICATIONS FOR PAYMENT

A. **Format:**

1. Applications for Payments will be prepared on AIA forms G702 - *Application and Certificate for Payment* and G703 - *Continuation Sheet*; or, a computer generated form containing similar data may be used.

B. **Preparation of Application:**

1. Present required information in typewritten form
2. Execute certification by signature of authorized officer
3. Use data from approved *Schedule of Values*. Provide dollar value in each column for each line item for portion of Work performed and for stored products.
4. List each authorized Change Order as an extension on continuation sheet, listing Change Order number and dollar amount as for an original Item of Work.
5. Prepare Application for Final Payment as specified in Section 01 7700 entitled *Contract Closeout*.

C. **Submittal Procedures:**

1. Submit original and one (1) copy of each Application for Payment
2. Submit an updated construction schedule with each Application for Payment as described in Section 01 3216 entitled *Progress Schedule* or Section 01 3127 entitled *Network Analysis Schedules*.
3. Submit requests for payment at intervals agreed upon by the Professional, Owner and Contractor.
4. Submit requests to the Professional at agreed upon times, or as may be directed otherwise.

D. **Substantiating Data:**

1. Submit data justifying dollar amounts in question when such information is needed.
2. Provide one (1) copy of the data with a cover letter for each submittal.
3. Indicate the Application number, date and line item number and description.

# PROJECT COORDINATION

## SECTION 01 3100

### 1.01 DESCRIPTION

- A. **Scope:** To set forth procedures, conditions and responsibility for coordination of the total project.
- B. **Project Coordinator:** The Contractor, as soon as practicable after the award of each Job Order, and prior to commencement of any on-site Work, shall submit name(s) and qualifications of the proposed superintendent and any assistant superintendents as set forth in the Contract Documents. Upon the approval of the Professional and the Owner, the Project Coordinator will remain until the Project is completed and cannot be removed during construction without the written consent of the Owner and the Professional.
- C. **Project Manager:** Where a Project involves a Mississippi Landmark or a building and/or site potentially eligible for such designation, the Contractor shall also submit name and qualifications of the project home office project manager as set forth in the General and Supplementary Conditions of the Contract. Upon the approval of the Professional and the Owner, the Project Coordinator will remain until the Project is completed and cannot be removed during construction without the written consent of the Owner and the Professional.



**DUTIES OF PROJECT COORDINATOR**

- A. **General:**
1. **Coordination:** Coordinate the work of all Subcontractors and Material Suppliers.
  2. **Supervision:** Supervise the activities of every phase of work taking place on the Project.
  3. **Mechanical/Electrical:** Take special care to coordinate and supervise the work of the plumbing, heating and cooling and electrical Subcontractors.
  4. **Communication:** Establish lines of authority and communication at the job site.
  5. **Location:** The Project Coordinator must be present on the job all of the time.
  6. **Permits:** Assist in obtaining building and special permits required for construction.
- B. **Interpretations of Contract Documents:**
1. **Consultation:** Consult with Architects and Engineers to obtain interpretations.
  2. **Assistance:** Assist in resolution of any questions.
  3. **Transmission:** Transmit written interpretations to concerned parties.
- C. **Cessation of Work:** Stop all work not in accordance with the requirements of the Contract Documents.
- D. **Division One:** Coordinate and assist in the preparation of all requirements of Division One and specifically as follows:
1. **Cutting and Patching:** Supervise and control all cutting and patching of other trades' work.
  2. **Project Meetings:** Schedule and preside at all project meetings.
  3. **Construction Schedules:** Prepare and submit all construction schedules; supervise work to monitor compliance with schedules.
  4. **Shop Drawings, Product Data and Samples:** Administer the processing of all submittals required by the Project Manual.
  5. **Schedule of Values:** Assist in preparation and be knowledgeable of each entry in the Schedule of Values.
  6. **Testing:** Coordinate all required testing.
  7. **Temporary Facilities and Controls:** Allocate, maintain and monitor all temporary facilities.
  8. **Substitutions and Product Options:** Administer the processing of all substitutions.
  9. **Project Closeout:** Conduct final inspections and assist in collection and preparation of closeout documents.
  10. **Cleaning:** Direct and execute a continuing cleaning program throughout construction, requiring each trade to dispose their own debris.
  11. **Project Record Documents:** Maintain up-to-date project record documents.
  12. **Safety Measures:** Plan and enforce all safety requirements.
- E. **Changes:** Recommend and assist in the preparation of requests to the Professional for any changes in the Contract.
- F. **Application for Payment:** Assist in the preparation and be knowledgeable of each entry in the Application and Certificate for Payment.

## 1.03

**SUBCONTRACTOR'S DUTIES**

- A. **General:** The Subcontractor is responsible for coordinating and supervising employees in the work to be accomplished under their part of the Contract.
- B. **Schedules:** Conduct work to assure compliance with construction schedules.
- C. **Suppliers:** Transmit all instructions to Material Suppliers.
- D. **Cooperation:** Cooperate with the Project Coordinator and other Subcontractors.

## 1.04

**OWNER-PURCHASED PRODUCTS**

- A. **General:** Cooperate, accept delivery, arrange storage and protect Owner-purchased products until installation, or final acceptance.

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# PROJECT MEETINGS

## SECTION 01 3119

### 1.01 DESCRIPTION

- A. **Contractor's Responsibilities:** The General Contractor will administer all progress meetings which include the following:
1. Prepare agenda
  2. Distribute written notice of meetings to listed attendees seven (7) days in advance
  3. Make physical arrangements for and presiding at the meetings
  4. Record minutes
  5. Distribute copies of the minutes to listed attendees, regardless of actual participation, within four (4) days
- B. **Pre-Construction Meeting:** The Bureau will schedule a pre-construction meeting as soon as possible after the award of Contract and the issuance of a *Notice to Proceed*.
1. **Attendees:**
    - a. Owner
    - b. Professional and Consultants
    - c. General Contractor
    - d. Major Subcontractors, including mechanical and electrical
    - e. Representatives of governmental, or other regulatory agencies
    - f. Commissioning Authority Professional (if Cx on project)
  2. **Minimum Agenda:** (prepared by the General Contractor)
    - a. Distribute and discuss preliminary construction schedule
    - b. Critical work sequencing
    - c. Designation of responsible personnel
    - d. Procedures for maintaining record documents
    - e. Use of premises, including office and storage areas
    - f. Owner's requirements
    - g. Security procedures
    - h. Housekeeping procedures
    - i. Commissioning issues (if Cx on project)
  3. **Utilities:** A written agreement must be reached on how all utilities will be furnished and the rates the Contractor will be charged. This agreement should be resolved at this meeting. Refer to Section 01 5000 entitled *Construction Facilities and Temporary Controls* and Section 01 8000 entitled *Special Requirements* of this Project Manual for additional utility requirements.
- C. **Progress Meetings:**
1. The Bureau will schedule regular meetings at the time of the pre-construction conference
  2. Hold all meetings as progress of work dictates
  3. **Attendees:**
    - a. Owner
    - b. Professional and Consultants
    - c. General Contractor
    - d. Subcontractors, as pertinent to the agenda
    - e. Commissioning Authority Professional (if Cx on project)
  4. **Minimum Agenda:**
    - a. Review, approve minutes of the previous meeting
    - b. Review work progress since last meeting
    - c. Note field inspections, problems and decisions
    - d. Identify problems which impede planned progress
    - e. Review off-site fabrication problems
    - f. Revise construction schedule, as indicated
    - g. Plan progress during the next work period
    - h. Review proposed changes

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- i. Complete other current business
  - j. Commissioning issues (if Cx on project)
- D. **Commissioning Meetings (if Cx on project):**
- 1. The Bureau will schedule a commissioning scoping meeting the pre-construction conference. Regular Commissioning Meetings will coincide with regularly scheduled Progress Meetings until such time that the Commissioning Process requires additional meetings. The Commissioning Authority Professional will chair, facilitate and document all Commissioning Meetings.
  - 2. **Attendees:**
    - a. Owner
    - b. Commissioning Authority Professional
    - c. Professional and Consultants
    - d. General Contractor
    - e. Subcontractors, as pertinent to unresolved issues identified in current Issues Log
    - f. Testing, Adjusting and Balancing Contractor
    - g. Using Agency's Building Operator/Physical Plant Representative
  - 3. **Minimum Agenda:**
    - a. Review, approve minutes of the previous meeting
    - b. Review Issues Log

## PROGRESS SCHEDULES

### SECTION 01 3216

#### 1.01 DESCRIPTION

- A. **Scope:** Provide projected construction schedules for the entire Work and revise periodically. The following is a minimum requirement and other type schedules are acceptable with Owner's approval. This type of schedule is acceptable for any Project whose initial Contract award amount is **less than** one (1) million dollars (\$1,000,000).
- B. **Form of Schedules:** Prepare in form of horizontal bar chart.
  - 1. Provide separate horizontal bar column for each trade or operation.
  - 2. Place in order of the Table of Contents of Specifications.
  - 3. Identify each column by major Specification section number.
  - 4. Identify the first work day of each week by horizontal time scale.
  - 5. Scale and space to allow for updating.
- C. **Contents of Schedule:**
  - 1. Provide complete sequence of construction by activity.
  - 2. Indicate dates for beginning and completion of each stage of construction.
  - 3. Identify work of separate floors, separate phases, or other logically grouped activities.
  - 4. Show projected percentage of completion for each item of work as of first day of month.
- D. **Updating:**
  - 1. Show all changes occurring since previous submission of updated schedule.
  - 2. Indicate progress of each activity and completion dates.
- E. **Submittals:**
  - 1. Submit initial schedules to the Professional within fifteen (15) days after date of *Notice to Proceed*.
  - 2. Submit to Professional periodically updated schedules accurately depicting progress to first day of each month.
  - 3. Submit two (2) copies, one (1) to be retained by the Professional and the other forwarded to the Owner.

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# NETWORK ANALYSIS SCHEDULE

## SECTION 01 3217

### 1.01 DESCRIPTION

- A. **Scope:** Provide projected network analysis schedules for the entire Work and revise periodically. This type of schedule is acceptable for any Project whose initial Contract award amount is one million dollars (\$1,000,000), or greater.

### 1.02 REFERENCES

- A. **Critical Path Methods in Construction Practice, 4<sup>th</sup> Edition:** Written by James M. Antill and Ronald W. Woodhead, published by Wiley.

### 1.03 QUALITY ASSURANCE

- A. **Contractor's Administrative Personnel:** Two (2) years minimum experience in using and monitoring CPM schedules on comparable Projects is required.

### 1.04 FORMAT

- A. **Listings:** Reading from left to right, in ascending order for each activity, identify each activity with the applicable specification section number.
- B. **Diagram Sheet Size:** Height and width as required.
- C. **Scale and Spacing:** To allow for notations and revisions.

### 1.05 SCHEDULES

- A. **Critical Path Methods:** Prepare network analysis diagrams and supporting mathematical analyses using the critical path method.
- B. **Order of Work:** Illustrate order and interdependence of activities and sequence of Work; how start of a given activity depends on completion of preceding activities, and how completion of the activity may restrain start of subsequent activities.
- C. **Complete Sequence of Construction:** Illustrate complete sequence of construction by activity, identifying work of separate stages. Provide dates for submittals and return of submittals; dates for procurement and delivery of products; and dates for installation and provision for testing. Provide legend for symbols and abbreviations used.
- D. **Mathematical Analysis:** Tabulate each activity of detailed network diagrams, using calendar dates, and identify for each activity:
1. Preceding and following event numbers
  2. Activity description
  3. Estimated duration of activity, in maximum thirty (30) day intervals
  4. Earliest start date
  5. Earliest finish date
  6. Actual start date
  7. Actual finish date
  8. Latest start date
  9. Latest finish date
  10. Total and free float

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11. Monetary value of activity (keyed to *Schedule of Values*)
  12. Percentage of activity completed
  13. Responsibility
- E. **Analysis Program:** Capable of compiling monetary value of completed and partially completed activities, of accepting revised completion dates, and re-computation of all dates and floats.
- F. **Required Sorts:** List activities in sorts or groups:
1. By preceding work item or event number from lowest to highest
  2. By amount of float, then in order of early start
  3. By responsibility in order of earliest possible start date
  4. In order of latest allowable start dates
  5. In order of latest allowable finish dates
  6. Contractor's periodic payment request sorted by *Schedule of Values* listings, Specifications section
  7. Listing of basic input data which generates the report
  8. Listing of activities on the critical path
  9. Monthly cash flow
- G. **Schedule of Values:** Coordinate contents with *Schedule of Values* in Section 01 2973.

#### 1.06 SUBMITTALS FOR REVIEW

- A. **Preliminary Network Diagram:** Within fifteen (15) days after the date established in the *Notice to Proceed* submit proposed preliminary network diagram defining planned operations for the first sixty (60) days of Work, with a general outline for the remaining Work.
- B. **Review:** Participate in review of preliminary and complete network diagrams jointly with the Professional.
- C. **Proposed Complete Network Diagram:** Within twenty (20) days after joint review of proposed preliminary network diagram, submit draft of proposed complete network diagram for review. Include written certification that mechanical and electrical Subcontractors have reviewed and accepted proposed schedule.
- D. **Complete Network Diagram:** Within ten (10) days after joint review, submit complete network analysis consisting of network diagrams and mathematical analysis.
- E. **Updated Network Schedules:** Submit updated network schedules with each Application for Payment.
- F. **Copies:** Submit the number of opaque reproductions the Contractor requires, plus two (2) copies which will be retained by the Professional and the Owner.

#### 1.07 REVIEW AND EVALUATION

- A. **Review:** Participate in joint review and evaluation of network diagrams and analysis with the Professional at each submittal.
- B. **Evaluate:** Evaluate Project status to determine Work behind schedule and Work ahead of schedule.
- C. **Revisions:** After review and approval of the Professional, revise as necessary as a result of the review and resubmit within ten (10) days.

#### 1.08 UPDATING SCHEDULES

- A. **Schedules:** Maintain schedules to record actual start and finish dates of completed activities.
- B. **Progress:** Indicate progress of each activity to date of revision, with projected completion date of each activity. Update diagrams to graphically depict current status of Work.

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### Division One

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- C. **Modifications:** Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
  - D. **Changes:** Indicate changes required to maintain Date of Substantial or Total Completion. These changes will be made only with the approval of the Professional.
  - E. **Extensions:** Contract completion time will be adjusted only for causes specified in the Contract. Requests for an extension of the contract completion date by the Contractor shall be supported with a justification, CPM data and supporting evidence as the Owner may deem necessary for determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the Contract. Submission of proof based on revised activity logic duration and costs is obligatory to any approvals. The schedule must clearly display that the Contractor has used, in full, all the float time available for the work involved in the request. The Owner's determination as to the total number of days of contract extension shall be based upon the current computer-produced calendar-dated schedule for the time period in question and all other relevant information. Actual delays in activities which, according to the computer-produced calendar-dated schedule, do not affect the extended and predicted contract completion dates shown by the critical path in the network, will not be the basis for a change to the contract completion date. The Owner will, within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Owner's decision. The Contractor shall submit each request for a change in the contract completion date to the Owner. The Contractor shall include as a part of each change order proposal, a sketch showing all CPM revisions, duration changes, and cost changes, for the work in question and its relationship to other activities on the approved arrow diagram.
  - F. **Substantiate:** Submit sorts required to support recommended changes.
  - G. **Report:** Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect.

1.09 **DISTRIBUTION**

- A. **Distribution of Copies:** Following joint review, distribute copies of updated schedules to Contractor's Project site, to Subcontractors, Suppliers, Professional and Owner.
- B. **Reporting Problems:** Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

## **SHOP DRAWINGS, PRODUCT DATA AND SAMPLES**

### **SECTION 01 3323**

1.01 **DESCRIPTION**

- A. **Scope:** Submit to the Professional shop drawings, product data and samples required by Specification sections. Submit an additional copy of shop drawings, product data and samples related to items/systems identified to be commissioned to the Commissioning Authority Professional to be reviewed concurrently with the Professional. (if Cx on project).
- B. **Shop Drawings:** Original drawings prepared by Contractor, Subcontractor, Supplier, or Distributor which illustrate some portion of the Work; showing fabrication, layout, setting, or erection details.
  - 1. Prepared by a qualified detailer.
  - 2. Identify details by reference to sheet and detail numbers shown on Contract drawings.
  - 3. Minimum sheet size: 8 1/2" x 11"
  - 4. Reproductions for submittals: Opaque diazo prints.

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C. **Product Data:**

1. **Manufacturer's Standard Schematic Drawings:** Modify drawings to delete information which is not applicable to the Project. Supplement standard information to provide additional information applicable to the Project.
2. **Manufacturer's Catalog Sheets, Brochures, Diagrams, Schedules, Performance Charts, Illustrations and Other Standard Descriptive Data:** Clearly mark each copy to identify pertinent materials, products, or models. Show dimensions and clearances required. Show performance characteristics and capacities, wiring diagrams and controls.

D. **Samples:** Physical examples to illustrate materials, equipment or workmanship and to establish standard by which completed work is judged.

1. **Office Samples:** Of sufficient size and quantity to clearly illustrate functional characteristics of products or material with integrally related parts and attachment devices and full range of color samples. After review, samples remain the property of the Professional until completion of the construction project.
2. **Field Samples and Mock-ups:** Erect on project site at location acceptable to Professional. Construct each sample, or mock-up, completely including work of all trades required in finished work.

E. **Contractor's Responsibilities:**

1. Review shop drawings, product data and samples prior to submission.
2. Verify field measurements, field construction criteria, catalog numbers and similar data.
3. Coordinate each submittal with requirements of work and of Contract Documents.
4. Contractor's responsibility for errors and omissions in submittals is not relieved by the Professional's review of submittals.
5. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Professional's review of submittals unless Professional gives written acceptance of specific deviations.
6. Notify Professional in writing at the time of submission of deviations in submittals from requirements of Contract Documents.
7. Begin no work requiring submittals until the return of submittals bearing Professional's stamp and initials, or signature indicating review.
8. After Professional's review, distribute copies.

F. **Submission Requirements:**

1. Schedule submission with ample time before dates reviewed submittals will be needed.
2. Submit number of copies of shop drawings and product data which Contractor requires for distribution, plus one (1) copy to be retained by the Professional.
3. Submit number of samples specified in each Specification section.
4. Accompany submittals with transmittal letter, in duplicate, containing date, Project title and number; Contractor's name and address; the number of each shop drawings, product data and samples submitted; notification of deviations from Contract Documents; and, other pertinent data.
5. Submittals shall include:
  - a. Date and revision dates.
  - b. Project title and number.
  - c. The names of the Professional, Contractor, Supplier, Manufacturer and separate detailer, when pertinent.
  - d. Identification of product, or material.
  - e. Relation to adjacent structure, or materials.
  - f. Field dimensions clearly identified as such.
  - g. Specification section number.
  - h. Applicable standards such as ASTM number, or federal specifications.
  - i. A blank space (2" x 3") for the Professional's stamp.
  - j. Identification of deviations from Contract Documents.
  - k. Contractor's stamp, initialed or signed, certifying the review of submittal, verification of field measurements and compliance with Contract Documents.

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- G. **Resubmission Requirements:**
1. **Shop Drawings:** Revise initial drawings, as required, and resubmit as specified for initial submittal. Indicate on the drawings any changes which have been made other than those required by the Professional.
  2. **Product Data and Samples:** Submit new data and samples, as required, for initial submittal.
- H. **Distribution of Submittals After Review:**
1. Distribute copies of shop drawings and product data which carry Professional's stamp to Contractor's file, job site file, Subcontractor, Supplier and Fabricator.
  2. Distribute samples as directed.
- I. **Professional's Duties:**
1. Review submittals with reasonable promptness.
  2. Review for design concept of Project and information given in Contract Documents.
  3. Review of separate item does not constitute review of an assembly in which item functions.
  4. Affix stamp and initials, or signature, certifying the review of submittal.
  5. Return submittals to Contractor for distribution.

## **TESTING LABORATORY SERVICES**

### **SECTION 01 4529**

#### 1.01 **DESCRIPTION**

- A. **Scope:** The Contractor will employ and pay for the services of an independent laboratory to perform specified services. In some instances, Owner will provide such testing services through independent testing laboratory retained by the Professional. Employment of a testing laboratory or provision of such services by others shall in no way relieve the Contractor of his obligation to perform work in accordance with the Contract.
- B. **Inspection, Sampling and Testing:** Refer to each individual specification section for specific inspection, sampling and testing requirements.
- C. **Qualification of Laboratory:**
1. Meet the *Recommended Requirements for Independent Laboratory Qualification* published by the American Council of Independent Laboratories.
  2. Meet the basic requirements of ASTM E 329-70, *Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction*.
  3. **Responsible Engineer:** Perform all testing under the direct supervision of a registered Professional engineer employed full time by the testing laboratory.
  4. **Submittals:** Submit a copy of the inspection report of the facilities made by materials reference laboratory of National Bureau of Standards of any deficiencies reported by the inspection.
  5. **Approval:** The Professional must approve the testing laboratory.
- D. **Laboratory's Duties:**
1. Upon notice, cooperate with the Professional and the Contractor to promptly provide qualified personnel. Perform specified inspections, sampling and testing of materials and methods of construction to ascertain compliance with requirements of Contract Documents. Promptly notify the Professional and the Contractor of irregularities or deficiencies of work observed during performance of services.
  2. Reports of inspections and tests will include:
    - a. Date issued
    - b. Project title and number
    - c. Testing laboratory's name and address
    - d. Name and signature of inspector
    - e. Date of inspection, or sampling
    - f. Record of temperature and weather
    - g. Date of test

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### **Division One**



- h. Identification of product and Specification section
  - i. Location of Project
  - j. Type of inspection, or test
  - k. Observations regarding compliance with Contract Documents
3. Prompt distribution of copies of the inspection reports and tests to:
- a. Owner
  - b. Professional
  - c. General Contractor
  - d. Consulting Engineer, when pertinent
  - e. Subcontractor, when pertinent

**E. Contractor's Responsibilities:**

- 1. Cooperate with laboratory personnel to provide access to work and to manufacturer's operation. Provide the laboratory with the required quantities of preliminary samples representative of materials to be tested and required quantities. When required, furnish copies of mill test reports. Furnish laboratory casual labor to obtain and handle samples at the site and to facilitate inspections and tests. Provide facilities for laboratory's exclusive use for storage and curing of test samples. Notify laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
- 2. Arrange and pay for additional samples and tests required for Contractor's convenience. When initial tests indicate work does not comply with Contract Documents, the Contractor may employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing.

## CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

### SECTION 01 5000

1.01 **DESCRIPTION**

- A. **Scope:** Work required under this section consists of all temporary construction facilities, services and related items to complete the work indicated on the drawings and described in the Project Manual.
- B. **Standards:**
  - 1. Conform to or exceed all temporary construction requirements stated in the current edition of the **International Building Code** [Chapter entitled *Safeguards During Construction*].
  - 2. Refer to Section 00 7200 entitled *General Conditions of the Contract For Construction, Article 10 Protection of Persons and Property* as amended by Section 00 7300 *Supplementary Conditions*.
- C. **Materials:** All materials required by the Work of this section shall be as specified in the respective sections.

1.02 **FACILITIES AND CONTROLS**

- A. **Access:** The Prime General Contractor shall provide an adequate access and/or roads to the site of the structure, if required for the prosecution of work; and, should also provide and maintain at least one (1) temporary, or permanent, access to each working elevation to be permanently occupied.
- B. **Hoisting Facilities:** The Prime General Contractor shall be responsible for providing suitable capacity and hoisting facilities for all people and materials. The use of the hoisting facilities shall be by mutual agreement of the Prime General Contractor and the individual Contractor.
- C. **Field Office and Sheds:** At all times, the Prime General Contractor shall provide and maintain an on-site office with telephone, which may also be used by Subcontractors, the Owner and the Professional. Office location will be approved by the Owner. Where no suitable available space within an existing building is specifically identified for such purposes in Section 01 8000 entitled *Special Requirements* or elsewhere in the Contract Documents, the Prime General Contractor shall provide a trailer with full utilities for such purpose throughout

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the Contract Time with space for both Contractor management personnel as well as for holding progress meetings. Each general and individual Contractor shall provide suitable watertight/dampproof sheds or containers to house their construction materials.

- D. **Sanitation Facilities:** The Prime General Contractor is responsible for furnishing adequate temporary toilet facilities on the job site unless use of existing facilities on site is specifically permitted in Section 01 8000 entitled *Special Requirements* or elsewhere in the Contract Documents.
- E. **Drinking Water:** The Prime General Contractor shall provide at all times sanitary drinking water facilities for all workmen on the job including ice, when required, and paper cups, etc.
- F. **Fire Protection:** The Prime General Contractor shall provide general temporary fire protection except where the Work is within an existing building with operational permanent fire protection systems. Subcontractors will be responsible for their own. Where operational permanent fire protection systems exist, the Prime General Contractor and all Subcontractors shall take care not to damage such systems and take measures to prevent accidentally engaging such systems. Where the temporary disabling of any existing operational system is required for the performance of the Work, such shut-down shall be coordinated with the Owner.
- G. **Storage:** The Prime General Contractor shall coordinate the allocation of storage areas to the various Subcontractors.
- H. **Temporary Heating/Cooling/Dehumidification:** The Prime General Contractor shall provide heating, cooling, dehumidification, fuel and services, as necessary, to protect all work from dampness and cold or excessive heat and humidity until final acceptance. If in the late stages of the construction, mechanical and electrical installations will permit operation without damage to systems, and subject to the approval of the Professional and Owner, the mechanical and electrical facilities may be used to provide heating, cooling, dehumidification and ventilation in strict accordance with conditions established by the Professional and/or his Consultants. However, the Owner is saved harmless of any costs of operation, including the periodic replacement of filters, or responsibility as to acceptance of mechanical and/or electrical installations.
- I. **Utilities:** The Prime General Contractor shall make arrangements for and furnish all water, gas, electricity (lighting and power) and other utilities necessary for construction purposes unless otherwise specified in Section 01 8000 entitled *Special Requirements* or elsewhere in the Contract Documents. Where any such utilities are to be furnished by the Institution or Agency, and such requirements are not detailed in Section 01 8000 or elsewhere in the Contract Documents, a written agreement must be reached on how any such utilities (water, gas, and electricity) will be furnished and the rates the Contractor will be charged by the Institution or Agency prior to initial use of any such utility. A copy of the final agreement signed by the Contractor and the Institution or Agency must be forwarded to the Owner. If the written agreement is not filed with the Owner, the Contractor and the Institution or Agency waives all rights as to the rates charged. The Owner will then determine all utility rates and assess the charges before final payment is rendered.
- J. **Project Sign:** Where required in Section 01 8000 entitled *Special Requirements* or elsewhere in the Contract Documents, the Contractor shall furnish and erect on adequate supports and maintain one (1) neatly constructed sign identifying the names of the Project, Governor, Owner, Prime Professional, Contractor and Using Agency/Institution, and Governing Board as applicable. Sign shall also indicate the source(s) of funds for the project. The erection of additional signs depicting the names of the Contractor, Sub-Contractor, or Vendors is strictly prohibited. Unless a larger sign is otherwise detailed in the Contract Documents, such sign shall be as follows:
1. The Prime General Contractor will erect on adequate supports one (1) neatly constructed and painted or printed four foot by eight foot (4' x 8') plywood or equivalent panel conforming to the Owner's Project Sign Template to be furnished with text, colors, and graphics specific to the Project.
  2. No logos, graphics, custom fonts or similar are permitted for Prime Professional or Contractor names depicted on Project Sign.
  3. The Prime General Contractor is responsible for maintaining the Project Sign until Final Acceptance of the Work or until Substantial Completion when authorized by the Owner. Any damage, including chipping, peeling or fading of text or images shall be promptly repaired or replaced.

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## Division One

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# SUBSTITUTIONS AND PRODUCT OPTIONS

## SECTION 01 6000

### 1.01 DESCRIPTION

A. Scope: To set forth the procedure and conditions for substitutions and to give the product options available to the Contractor.

### 1.02 PRODUCTS LIST

A. Within thirty (30) days after the Contract has been signed, the Contractor will submit to the Professional five (5) copies of a complete list of all products proposed for installation.

B. Tabulate the list by Specification sections.

C. For products specified under reference standards, include with listing of each product:

1. Name and address of Manufacturer.
2. Trade name.
3. Model, or catalog designation.
4. Manufacturer's data.
5. Performance and test data.
6. Reference standards.
7. Percentage of recovered materials.

### 1.03 CONTRACTOR'S OPTIONS

A. For products specified only by reference standards or technical performance requirements, select any product meeting product standards by any Manufacturer.

B. For products specified by naming a minimum of three (3) products or Manufacturers, select any product and Manufacturer named. Equivalent products of domestic manufacture containing not less than the same percentage of recovered materials as named products will always be accepted if equal in all consequential respects.

C. For product specified by naming one (1) or more products and/or Manufacturers, but indicating the option of selecting equivalent products by stating "or equal" after specified product and/or Manufacturer, select named product or any product of domestic manufacture containing not less than the same percentage of recovered material as named product meeting specified reference standards or technical performance requirements as represented by the named products and/or Manufacturers.

D. For products specified by naming only one (1) product and/or Manufacturer as a "basis of design", an equivalent product of domestic manufacture containing not less than the same percentage of recovered materials as named product will always be accepted if it is equal in all consequential respects.

E. For products specified by naming only one (1) product and Manufacturer and stating no substitutions will be accepted, there is no option and no substitutions will be allowed. This option must have written approval by the Owner before bidding.

### 1.04 SUBSTITUTIONS

A. A product or construction method that varies from a product or construction method specified in one or more consequential characteristics, reference standards, or technical performance requirements shall be considered a substitution.

B. Professional will not consider requests for substitutions during bidding.

C. Within thirty (30) days after the Contact has been signed, the Professional will consider formal requests from the Contractor for substitution of products in place of those specified. Submit five (5) copies of the request for substitutions. Include in the request:

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## Division One

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1. Narrative summarizing characteristics, reference standards, or technical performance requirements that product varies from and how the proposed product or construction method will meet or exceed project requirements
  2. For products:
    - a. Product identification including Manufacturer's name and address.
    - b. Manufacturer's literature: Product description, performance and test data and reference standards.
    - c. Samples.
    - d. Name and address of similar projects on which product was used and date of installation.
  3. For construction methods:
    - a. Detailed description of proposed method.
    - b. Drawings illustrating methods.
  4. Agreement to pay for any additional professional costs if acceptance of substitution will require substantial revision of Contract Documents.
  5. Data relating to any delays to the construction schedule if any will result from proposed substitution.
  6. Accurate cost data on proposed substitution if any project cost increases are anticipated or any cost savings are being offered for proposed substitution.
- D. In making request for substitution, Contractor represents:
1. Proposed product, or method, has been investigated and determined that it is equal or superior in all respects to that specified.
  2. The same or better guarantee and/or warranty will be provided for substitutions for product or method specified.
  3. Installation of accepted substitutions will be coordinated into the Work, making such changes required of work to be complete in all respects at no additional cost to the Owner.
  4. All claims for additional costs related to substitution, including any delays to the construction schedule, which consequently become apparent will be waived.
  5. Unless specifically identified in substitution submittal and such delay is specifically agreed to by Change Order to the Contract, substitution will not cause any delay to the construction schedule.
  6. Proposed product, or method, will not result in any additional costs to the Owner.
- E. Substitutions will not be considered if:
1. Indicated, or implied, on shop drawings or product data submittals without formal request submitted in accordance with this Section.
  2. Acceptance will require substantial revision of Contract Documents unless compensation for such additional professional costs are paid by Contractor at no additional cost to the Owner.
  3. In the Professional's judgment, the product, or material, is not equal.
- F. For products where all named products are of domestic manufacture, substitutions of products of foreign manufacture will not be considered unless Contractor can sufficiently document that one or more of the following conditions exist:
1. No product of domestic manufacture meeting the product specifications is readily available that can be provided within the time constraints of the project requirements.
  2. Cost to provide a product of domestic manufacture meeting the product specifications is significantly greater than proposed product substitute.
- G. Substitutions of products with those of less percentage of recovered material than named product(s) shall only be considered where Contractor can sufficiently document that one or more of the following conditions exist:
1. No product of equal or greater percentage of recovered material as named product(s) is available that can be provided within the time constraints of the project requirements.
  2. Cost to provide a product of equal or greater percentage of recovered material as named product(s) meeting the product specifications is significantly greater than that of named product(s).

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## CUTTING AND PATCHING

### SECTION 01 7329

#### 1.01 GENERAL DESCRIPTION

- A. **Scope:** To set forth broad, general conditions covering cutting and patching that applies to everyone and everything on the job.
- B. Execute cutting including excavating, fitting, or patching of work required to:
  - 1. Make several parts fit properly.
  - 2. Uncover work to provide for installation of ill-timed work.
  - 3. Remove and replace defective work.
  - 4. Remove and replace work not conforming to Contract requirements.
  - 5. Install specified work in existing construction.
- C. In addition to Contract requirements, upon Professional's written instructions:
  - 1. Uncover work for observation of covered work.
  - 2. Remove samples of installed materials for testing.
  - 3. Remove work to provide alteration of existing work.
- D. Do not cut or alter work of another Contractor without permission.
- E. **Payment of Costs:** Costs caused by ill-timed, or defective work, or work not conforming to Contract Documents will be borne by party responsible for ill-timed, defective work, or non-conforming work.

#### 1.02 MATERIALS/PRODUCTS

- A. **Materials for Replacement or Work Removed:** Comply with Specifications for type of work to be accomplished.

#### 1.03 EXECUTION

- A. **Inspection:** Inspect existing conditions of work, including elements subject to movement, or damage during cutting and patching.
- B. **Preparation Prior to Cutting:** Provide shoring, bracing and support, as required, to maintain structural integrity of the building. Provide protection for other portions of work and protection from the elements.
- C. **Performance:**
  - 1. Execute cutting and demolition by methods which prevent damage to other work and will provide surfaces to receive installation of repairs and new work.
  - 2. Execute excavating and backfilling by methods which prevent damage to other work and prevent settlement.
  - 3. Restore work which has been cut or removed; install new products to provide completed work in accordance with requirements of Contract Documents.
  - 4. Refinish entire surfaces, as necessary, to provide an even finish. Refinish continuous surfaces to the nearest intersection and assemblies entirely.

## CLEANING

### SECTION 01 7400

#### 1.01 DESCRIPTION

- A. **Scope:** Maintain premises and public properties from accumulations of waste, debris and rubbish caused by operations. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials and clean all sight-exposed surfaces; leave Project clean and ready for occupancy.

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### Division One

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1.02 **PRODUCTS**

- A. **Materials:** Use only cleaning materials recommended by Manufacturer of surface to be cleaned. Use cleaning materials only on surfaces recommended by the cleaning materials Manufacturer.

1.03 **EXECUTION**

- A. **During Construction:** Execute cleaning to insure that building, grounds and public properties are maintained free from accumulations of waste materials and rubbish. Wet down dry materials and rubbish to lay dust and prevent blowing dust. At reasonable intervals during progress of work, clean site and public properties and dispose of waste materials, debris and rubbish. Remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off Owner's property. Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights. Schedule cleaning operations so that dust or other contaminants resulting from cleaning process will not fall on wet or newly painted surfaces.
- B. **Final Cleaning:** Employ experienced workmen, or professional cleaners, for final cleaning. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces and concealed spaces. Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials from sight-exposed finishes. Repair, patch and touch up marred surfaces to specified finish to match adjacent surfaces. Broom clean paved surfaces; rake clean other surfaces of grounds. Replace air conditioning filters, if units were operated during construction. Clean ducts, blowers and coils if air conditioning units were operated without filters during construction. Maintain cleaning until Project, or respective portions thereof, is occupied by Owner.

**STARTING OF SYSTEMS**  
**SECTION 01 7500**

1.01 **GENERAL**

- A. **Scope:** This Section describes the procedures for start up of all building equipment and systems including necessary demonstration and instructions.

1.02 **STARTING SYSTEMS**

- A. Coordinate Schedule for start-up of various equipment and systems.
- B. Notify Professional and Owner seven (7) days prior to start-up of each system.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.
- D. Verify that tests, meter readings and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of responsible Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require Manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

**Division One**

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1.03 **DEMONSTRATION AND INSTRUCTIONS**

- A. Demonstrate operation and maintenance of Products to Owner's personnel prior to date of Substantial Completion.
- B. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- C. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed-upon times, at designated location.
- D. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

**CONTRACT CLOSEOUT**  
**SECTION 01 7700**

1.01 **DESCRIPTION**

- A. **Scope:** The work required in this Section consists of the final inspections and the submission of all closeout documents and related items to complete the Work indicated on the Drawings and described in the Project Manual.

1.02 **FINAL INSPECTIONS**

- A. **Professional's Review:** The Contractor shall make written notice that the Work of a Job Order is ready for final inspection and acceptance by the Owner to the Professional; such notice to be given not less than ten (10) days prior to the date desired for inspection. The Professional will promptly visit the site and assess the state of Work of the Job Order to determine if it is ready for final inspection by the Owner. If, in the Professional's judgment, the Work of the Job Order is not ready for final inspection, the Professional will report the reasons for such determination to the Contractor. In such case, the Contractor shall then submit a revised request for final inspection when those reasons have been resolved. Once the Professional determines the Work of the Job Order is ready for final inspection, the Prime Professional will call for final inspection of the Project with the Owner for the purpose of determining whether the Work of the Job Order is acceptable under the Contract Documents.
- B. **Owner's Inspection:** After the Professional has ascertained the Work of the Job Order to be ready, an Owner's inspection will be scheduled within ten (10) days thereafter. The Contractor will have not more than thirty (30) days thereafter, unless a longer time for specific items is mutually agreed to in writing by the Owner and Contractor to make any corrections of the final punch list items and to submit closeout documents.
- C. **Correction of Work Before Final Payment:** The Contractor shall address all defects or discrepancies noted on the final punch list and promptly remove from the Owner's premises all materials condemned for failure to conform to the Contract, whether incorporated in the Work or not, and the Contractor shall, at his own expense, replace such condemned materials with those conforming to the requirements of the Contract. Failure to remedy such defects or discrepancies after thirty (30) days, unless a longer time for specific items is mutually agreed to in writing by the Owner and Contractor, will allow the Owner to make good such defects and such costs shall be deducted from the balance due the Contractor, or charged to the Contractor in the event no payment is due.

1.03 **CLOSEOUT DOCUMENTS**

Unless otherwise notified, the Contractor shall submit to the Owner through the Professional, three (3) copies of the following before final payment is made:

- A. **Request for Final Payment:** AIA Document G702, current edition, completed in full or a computer generated form having similar data.

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**Division One**

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- B. **Consent of Surety Company to Final Payment:** AIA Document G707, current edition, completed in full by the Bonding company.
  - C. **Power of Attorney:** Closeout documents should be accompanied by an appropriate Power of Attorney.
  - D. **Release of Liens and Certification that All Bills Have Been Paid:** AIA Document G706A, current edition, completed in full or a sworn statement and affidavit from the Contractor to the Owner stating that all bills for this job have been paid and that the Owner is released from any and all claims and/or damages.
  - E. **Contractor's Affidavit of Payment of Debts and Claims:** AIA Document G706, current edition, completed in full.
  - F. **Guarantee of Work:** Sworn statement that all work is guaranteed against defects in materials and workmanship for one (1) year from date of Owner's acceptance, except where specified for longer periods.
    - 1. Word the Guaranty as follows, or in a similar manner:  
*We hereby guarantee all work performed by us on the above captioned Project to be free from defective materials and workmanship for a period of one (1) year or such longer period of time as may be called for in the Contract Documents for such portions of the Work.*
    - 2. All guarantees and warranties shall be obtained in the Owner's name.
    - 3. Within the Guaranty period, if repairs or changes are requested in connection with guaranteed work which, in the opinion of the Owner, are rendered necessary as a result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the Contract, the Contractor shall promptly, upon receipt of notice from and without expense to the Owner, place in satisfactory condition building, site, equipment or contents thereof. The Contractor shall make good any work, materials, equipment or contents of said buildings or site which may be disturbed by fulfilling any such Guaranty.
    - 4. If, after notice, the Contractor fails to proceed promptly to comply with the terms of the Guaranty, the Owner may have the defects corrected and the Contractor and his Sureties shall be liable for all expense incurred.
    - 5. All special guarantees applicable to definite parts of the work stipulated in the Project Manual or other documents forming part of the Contract shall be subject to the terms of this paragraph during the first year of the life of such special guaranty.
  - G. **Project Record Documents:** Furnish all other record documents as set forth in Section 01 7800 entitled *Project Record Documents*. Failure provide such documents within thirty (30) days of Request for Final Payment shall result in the Owner, in consultation with the Professional, determining a fair market value of such documents with such costs to be retained or deducted from the balance due the Contractor, or charged to the Contractor in the event no payment is due.
  - H. **Additional Documents Specified Within the Project Manual:** Provide all additional certificates, warranties, guarantees, bonds or documents as called for in the individual sections of the Project Manual. The Contractor is responsible for examining the Project Manual for these requirements. Failure provide such documents within thirty (30) days of Request for Final Payment shall result in the Owner, in consultation with the Professional, determining a fair market value of such documents with such costs shall be deducted from the balance due the Contractor, or charged to the Contractor in the event no payment is due.

## PROJECT RECORD DOCUMENTS

### SECTION 01 7800

#### 1.01 DESCRIPTION

- A. **Scope:** To set forth the procedure and requirements for keeping project record documents.

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### Division One



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- B. **Maintenance Documents:**
1. Throughout the Contract, maintain one (1) copy of all of the following: Contract Drawings, Project Manual, Addenda, Change Order(s), reviewed shop drawings, reviewed submittals, hardware schedules, field, and laboratory test records, equipment brochures, parts lists, operating instructions and other modifications to the Contract.
  2. Store documents on site apart from documents used for construction.
  3. Maintain documents in clean, dry, legible condition. Do not use record documents for construction purposes.
  4. Make documents available, at all times, for inspection by the Professional, Commissioning Authority Professional, and the Owner.
  5. Keep documents in 8 ½" x 11" loose leaf binders. Clearly label each binder on the spine. Sub-divide with permanently marked tabs of card stock. Provide a main tab for each specification section. Provide sub-tabs for each major piece of equipment or component.
  6. Format for information behind each tabbed piece of equipment/component shall be:
    - a. Contractor/Installer Information: Include address, phone number and contact name. Include emergency service contact information as applicable.
    - b. Manufacturer Information: Include address, phone number and contact name.
    - c. Shop Drawings and Product Data
    - d. Operation and Maintenance Instructions
    - e. Control Drawings
- C. **Recording:**
1. **General:** Mark all modifications in red pencil. Keep record documents current. Do not permanently conceal any work until required information has been recorded.
  2. **Contract Drawings:** Legibly mark to record actual construction.
    - a. Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements.
    - b. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
    - c. Field changes in dimension and detail.
    - d. Changes made by change order(s) or field order(s).
  3. **Project Manual and Addenda:** Legibly mark up each section to record Manufacturer, trade name, catalog number and Supplier of each product and item of equipment actually installed.
  4. **Shop Drawings:** Maintain as record documents. Legibly mark drawings to record changes made after review.
- D. **Submittal:** At completion of Project, deliver two (2) copies of each record document to the Professional, who will transmit both sets to the Institution or Agency. Additionally, provide to Owner updated As-Built Contract Documents in electronic format utilizing electronic format copy of Contract Documents furnished by Professional or by scanning of marked-up contract Documents.

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# SPECIAL REQUIREMENTS

## SECTION 01 8000

### PART 1 - SUMMARY OF WORK SUPPLEMENT

#### 1.01 WORK SEQUENCE

- A. Owner will not occupy the building during construction.
- B. Construct work in stages as follows:
  - 1. N / A
  - 2. N / A
  - 3. N / A

#### 1.02 PARTIAL OWNER OCCUPANCY

- A. Schedule early completion of designated areas for Owner's usage prior to substantial completion of entire Project as follows: N/A
- B. Owner will occupy the following areas throughout the Project or during portions of the Project as follows:  
N/A
- C. Prior to occupancy of any portion of the Project, a *Certificate of Substantial Completion* for designated areas shall be executed establishing responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance for such portion of the Work.

### PART 2 - ALLOWANCE SUPPLEMENT

#### 2.01 SCHEDULE OF ALLOWANCES

- A. Include in the Bid, for inclusion in the Contract Sum, the amount of \$ 450,000 for purchase of ENERGY MANAGEMENT AND CONTROL SYSTEM  
(Refer to Section 23 09 00, ENERGY MANAGEMENT AND CONTROL SYSTEM - GENERAL)

### PART 3 - ALTERNATE SUPPLEMENT

#### 3.01 DESCRIPTION OF ALTERNATES

- A. Alternate Number One. PROVIDE ALL LABOR AND MATERIALS ASSOCIATED WITH THE CONSTRUCTION OF THE ALUMINUM ENTRY CANOPY AS DESCRIBED THROUGHOUT THE CONSTRUCTION DOCUMENTS, INCLUDING FOUNDATION, STEEL SUPPORTS AND LIGHTING INSTALLATIONS.
- B. Alternate Number Two. PROVIDE ALL LABOR AND MATERIALS ASSOCIATED WITH THE PROVISION AND INSTALLATION OF THE SECOND CHILLER UNIT IN THE MECHANICAL YARD AS DESCRIBED THROUGHOUT THE CONSTRUCTION DOCUMENTS.

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## **PART 4 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS**

### **4.01 SUPPLEMENT FIELD OFFICE**

### **4.02 UTILITIES**

### **4.03 PROJECT SIGN**

- A. The contractor will erect on adequate supports and maintain one (1) neatly constructed and painted ¾” thick plywood sign approximately four feet by eight feet (4’ x 8’). The Professional will provide the colors, letters, layout and location of the sign. No other signs will be displayed on the job site without permission of the Professional. The displaying of sign advertisements is strictly prohibited.
- B. Sign to be white background with black lettering/seal. Text style to be Times New Roman. Color of rectangular field at bottom to be selected by Owner. Provide custom Using Agency logo at circular white field of up to three additional colors. No corporate logos for Architect or Contractor shall be permitted. Where additional rendered signage is specified elsewhere, it shall consist of (1) or (2) additional 4’x8’ panels, contiguous to the right side of primary project sign.

## **PART 5 – ANTICIPATED DELAYS**

### **5.01 ADVERSE WEATHER**

- A. The General Contractor must keep a rain gauge at the job site and record any measurable rain that occurs to successfully submit for Rain Days. The Contractor can utilize official recordings from the National Weather Service if a nearby weather station is available (within 5 miles). The Contractor shall submit a Rain Days Log with every Application for Payment. This Log shall include the day and amount of rain received (in inches). If there are zero rain days during a period, the Contractor shall submit the Log with “zero” days listed.
- B. The Contractor shall figure the following number of rain days for each month listed below in his schedule: January-8 days; February-7 days; March-6 days; April-5 days; May-5 days; June-5 days; July-5 days; August-7 days; September-4 days; October-4 days; November-4 days; December-7 days.
- C. Request for rain days shall not be made unless the number of days per month amounting to 1/10” or more exceeds the number of days on the above chart.
- D. For an extension of time for rain days to be considered, the Contractor must document that they had workdays to include the time that rain began at the site, the amount of rainfall received at the site, and either rain duration or the time work was suspended for the day. In addition, the Contractor shall provide the Architect with independent verification of the quantity of days when rainfall exceeded 1/10” during each billing period.
- E. For an extension of time for rain days to be considered, the Contractor shall document that weather and soil conditions are such that the Contractor cannot proceed with construction for seven (7) consecutive daylight hours with normal working forces engaged in performing the controlling item or items of work would be in progress at that time. This shall include a daily report for each rain day describing the work items that cannot be performed due to adverse weather or soil conditions.
- F. The Architect shall full discretion on the determination of rain days and the authorization of an extension of time for rain days.

## **PART 6 – INSTITUTION/AGENCY REQUIREMENTS**

### **6.01 PROHIBITED ACTIVITIES**

### **6.02 USE OF PREMISES**

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## **Division One**





**THIS PROJECT IS FUNDED BY THE TAXPAYERS OF  
MISSISSIPPI**

**GOVERNOR TATE REEVES**

**PROJECT NAME**

GS# 385-001

HB 1353, HB 1649, HB 1729, HB 1730, SB 2948

**DEPARTMENT OF FINANCE & ADMINISTRATION  
BUREAU OF BUILDING, GROUNDS AND REAL  
PROPERTY MANAGEMENT**

**ARCHITECT**

ALBERT & ROBINSON ARCHITECTS, PLLC

**CONTRACTOR**

CONTRACTOR NAME

MISSISSIPPI C.O.R. #11111



**OFFICE OF CAPITOL FACILITIES  
DEPARTMENT OF FINANCE AND ADMINISTRATION  
LIZ WELCH, EXECUTIVE DIRECTOR**



## **SECTION 013324: STRUCTURAL SUBMITTALS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Structural submittals include shop drawings, diagrams, illustrations, schedules, performance charts, nomenclature charts, samples, brochures and other data prepared by the Contractor or any subcontractor, manufacturer, supplier, fabricator, or distributor and which illustrate some portion of the Project.

#### **1.2 RELATED SECTIONS**

- A. Division 1 Sections

#### **1.3 SUBMITTAL PROCEDURES**

- A. Submittals shall be accompanied by a transmittal letter with the following information:
  - 1. Project name.
  - 2. Contractor's name.
  - 3. Date submitted.
  - 4. Description of items submitted; identify Work and product by Specification Section.
  - 5. Number of drawings and other pertinent data.
- B. Provide blank space on each submittal for the Architect/Structural Engineer's review stamp.
- C. The type and number of submittals for each item shall be in accordance with Section 013300.
- D. Contractor shall direct specific attention on the submittal to any deviation from the Construction Documents.

#### **1.4 CONTRACTOR RESPONSIBILITY**

- A. Contractor shall make all submittals in advance of installation or construction to allow the Architect/Structural Engineer sufficient time for review.
- B. Contractor shall review all submittals and shall stamp and sign each sheet of shop drawings and product data and sign each sample to certify compliance with requirements of Construction Documents. Submittals received without the contractor's stamp of review will be returned to the contractor for review and resubmittal.
- C. Contractor shall understand that the submittal of the required documents does not constitute compliance with the requirements of the Construction Documents; only submittals reviewed by the Architect/Structural Engineer constitute compliance.
- D. It is the Contractor's responsibility to furnish equipment, materials, and labor for the Project which meets the requirements of the codes and authorities quoted as well as the Construction Documents. Proprietary items specified herein only establish a minimum functional and aesthetic standard and it is incumbent upon the Contractor to ascertain conformance of these proprietary items or any proposed substitution with the codes and authorities.

- E. By reviewing, approving and submitting shop drawings, product data, or samples, Contractor thereby represents that he has determined and verified all field measurements, field construction criteria, materials, member sizes catalog numbers, and similar data and that he has checked and coordinated shop drawings with the requirements of the Project and of the Construction Documents.
- F. Work requiring shop drawings, whether called for by the Construction Documents or requested by the Contractor, shall not commence until the Architect/Structural Engineer has reviewed the submission. Work may commence if the Contractor verifies the accuracy of the Architect/Structural Engineer's corrections and notations and complies with them without exception and without requesting change in Contract Sum or Contract Time.

### **1.5 ARCHITECT / STRUCTURAL ENGINEER REVIEW**

- A. Architect/Structural Engineer will review submittals with reasonable promptness.
- B. Architect/Structural Engineer's review or corrections refer only to the general arrangement and conformance of the subject of the submittals with the design concept of the Project and with the information given in the Construction Documents. Under no conditions should the Contractor consider the review to include the dimensions, quantities, and details of the items nor the approval of an assembly in which the item functions.
- C. Architect/Structural Engineer's review shall not relieve the Contractor from responsibility for errors or omissions in the submittals.
- D. Architect/Structural Engineer's review of submittals shall not relieve the Contractor of responsibility for any deviation from the requirements of the Construction Documents unless the Contractor has directed specific attention to the deviation at the time of submission and the Architect/Structural Engineer has given written approval to the specific deviation.
- E. Architect/Structural Engineer's review of submittals shall not be construed as authorizing any change in the Contract Sum or Contract Time.

### **1.6 SHOP DRAWINGS**

- A. Present in a clear and thorough manner. Title each drawing with Project name and number; identify each element of drawings by reference to sheet number and detail of Construction Documents.
- B. Reproduction of Structural Drawings for shop drawings is not permitted. Electronic drawing files will not be provided to the Contractor.
- C. Identify field dimensions; show relationship to adjacent or critical features of Work or products.
- D. A copy of the marked structural shop drawings with the Architect/Structural Engineer's review stamp is to be maintained at the job site.

### **1.7 PRODUCT DATA**

- A. Submit only pages that are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.



- B. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information that is not applicable.
- C. Provide manufacturer's preparation, assembly, and installation instructions.

#### **1.8 SAMPLES**

- A. Submit full range of manufacturer's standard finishes, except where more restrictive requirements are specified, indicating colors, textures, and patterns.
- B. Submit samples to illustrate functional characteristics of products, including parts and attachments as required by Architect/Structural Engineer.
- C. Approved samples that are of proper size may be incorporated in Work.
- D. Label each sample with identification.
- E. Field Finishes: Provide full samples at Project, at location acceptable to Architect/Structural Engineer, as required by individual Specification Section. Install each sample complete and finished. Acceptable finishes in place may be retained in completed Work.

#### **1.9 RESUBMITTALS**

- A. When submittals are returned to the Contractor with the Architect/Structural Engineer's corrections the Contractor shall make the required corrections. Upon request, resubmit one corrected set.
- B. Contractor shall direct specific attention on the resubmittal to all revisions including those requested by the Architect/Structural Engineer on previous submission.

#### **1.10 DISTRIBUTION**

- A. Distribute reproductions of shop drawings, copies of product data, and samples which bear the Architect/Structural Engineer's review stamp to job site file, Record Documents file, subcontractors, suppliers, other affected contractors, and other entities requiring information.
- B. Work shall be in accordance with and performed from the reviewed drawings.

### **PART 2 PRODUCTS**

Not Used.

### **PART 3 EXECUTION**

Not Used.

**END OF SECTION**



**SECTION 01 45 00**  
**PROJECT QUALITY CONTROL**

**PART 1 – GENERAL**

1.01 SECTION INCLUDES

- A. Definition of Project Quality Control.
- B. Administrative procedures and responsibility requirements for achieving the quality required for the work for the project.

1.02 DEFINITION

- A. Project Quality Control: Defines as the continuing system of critical review and guidance of the Project construction, to ensure that the cooperative efforts of the involved parties (included, but not limited to, the forces of contractors, subcontractors, suppliers, manufacturers) shall result in procedures, services, workmanship and incorporated material and equipment, which will achieve the Project Quality (“Level of Excellence”) required by the Contract Document (in the whole or in part) for the complete work.

1.03 RESPONSIBILITY

- A. The General contractor shall implement, monitor and maintain Project Quality Control from the beginning of the project until the work is complete.
- B. The General Contractor shall give special attention to the following items, with necessary coordination and monitoring, to assure compliance with the requirements for each as outlined in Part 3 - Execution, below:
  - 1. Products
  - 2. Workmanship
  - 3. Manufacturers' Instructions, Certificate, and Field Services Representative
  - 4. Mock – ups and Field Samples
  - 5. Pre-Installation Meetings
  - 6. Field Testing
  - 7. Independent Roofing Manufacturer Inspections
  - 8. Project layout and dimensional coordination
  - 9. Mechanical, Plumbing, Electrical above ceiling coordination
- C. Neither the observation of the Architect in the administration of the Contract, nor tests and inspectors of the Testing Laboratory, nor approvals by persons of any other agencies or entities, shall relieve the General Contractor from his obligation to provide the work of the project, in whole or in part, in accordance with the requirements of the Contract Documents.

**PART 2 – PRODUCTS**

- 2.01 The contractor shall require that the quality of the products for this project comply with the requirements of each specification section or, if substituted, by the requirements of *Section 01 63 00 Substitutions and Product Options*.

### PART 3 – EXECUTION

#### 3.01 MANUFACTURER'S INSTRUCTIONS

- A. The Contractor shall require full compliance with manufacturers', fabricators' and suppliers' instructions for every aspect and phase of the work, including, but not limited to:
  - 1. Delivery, storage, handling and protection
  - 2. Conditioning and preparation on Site
  - 3. Installation, including remedial work
  - 4. Cleanup and protection
- B. Should instructions conflict with the requirements of the Contract Documents, request clarification from Architect / Engineer before proceeding.

#### 3.02 MANUFACTURER'S CERTIFICATES

- A. When required by individual Specification Sections, submit manufacturer's certificate, in duplicate, executed by a responsible company officer and notarized, certifying that product meets or exceeds specified requirements.

#### 3.03 MANUFACTURER'S FIELD SERVICE REPRESENTATIVE

- A. When required by individual Specification Sections, manufacturers or suppliers shall provide a qualified technical representative to serve as a "Field Representative" for required site visits and other necessary responsibilities, including, but not limited to, attending Pre-Installation Meeting and observing field conditions (such as: conditions of surfaces and installation, quality of workmanship, start-up of equipment, and testing, adjusting and balancing of equipment, as applicable) during and after construction (including warranty inspections).
- B. Representative's Qualifications:
  - 1. Full-time employee of Manufacturer
  - 2. Fully knowledgeable of applicable Codes, Manufacturer's specified product(s) and installation requirements for each
  - 3. Authorized to represent Manufacturer in all field decisions necessary to validate warranty.
- C. Immediately following each visit to the site, Representative shall make a written report with observations and recommendations to Architect.
- D. Contractor shall schedule such required field representation to coincide with regularly scheduled monthly progress meetings where possible.

#### 3.04 MOCK – UPS AND FIELD SAMPLES

- A. General: the purpose of mock – ups and field sample assemblies is to coordinate the products and systems with the means and methods of construction to ensure the quality performance standard defined in the Contract Documents can be achieved. The Contractor shall provide mock – ups and field samples, as required by individual Specification Sections, to be placed at the site in locations designated by the Architect and complying with individual Specification Sections. In addition, all work and materials and associated Specification Sections involved in the envelope enclosure of the buildings shall be coordinated in one mock – up as described in the *Envelope Coordinated Mock-Up* paragraph below.
- B. Envelope Coordinated Mock – Up: Contractor shall construct a coordinated mock – up of an exterior foundation/wall/window/overhang/roof condition, approximately 12' – 0" high x 8' – 0"

wide (or size appropriate for the project scope), including the building's cladding system(s), back-up support system(s), sheathing, waterproofing system(s) and flashing. Also, include all materials, fasteners and other requirements of the Construction Documents. (For example, a brick CMU back up wall would include: brick on CMU back up, corner, sill, window, furring, sheet metal cornice and roofing, and all other sub framing, materials and details required for a complete installation. Include all clips, angles, ties and reinforcing and fasteners.) Mock – up will be independent of the finished building work and will remain in place through the duration of the project's construction. Contractor shall provide a temporary steel frame structure to support coordinated mock – up. If not shown on the building elevation drawing(s), the Architect will provide a drawing for this mock – up after the start of the work.

### 3.05 PRE – INSTALLATION MEETINGS

- A. Schedule: When required by individual Specification Sections, convene a pre-installation meeting at project site, under provisions of *Section 01 21 00 Project Meetings* and the following:
1. Convene minimum one (1) week or more prior to commencing the work of the Section.
  2. Require attendance of parties directly affected by the work of the Section, including manufacturer's field representative, those providing fire rated assemblies and those with penetrating materials. Include, if possible, local regulatory officials. **Include Subcontractors, foreman and skilled and unskilled laborers who will be involved in the work.**
  3. Review site conditions involving preparation and installation procedures, scheduling, coordination with related work, and regulatory inspections/ approvals.
  4. Contractor shall schedule such required field representation to coincide with regularly scheduled monthly progress meetings where possible.

### 3.06 FIELD TESTING

- A. Under provisions of *Section 01 45 24 Structural Special Inspections* the Contractor shall administer and pay for all Field Testing and Special Inspections required by code and/or as required by individual Specification Sections and Quality Control provided in the Drawings.

### 3.07 LAYOUT

- A. The General Contractor shall perform and be responsible for all layouts for all trades and Subcontractors. The General Contractor shall verify all clearances prior to installation of any subcontract work. If the General Contractor cannot adequately provide layout services themselves, they shall engage the services of a professional engineer or surveyor to provide this service.

### 3.08 COORDINATED SHOP DRAWINGS

- A. The contractor shall product a set of Coordinated Shop Drawings, showing all above ceiling Mechanical, HVAC Plumbing, Fire Sprinkler and Electrical / Communication Systems. The drawings shall also show riser and shaft locations that may affect the distribution of the building services systems. Each system shall be shown in plan and section or marked to show top and bottom elevations. Each system shall show clearance between other trades and building structure and finishes. The Coordinated Shop Drawings shall show a clear path for all systems, or if a conflict exists that cannot be solved by the contractor, identify on the Shop Drawings for the Architects to make appropriate changes.

**END OF SECTION**



## **SECTION 014524: STRUCTURAL SPECIAL INSPECTIONS**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Section summarizes the responsibility of the Contractor and the Special Inspector in the performance of the special inspections required in the Construction Documents.
- B. Neither the observation of the Architect/Structural Engineer in the administration of the contract, nor tests/inspections by the Special Inspector, nor approvals by persons other than the Architect/Structural Engineer shall relieve the Contractor from his obligation to perform the Work in accordance with the Construction Documents.

#### **1.2 RELATED SECTIONS**

- A. Section 013324 - Structural Submittals.

#### **1.3 REFERENCES**

- A. ASTM E329 – Standard Specification for Agencies Engaged in Construction Inspection and/or Testing.
- B. American Council of Independent Laboratories – Recommended Requirements for Independent Laboratories Qualifications.

#### **1.4 SELECTION AND PAYMENT**

- A. Contractor will employ and pay for the structural testing/inspection services that are required by the Construction Documents.
- B. Contractor shall pay for any additional structural testing/inspection required for Work or materials not complying with Construction Documents due to negligence or nonconformance.
- C. Contractor shall pay for any additional structural testing/inspection required for his convenience.

#### **1.5 STRUCTURAL TESTING/INSPECTION REQUIREMENT SUMMARY**

- A. Refer to the Structural Quality Assurance Plan in the Structural Drawings for the required tests/inspections.

#### **1.6 CONTRACTOR SUBMITTALS**

- A. Prior to start of Work, submit name of Special Inspector, address, telephone number, fax number, and names and qualifications of technicians, inspectors, and engineers who will be working on this Project.
- B. If multiple Special Inspectors are used, submit the information stated above for each firm along with a statement of the testing/inspection responsibilities for each firm.

## **1.7 STRUCTURAL TESTING/INSPECTION AGENCY'S QUALIFICATIONS**

- A. Provide inspectors qualified to perform special inspections as required by the Building Code and the Construction Documents.
  - 1. Inspectors shall have a minimum of two years' experience.
  - 2. Where required, the Inspectors shall be approved by the local building authority.
- B. Comply with the American Council of Independent Laboratories recommended requirements.
- C. Comply with ASTM E329.
- D. Maintain properly calibrated equipment; calibrated within the past 12 months with devices of accuracy traceable to either National Bureau of Standards (NBS) or accepted values of natural physical constants.
- E. Inspection of all field welding operations, including the installation of automatic end-welded stud shear connectors, shall be made by qualified welding inspectors. Such inspectors shall be persons trained and thoroughly experienced in inspecting welding operations. The minimum requirements for a qualified welding inspector shall be as those for an AWS certified welding inspector (CWI), as defined in the provisions of the 1992 edition of AWS QCI, Standard and Guide for Qualification and Certification of Welding Inspectors published by the American Welding Society. Inspectors performing nondestructive testing shall be qualified in accordance with the American Society of Nondestructive Testing, Inc.

## **PART 2 MATERIALS**

Not Used.

## **PART 3 EXECUTION**

### **3.1 STRUCTURAL PRECONSTRUCTION MEETING**

- A. A structural preconstruction meeting may be conducted at the construction site by the Structural Engineer to discuss quality issues. The parties involved may be the Architect, Contractor, Special Inspector, appropriate subcontractors, suppliers, and detailers.

### **3.2 SPECIAL INSPECTOR'S RESPONSIBILITIES**

- A. Cooperate with the Contractor and provide timely service.
- B. Upon arriving at the construction site, sign in and notify the Contractor of presence.
- C. Select the representative samples that are to be tested/inspected.
- D. Perform tests/inspections as outlined in Construction Documents, the applicable codes, and as directed by the Structural Engineer.
- E. Report results of tests/inspections in accordance with the Construction Documents and the Building Code. Work and materials not complying with Construction Documents shall be immediately reported to the Contractor and Structural Engineer.



- F. Leave copies of field notes with the Contractor prior to leaving the construction site. Field notes shall include the message given to the Contractor, date, time of message, name of Contractor's representative informed, type and location of Work or materials tested/inspected, whether the work or materials complies with Construction Documents and name of the Structural Testing/Inspection Agency's representative.
- G. Report and distribute results of tests/inspections promptly in the form of written reports as directed by the Structural Engineer.
- H. Special Inspector shall not alter requirements of Construction Documents, approve or reject any portion of the Work, or perform duties of the Contractor.
- I. Submit written confirmation at end of construction that, to the best of their knowledge, the structural Work conforms to the Construction Documents.

### **3.3 CONTRACTOR'S RESPONSIBILITIES**

- A. Provide copy of Construction Documents to the Special Inspector.
- B. Arrange the preconstruction meeting to discuss quality issues.
- C. Notify the Special Inspector sufficiently in advance of operations to allow assignment of personnel and scheduling of tests.
- D. Cooperate with Special Inspector and provide access to Work.
- E. Provide samples of materials to be tested in required quantities.
- F. Furnish copies of mill test reports when requested.
- G. Provide storage space for Special Inspector's exclusive use, such as for storing and curing concrete testing samples.
- H. Provide labor to assist the Special Inspector in performing tests/inspections.

### **3.4 OPTIONS**

- A. If the Structural Testing/Inspection Agency is located at such a distance from the Project that travel expenses will be a consideration, or if the amount of sampling performed is minor, and by mutual agreement of the Architect/Structural Engineer and Contractor, the Contractor may be requested to take samples and forward them to the Structural Testing/Inspection Agency for testing/inspection.

**END OF SECTION**



## SECTION 019100 – GENERAL COMMISSIONING REQUIREMENTS

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Commissioning requirements common to all Sections.
- B. Systems and equipment 'Start-Up' and 'Functional Performance Testing'.
- C. Validation of proper and thorough installation of systems and equipment.
- D. Equipment performance verification.
- E. Documentation of tests, procedures, and installations.
- F. Coordination and requirements of 'Training Events'.
- G. Preparation and logistics of Systems Manual content.
- H. Management of record construction documentation.

#### 1.02 GENERAL DESCRIPTION

- A. Commissioning (Cx) is the process of ensuring that (i) all building systems are installed and perform interactively according to the design intent; (ii) that systems are efficient and cost effective and meet the Owner's operational needs; (iii) that the installation is accurately documented; and (iv) that the Operators are adequately trained. Commissioning serves as a tool to minimize post- occupancy operational problems, and establishes testing and communication protocols to advance the building systems from installation to optimized, fully dynamic operation.
- B. Commissioning Authority (CA) shall work with the Contractor and the design engineers to direct and oversee the Cx process and perform Functional Performance Testing.
- C. The Commissioning Plan outlines the Cx process beyond the Construction Contract, including design phase activities and design team/Owner responsibilities. The specification Sections dictate all requirements of the commissioning process relative to the construction contract. The Cx Plan is not part of the construction contract, although it is available for reference at the request of the Contractor.
- D. This Section and other sections of the specification details the Contractor's responsibilities relative to the Cx process. It expands on the Cx Plan, which covers the roles and responsibilities of Parties outside of the construction contract.

#### 1.03 SCOPE

- A. This Section covers elements, requirements, procedures, and protocols common across all Divisions of the work. Requirements specific to individual Sections are generally specified

in the technical specification as well as a dedicated Section for each of Divisions 22, 23, and 26.

- B. Specific systems to be commissioned are indicated in the following Divisions of the Specification:
1. Division 01 - Building Envelope: Requirements for Cx are specified in Section 019119.
  2. Divisions 02–12, 14: Conformance to the following provisions of the Cx requirements is required under Division 01 and this Section:
    - a. Equipment and Systems Training as required by individual Sections.
    - b. Systems Manual preparation and maintenance.
    - c. Record Document preparation and maintenance.
  3. Division 22 – Plumbing: Requirements for Cx are specified in Section 220090 as well as in individual Division 22 Sections.
  4. Division 23 - HVAC: Requirements for Cx are specified in Section 230090 as well as in individual Division 23 Sections.
  5. Division 26 – Electrical: Requirements for Cx are specified in Section 260090 as well as in individual Division 26 Sections.

#### 1.04 RELATED WORK AND DOCUMENTS

- A. Commissioning Plan: The Cx Plan outlines responsibilities outside of the construction contract and shall be available to all Parties for reference. It gives the Contractor a perspective with respect to the overall process. It encompasses the entire Cx process including design phase and post construction tasks.
- B. The Cx process references many related Sections, particularly Section 019100 - General Commissioning Requirements. It is important for all Contractors subject to the Cx process to be familiar with Section 019100.
- C. Section 019110 – General Commissioning Requirements for Functional Performance Testing.
- D. Section 220090 – Plumbing System Commissioning.
- E. Section 230090 – BAS Commissioning.
- F. Section 260090 – Electrical Systems Commissioning.
- G. Individual Specification Sections: Individual Sections stipulate installation, start-up, warranty, O&M documentation, and training requirements for the system or device specified in the Section.

#### 1.05 DEFINITIONS AND ABBREVIATIONS

- A. Acceptance Phase: This is the phase of the project when the facility and its systems and equipment are inspected, tested, verified, and documented; and when most of the Functional Performance Testing and final training occurs. This will generally occur after the Construction Phase is complete (after Start-Up Documentation have been completed). The

Acceptance Phase begins upon System 'Turn-Over' with certification by the Contractor that the systems have been placed into service in accordance with the approved protocols and after the submission of the approved Start-Up Documentation. The Acceptance Phase ends with the successful completion of all Functional Performance Testing and sign-off by the CA.

- B. Action Item (AI): Any Cx-related issue that requires a response, completion, corrective or additional work, or any other action. Examples include a Request for Information (RFI), a work directive, a clarification request, a to-do item, an identified deficiency, or any other like item. Action Items must be categorized as appropriate.
- C. Action List: This is a list that is maintained and updated by the CA that includes all Action Items that relate to Cx activities.
- D. Activation: The process of relocating the occupants; fitting out the furniture, furnishings, and equipment (FF&E); and generally ensuring a smooth occupant transition.
- E. A/E: General reference to the Architect/Engineer lead-design entity.
- F. ASHRAE: American Society of Heating, Refrigerating, and Air Conditioning Engineers.
- G. Basis of Design (BOD) Document: The Basis of Design document is developed by the design team, and shall respond to and be consistent with the performance criteria specified in the Owner's Project Requirements. The BOD illustrates the means by which the OPR criteria are to be achieved, documenting the assumptions and parameters used in the design, and documenting the primary thought processes or decisions made that resulted in the selected alternatives. At the end of the project, the final BOD content may be incorporated into the Systems Manual if desired in part or in its entirety. The BOD is a required component for LEED-certified projects, and is recommended by ASHRAE for all projects subject to the Cx process.
- H. Building Automation System (BAS): The computer-based control or automation system. BAS is used throughout these Sections. Alternate references common in the industry include facility management system, automatic temperature control system, direct digital control system, building management system, building management and control system, digital control system, Energy Management System, Energy Management and Control System or System Control and Data Acquisition (SCADA) System.
- I. Building Automation System Sub-System: This is a special case of the BAS definition presented earlier. These systems are representative of all control systems that must integrate with or be connected to the primary BAS infrastructure in the project. Division 25 covers all requirements for BAS Sub-Systems requirements in relation to the BAS. These sub-systems may be defined in many Sections.
- J. Building Enclosure Commissioning Authority (BECxA): The Party retained by the Owner will oversee the BECx process, develop and stipulate many of the BECx requirements, manage the BECx process, and validate that building enclosure systems are designed, installed, and tested to meet the Owner's requirements and/or contract documents provided by the Architect-of-Record.
- K. Building Enclosure Commissioning (BECx): The process of facilitating the quality installation of the building enclosure materials, components, and systems in accordance with the contract documents and satisfy the requirements of the Building Enclosure Design Intent.

- L. Building Enclosure Commissioning Coordinator (BECxC): This refers to the Individual that is designated the POC for BECx activities.
- M. Checklist Item: An item to inspect to verify proper installation of equipment or systems by the Contractor. Checklist items simply require a 'Yes/No' or 'OK/Not' response. Start-Up Checklist items are one component of the Start-Up Documentation.
- N. CMMS: Computerized Maintenance Management System.
- O. Commissioning (Cx): The process of ensuring that all building systems perform interactively according to the design intent, that the systems are efficient and cost effective, and that they meet the Owner's operational needs.
- P. Commissioning Authority (CA): The Party retained by the Owner who will oversee and manage the Cx process, develop and stipulate many of the Cx requirements, and ensure and validate that systems and equipment are designed, installed, and tested to meet the Owner's requirements.
- Q. Commissioning Coordinator (CxC): This refers to the Individual within each of the various Parties that is designated the POC for that Party relative to Cx activities. Each of the Contractors subject to the Cx process should designate a CxC and make that person available to the CA as the point-of-contact for that Contractor.
- R. Cx Record Matrix: The Cx Record Matrix provides an ongoing and updated status of the Cx program as it is being executed. It is a table of all systems and equipment subject to the Cx process and the status and responsible party of Cx procedures relating to that equipment. Typical fields tracked include equipment tag, location, description, Start-Up Documentation status, FPT status, training status, status of submittals and record drawings, and final Cx disposition.
- S. Commissioning Specifications: Generic reference to any of the Cx-specific specification Sections, as inferred by the usage. Divisions 01, 22, 23, 26, and others contain Sections that are specific to or reference the Cx process. All Contractor requirements relating to Cx should be conveyed within the Cx Specs. Cx Specs should be referenced but not duplicated within the Cx Plan (the Cx Plan is designed to govern non-Contractor-related Cx issues).
- T. Commissioning Team (CxT): The group of Parties involved in the Cx process for any given system. The Cx Team will include a core group involved with all systems, consisting of the CA and CxC members representing the CM and the Owner. On any given system, the Cx Team will additionally include the CxC's for the Contractors responsible for the system or equipment.
- U. Contractor: As used herein, 'Contractor' is a general reference to the installing Party or the Parties that hired installing Parties and can therefore refer to the CM, subcontractors, or vendors as inferred by its usage.
- V. Construction Manager (CM): The Party acting as the primary coordinator of all the major subcontractors (MC, EC, TAB, BAC, etc.) as applicable.
- W. Construction Phase: Phase of the project during which the facility is constructed and/or when systems and equipment are installed and started. Contractor and subcontractors complete the installation, complete Start-Up Documentation, submit O&M information, establish trends, and perform any other applicable requirements to make systems operational. Contractor and Vendors may also conduct 'Equipment and Systems Training'

events during this phase. The Construction Phase concludes upon completed Start-Up and TAB of systems and equipment.

- X. Contract Documents: The documents governing the responsibilities and relationships between Parties involved in the design and construction of this project including (but not necessarily limited to):
1. Agreements/Contracts.
  2. Construction Plans and Drawings.
  3. Specifications.
  4. Addenda.
  5. Change Orders.
  6. Commissioning Plan (for reference only).
- Y. Construction Documents: Refers generally to the Contract Documents that dictate the details of the installation (all but item 1. above).
- Z. Deficiency: A condition in the installation or function of a component, piece of equipment or system that is not in compliance with the Contract Documents, does not perform properly or is not complying with the design intent.
- AA. Design Engineer: Generic reference to the engineer-of-record or a specific engineering discipline as inferred by its usage.
- BB. Design Intent Document (DID): Outdated term that is synonymous with Owner's Project Requirements (see below).
- CC. Electrical Contractor (EC): Contractor generally responsible for Division 26 work.
- DD. Factory-Authorized Representative: An individual fully trained on the equipment and certified by the manufacturer to perform the respective task.
- EE. Factory Testing: Testing of equipment off-site at the manufacturer's facility. May be witnessed by the members of the project team.
- FF. FF&E: Furniture, Furnishing, and Equipment. This term is used to refer to the generally movable fit-out elements of a building that are not included in the construction contract but are dealt with in the Activation.
- GG. Fire Alarm Contractor (FAC): Contractor generally responsible for the fire alarm system installation.
- HH. Fire Suppression Contractor (FSC): Contractor generally responsible for the installation of the fire suppression system (sprinkler, standpipe, and fire pump).
- II. Fixed Construction: Elements of the building that are built in. This term is typically used in contrast to FF&E.
- JJ. Functional Completion: A Cx program milestone that marks the successful completion of the FPTs by the CA and therefore completion of the Acceptance Phase. Functional Completion is a prerequisite for Substantial Completion.
- KK. Functional Performance Tests/Testing (FPT): The detailed and thorough tests (and test procedure) developed and performed by the CA to document proper operation of building

systems and the components and equipment making up those systems during the Acceptance Phase. References made to FPT throughout the documents are inclusive of ISFPT unless specifically indicated otherwise.

- LL. General Contractor (GC): The prime contractor hired to execute the construction project. Generally, this contractor would hold the contracts for the majority of sub-contractors on the project.
- MM. IAQ: Indoor Air Quality.
- NN. Interactive System Functional Performance Testing (ISFPT): The detailed and thorough testing of the interactions of various systems in the building. ISFPTs are considered a subset of the overall concept of FPT and therefore references made to FPT generally will include ISFPTs unless specifically indicated otherwise.
- OO. Laboratory Controls Contractor (LCC): Contractor generally responsible for Laboratory control systems and components.
- PP. Manufacturer's Representative: Either an individual in direct employ of the manufacturer of the applicable system, or an individual who is certified by that manufacturer to perform the applicable work for which the reference is made. This is synonymous with Factory-Authorized Representative.
- QQ. Mechanical Contractor (MC): Contractor generally responsible for Division 21-25 work.
- RR. O&M Documentation: Contractor-developed documentation designed to address the needs of facilities personnel and customized for the context of the specific facility and installation. The foundation of O&M Documentation is manufacturer's literature (O&M Manuals), with additional Contractor-developed step-by-step instructions for manual start/stop, emergency procedures, operating sequences, preventative maintenance, and other installation-specific information. O&M Documentation content is indexed/organized by equipment-type. When a Systems Manual is being developed by the CA, some of the Contractor-developed content will need to be made available to the CA for inclusion into the Systems Manual.
- SS. O&M Manuals: Generic reference to manufacturer-published O&M materials, which have no information specific to the facility, but may be edited or marked up to indicate specific equipment or systems installed. O&M Manuals include documents covering installation, operation, maintenance, troubleshooting guides, parts numbers, engineering and design parameters, applications manuals, and any/all information available from the manufacturer pertaining to the installed equipment or systems. Specifications should strive for this information to be submitted in electronic form whenever possible. The electronic versions of these documents can also be electronically edited to indicate equipment installed and to delete or mask-over equipment and content that is not installed on the project.
- TT. Observation Period (BAS): Period of time either prior to or immediately following Functional Performance Testing where the BAS is shown to operate properly without malfunction, without alarm caused by control action or device failure, and with smooth and stable control of systems and equipment in conformance with these specifications.
- UU. Opposite Season: The season opposite that when the majority of the functional performance testing occurs.
- VV. Owner (Owner): Party acting as the Owner's designated representative for the project. The Owner is responsible for managing the entire project and to act as the Owner in all design



and construction-related issues. Generally, the Owner will include multiple personnel such as the Project Manager, Field Manager, and MEP Project Engineer.

- WW. Owner's Project Requirements (OPR): The OPR is intended to provide the basis from which all design, construction, acceptance, and operational decisions are made. It details the functional requirements of the project, including systems subject to commissioning. The OPR defines the benchmarks and metrics by which the success of the project is ultimately judged, and evolves through each project Phase. The OPR is typically developed early in the project cycle by the Owner and the A/E and provides the user needs, requirements, goals, and metrics that are defined by the Owner to be important. The OPR criteria are referenced by and should be the foundation of the BOD narrative. At the end of the project, the content of final OPR and BOD may be incorporated into the Systems Manual. The OPR and BOD are a required component for LEED-certified projects, and is recommended for all projects subject to the Cx process.
- XX. Party: Entity (company, corporation, etc.) legally responsible for portion of work.
- YY. Point-of-Contact (POC): General reference to a key individual within each Party.
- ZZ. Prefunctional: The term "Prefunctional" is synonymous with "Start-Up", but not used in these specifications. It is a modifier for checks, tests, and other activities that occur prior to and are prerequisites for Functional Performance Testing.
- AAA. Preliminary Service: Refers to initial operation of a system or piece of equipment to provide temporary service where initial Start-Up to determine safe operation has been performed. Final TAB and Functional Performance Testing proceeds while the system is in Preliminary Service.
- BBB. Pre-Test: Preliminary testing accomplished to verify system functionality prior to placing the system/equipment into Preliminary Service.
- CCC. Project Phases: Phases of the project include the Construction Phase, Acceptance Phase, Warranty Phase. Earlier Phases include Program Phase and Design Phase.
- DDD. RFI: Request for Information.
- EEE. Scheduled Outage: A period of time, scheduled by Owner, in which the system is out-of-service or not to be used by occupants.
- FFF. Security System Contractor (SSC): Contractor responsible for the installation of the Security Systems.
- GGG. Start-Up: Refers to the quality control procedures whereby the Contractor verifies the proper installation of a device or piece of equipment, executes the manufacturer's starting procedures, completes the 'Start-Up Checklist', energizes the device, verifies that it is in proper working order and ready for dynamic testing, and completes the 'Start-Up Tests'. Start-Up procedures are performed by the Contractor with or without a formal Cx process, although the documentation is more formalized when the Cx process is used.
- HHH. Start-Up Checklist: A list of items to inspect to verify proper installation of equipment or systems by the Contractor. Checklist items simply require a 'Yes/No' or 'OK/Not' response. These include primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension checked oil levels OK, labels affixed, gages in place, sensors calibrated, etc.). Start-Up Checklist items are one component of the Start-Up Documentation (Start-Up Tests being the other).

- III. Start-Up Documentation: Refers to the combination of Start-Up Checklists + Start-Up Tests. The Contractor documents the Start-Up procedure by completing and submitting the Start-Up Documentation. Start-Up Documentation may be a combination of procedures prepared by the Contractor and/or the CA, those included in the Contractor's in-house quality assurance process, and those required by the manufacturer start-up procedures. Regardless of the context of the checklist or format of the form used to document it, the reference to 'Start-Up Documentation' includes all of the stated checklists and tests.
- JJJ. Start-Up Test: This is a quality-assurance test that is required to ensure the system is ready to be placed into service. It differs from a checklist item in that it requires more than a binary (yes/no, OK/Not OK) response. It is an observation, measurement, or sequence of events that must be documented. Start-Up Tests are one component of the Start-Up Documentation (Start-Up Checklists being the other).
- KKK. Substantial Completion: Milestone as defined in the Owner-Contractor agreement and Specifications. This milestone also coincides with the start of the Warranty Period.
- LLL. System Turn-Over Meeting ("STOM"): Turn-Over is a quality control milestone in which all Contractors responsible for completing the installation and start-up of a system or equipment, along with the Owner and CM, meet to validate that the system or equipment is completed and operational per the contract documents and ready for Functional Performance Testing, and that all the Start-Up Documentation and nameplate data is complete and accurate. The CA will in many cases participate in this. CM shall organize and lead the process in all cases.
- MMM. Systems Manual: The Systems Manual is the final deliverable from the Cx process, and provides the information needed to understand, operate, and maintain the facility and its systems. It is typically developed by the CA or A/E, but with content required to be provided by the design team and the Contractors. The Systems Manual expands the scope of standard O&M documentation to incorporate additional information developed through the Cx process. The Systems Manual should be the repository of all updates and corrections as they occur (even throughout Occupancy). It is narrative in nature and organized by system types and by area/usage of the facility (if applicable). Systems Manual content typically includes narrative descriptions of the facility and systems, sequences of operation, schematic diagrams, cuts from design drawings and equipment literature, photos, and manual start/stop and emergency operating procedures for important equipment. The content of the Systems Manual is dictated by budget, and usually consists of a single narrative document with references to and inclusive of the entire set of O&M and Training materials.
- NNN. Systems Matrix: A table that lists systems and equipment as individual rows (typically using the specifications sections as a guide) and columns that indicate different tasks, documentation, and work elements. The content of the cells of the matrix summarizes the requirement for system as it relates to that column. It provides an effective summary of requirements that is approved by the Owner and operator representatives during design phase.
- OOO. Test: A task, procedure or measurement that confirms capacity, functionality, accuracy, etc. Tests can have only 1 state at any given time; "Pass", "Fail", "Couldn't Test" or "Didn't Test". May refer to Start-Up or Functional Performance Tests.
- PPP. TAB: Can refer to the test, adjust, and balance process or the Testing, Adjusting, and Balancing Contractor as inferred by its usage.

- QQQ. Temporary Conditioning Plan: A plan that summarizes the logistics, procedures, and protocols for taking permanent equipment and using it to maintain conditions throughout construction. The Temporary Conditioning Plan must be approved by all members of the Cx Team prior to placing equipment into temporary service.
- RRR. Testing Agency: An independent agency typically retained by the Contractor to perform specialized testing of systems or equipment (most commonly electrical). The Testing Agency shall be qualified and equipped to perform the testing and shall submit appropriate qualifications.
- SSS. Trending: Monitoring and recording a history of parameters typically using the building automation system.
- TTT. Vendor: Refers to the organization that sold a system or equipment to the subcontractor. This may be a branch office of the manufacturer or a value-added reseller.
- UUU. Warranty Period: The period defined by the construction documents where elements of the facility are under contractual warranty.
- VVV. Warranty Phase: Includes the early occupancy of the building and can continue through the contractual Warranty Period and at least into the opposite season from when the facility systems were initially tested.

#### 1.06 REFERENCE STANDARDS

- A. ASHRAE Standard 202 – Commissioning Process for Buildings and Systems.
- B. ASHRAE Guideline 0 – The Commissioning Process.
- C. ASHRAE Guideline 1.1 – HVAC&R Technical Requirements for the Commissioning Process.
- D. ASHRAE Guideline 1.3 – Building Operations and Maintenance Training for the HVAC&R Commissioning Process.
- E. ASHRAE Guideline 1.4 – Procedures for Preparing Facility Systems Manual.
- F. NEBB – Procedural Standards for Building Systems Commissioning.
- G. SMACNA IAQ Guidelines for Occupied Buildings Under Construction.

#### 1.07 DOCUMENTATION

- A. Contractor shall provide the following documentation to the CA per the procedures specified herein and in other Sections of the specification.
  - 1. Shop Drawings and Product Data: CA shall be provided shop drawings and submittal data for systems and equipment that will be part of the Cx process. Some of these submittals will be reviewed by the CA and others are only needed for record. CA will mark up the Submittal Register to indicate the documents required. Electronic format shall be in PDF format and shall be capable of allowing electronic comments and markups.

- a. Submittals to be Reviewed: CM shall provide the CA one electronic copy of Shop Drawings and Product Data concurrent with distribution to the A/E. CA shall review and incorporate comments via the A/E. CM shall then copy CA with the final reviewed submittal with A/E approval stamp.
  - b. Submittals for Record: CM shall provide to the CA the final electronic record copy of the submittal.
2. Factory Test Reports: Contractor shall provide any factory testing documentation or certified test reports required by the specifications. These shall be provided prior to Acceptance Phase.
  3. Schedule Updates: Issue periodic updates to the construction schedule as specified. Provide electronic copy of each update to the CA. Contractor shall use schedule updates to notify Cx Team of scheduled start-up and training activities.
  4. Temporary Operating and Conditioning Plan: Contractor shall provide initial Temporary Operating and Conditioning Plan for approval and then issue periodic updates to reflect actual conditions. At the completion of the temporary conditioning period, the final plan shall be submitted with completed maintenance records, inspection and check logs, operating logs, and narrative of any problems or issues that occurred during Temporary Conditioning (if applicable).
  5. Piping Cleaning, Flush, and Fill Plan: Contractor shall provide Piping Cleaning, Flush, and Fill Plan for approval at least 30 days prior to final cleaning, flush, and fill.
  6. Action Item Response: Respond to Action Items to which the CA assigns responsibility to the Contractor.
  7. Field Testing Agency Reports. Provide all documentation of work of independent testing agencies required by the specification. These shall be provided prior to Acceptance Phase.
  8. Completed Start-Up Documentation: Provide completed Start-Up Documentation for all applicable equipment and systems. Provide prior to the start of the Acceptance Phase. CA will review prior to FPT.
  9. Nameplate Data Documentation: Provide prior to the start of the Acceptance Phase.
  10. Equipment Warrantees: Provide prior to the start of the Acceptance Phase.
  11. Training Plan: Provide prior to the start of the Acceptance Phase.
  12. Record Training Documentation: Provide at least 7 days prior to the start of the applicable training session. The compiled and final record training documentation will be provided by the CM within 14 days of the last training session provided under the construction contract (this will typically be the site-specific controls training). This will take the form of the Training Plan supplemented with evaluations and actual dates and topics.
  13. O&M Documentation Content: Provide O&M Documentation content (including installation-specific instructions) to the CA for incorporation into the Systems Manual per the requirements of this Section, and Division 01 requirements. Submit at least one month prior to the beginning of the Acceptance Phase.
- B. Record Drawings: Contractor shall maintain an updated set of record or 'As-Built' documents at the jobsite and electronically reflecting actual installed conditions and all approved changes and modifications to the contract documents. Contractor shall provide access to the CA to review the As-Built and Record Drawings. Provide Record Drawings in accordance with Division 01.

## 1.08 COMMISSIONING SEQUENCING AND SCHEDULING

- A. Refer to the sequencing illustration at the end of this Section for a conceptual graphical representation of the precedents related to the Cx tasks. These precedents are generally to be applied per system and/or per area. Where applicable, in order to expedite the closeout of the facility, various systems can be in various stages of the Cx process. CA and Contractor shall cooperate to schedule the Cx tasks to minimize the duration of the Cx activities.
- B. The Cx process will be categorized into Phases as indicated below and defined under the definitions paragraph above. Note that per schedule, different systems and/or areas may be in different phases at any given time given that the Cx program will be integrated into the construction process:
1. Construction Phase.
  2. Acceptance Phase.
  3. Endurance Phase.
  4. Warranty Phase.
- C. CA will provide a more detailed Cx tasking precedent diagram in Gantt chart format for direction of Cx precedents and approximate task durations.
- D. Prior to submission of the baseline schedule, the scheduler will coordinate with the CA to specifically include the detailed tasks involved in the Cx process. CA will provide an initial "Precedent Diagram" that outlines the optimal Cx process. Scheduler shall meet with the CA and the subcontractors to synthesize the Precedent Diagram with the general construction process constraints and integrate the agreed upon process into the main construction schedule. Commissioning-related tasks shall be coded as such to facilitate generating a Cx fragnet that will be used during Cx progress meetings.
- E. The Cx precedent schedule will outline generic Cx tasks with precedents or prerequisites to each task. These tasks, which will be shown generically for typical systems, will apply to many systems. Contractor shall incorporate the tasks into EACH SYSTEM. This will require a detailed track for each system and as such the scheduler must schedule and code by system as well as by area. The Cx precedent diagram will also indicate system precedent requirements for start-up and Functional Performance Testing. Contractor shall collaborate with the CA to determine impacts of project phasing as applicable. Examples of enumerated tasks include:
1. Contractor preparation of draft Start-Up Documentation.
  2. Contractor preparation of Training Plan.
  3. Preparation of O&M Documentation content and other content for the Systems Manual.
  4. Testing Agency activities.
  5. Electrical Start-Up by system and zone group.
  6. Mechanical Start-Up by system and zone group.
  7. BAS Start-Up by system and zone group.
  8. TAB by system and zone group.
  9. Training Events.
  10. Functional Performance Testing by system and zone group.
- F. Contractor shall completely install; thoroughly inspect; start-up; and test, adjust, and balance systems and equipment. All activities shall be documented per specified procedures and progress tracked on the construction schedule.

- G. Contractor shall notify CA at least 14 days in advance for all system and equipment Start-Ups, training, pressure tests, or system flush and fill. At their discretion, the CA shall witness selected Start-Ups, training events, or tests. Notification shall be accompanied by a schedule showing the coordinated start date and task duration and all currently open precedent requirements.
- H. CM shall schedule and conduct System Turn-Over Meetings for all systems and equipment in the Cx scope as specified below. CM shall notify CA, A/E, and Owner in writing that systems are complete and ready for verification and Functional Performance Testing.
- I. Notification of utility or system outages affecting current mission shall require advance notification per applicable Division 01 section.

#### 1.09 SYSTEM TURN OVER MEETINGS ('STOM' OR 'TURN-OVER')

- A. CM shall schedule and conduct System Turn-Over Meetings ('Turn-Over') for all systems and equipment. Turn-Over is a quality control milestone in which all Contractors responsible for completing the installation and start-up of a system or equipment, along with the Owner and CM, meet to validate that the system or equipment is completed and operational per the contract documents and ready for Functional Performance Testing, and that all the Start-Up Documentation and nameplate data has been completed and is accurate. The CA will in many cases participate in this. CM shall organize and lead the process in all cases.
- B. Notification shall be given of all System Turn-Over Meetings to the CA and the Owner via an Action Item posted on the Portal at least 14 days in advance of the activity. CA and Owner may elect to witness the Turn-Over, although it is not required. Primary responsibility of confirmation of the represented state of the equipment lies with the CM.

#### 1.10 ELECTRONIC RECORD SUBMITTALS

- A. Contractor shall submit a final electronic version of the submittal for Owner's future asset management within 14 calendar days after receipt of approval from the Owner and the Architect on any submittal for equipment in Divisions 11, 13, 21, 22, 23, 25, 26, 27 and 28.
- B. Final Electronic Record Submittals shall:
  - 1. Be originally authored in electronic media and not scanned versions with hand mark-ups unless specifically approved otherwise.
  - 2. Be provided in Portable Document Format (\*.pdf) with selectable text and graphics that are readable. The documents shall be merged into one bookmarked document up to 500 MB. Merged documents shall use hierarchical bookmarks to form a table of contents and provide hyperlinks to the subject topic. Submittals larger than 500 MB, provide a summary document in PDF or HTML format with relative hyperlinks to the associated document files within the same directory or in directories subordinate to the summary document.
  - 3. Include all final ratings, parameters, specifications, options, etc. In the case where the Architect returns the submittal "Approved-As-Noted, Resubmission-Not-Required" and includes mark-ups or comments that change the originally submitted ratings, parameters, specifications, options, etc., the Contractor shall correct the documents in the original electronic document prior to submitting the final electronic documents.

4. Highlight the specific rating, parameter, specification, option, etc. when the original document includes multiple alternatives. For instance, when a range of performance parameters are given or various sizes are shown, or various options are listed, the applicable item shall be indicated by highlight, circle, pointer, or other electronic marking. Partial-page material in the submittal that does not pertain to the project can be masked with a transparent gray screen over the text; entire pages that are not applicable may be electronically deleted.
  5. Do not include generalized direction from the Architect that does not relate to ordering and purchasing the equipment. For instance, notes such as "Coordinate with mechanical engineer for final motor horsepower" are not to be transferred to the electronic submittal. In that example, only the final coordinated sizes shall be indicated.
- C. Final Electronic Record Submittals shall be either posted to the project web site or provided on compact disc.

#### 1.11 MANAGEMENT PROTOCOL COORDINATION

- A. Coordination responsibilities and management protocols relative to Cx are initially defined below but will be refined and documented in the Construction Phase Cx Kick Off meeting. Contractor shall have input in the protocols and all Parties will commit to process and scheduling obligations. The CA will record and distribute.
1. Submittals and Shop Drawings: Owner or A/E shall distribute these to the CA. CA shall edit the project's submittal log to communicate which submittals must be forwarded to CA.
  2. CA Review Comments on Shop Drawings: Comments shall be included in Cx issues log, and a copy sent directly to the A/E and Owner by the CA. A/E shall consider and incorporate at their discretion.
  3. Deficiencies Identified by the CA: When the CA identifies a deficiency, CA shall make a good faith assessment of responsible parties. Those parties, as well as Owner and/or A/E shall be notified of the perceived deficiency. This communication is FOR INFORMATION ONLY and is not a directive to any party to resolve the deficiency. Contractor may accept responsibility and resolve the deficiency voluntarily. If Contractor contests either the deficiency or responsibility for that deficiency, Contractor shall respond to that deficiency indicating disagreement. If responsibility is not agreed to via the Cx dialogue, Owner shall issue a work directive or RFI via the normal contractual channels to resolve the issue.
  4. Requests for Meetings: Request by the Contractor for a meeting with the CA shall be routed through the Owner and/or A/E who will then determine the validity. Note that every attempt should be made to deal with Cx issues at regularly scheduled Cx Meetings.
  5. Control Sequence Modifications: CA shall make every attempt to thoroughly review the sequences during the submittal phase and address any issues prior to the submittal approval. However, CA and the BAC may incorporate minor changes to the sequence during testing when it is apparent that it improves the control of the equipment but does not fundamentally change the sequence. The time required by the BAC for this type of modification is addressed in Section 230090. Any and all changes must be thoroughly documented in the record documents.
  6. Scheduling Coordination: CA shall consult directly with the Owner and/or A/E to incorporate the Cx tasks in the project schedule. The process logic and integration shall ultimately be a collaboration between CM, CA, and subcontractors. The effort will start with CA and CM proposing initial logic. Then subcontractors will join the discussion and work out the final details, (precedent logic and durations).

7. Notification of Completion Milestones: Contractor shall notify Owner and/or A/E at least two weeks prior to an anticipated Cx activity or milestone (such as Turn-Over). Owner and/or A/E shall then coordinate the scheduling of the activity (as applicable) between all required parties as applicable. Notification shall be posted using the Portal (events module) with an associated Action Item distributed to interested parties.
8. Action List: CA maintains a categorized Action List which tracks the Cx-related action items. All content of the Action List will be available to all parties who have credentials on the Portal. Any party with credentials may post an Action Item. Any party that is copied on an email resulting from an Action Item posting may respond to it and contribute to the dialogue.
9. Start-Up Checklist and Test Documents: CA will provide initial 'generic' Start-Up Documents to the Contractor. The Contractor shall synthesize these with the manufacturer-specific start-up procedures and submit both to the CA for review and approval. The Contractor has the option of modifying the supplied generic procedures in the delivered format, or by supplementing these with their own procedures. The Contractor then executes, signs, and submits the final reviewed and approved Start-Up Documentation. The CA subsequently (and optionally) spot-checks the procedures and documentation at the 'System Turn-Over Meeting'. The Start-Up Documentation is then included in the Commissioning Record.
10. Functional Performance Test Documents: Functional Performance Tests are prepared and completed by the CA. They are developed during the construction phase, after BAS submittals have been submitted and approved. CA forwards the FPT procedures to the CM to be subsequently distributed to the Contractors for review. Contractors approve the procedures. Throughout the Cx process, CA maintains a current record of the FPTs and their results and keeps the documentation up to date and accessible for all to access the current progress. CA distributes hard copies of the FPTs at the completion of any significant stage of commissioning.

## 1.12 CONTRACTOR RESPONSIBILITIES

- A. Construction Phase: The following delineates the commissioning-related responsibilities of the Contractor (and their subcontractors) during the Construction Phase.
  1. Include Cx requirements in price and plan for work.
  2. Designate a Commissioning Coordinator (CxC) from each major subcontractor with activities related to commissioning. These Commissioning Coordinators are to be the primary contacts for Cx activities.
  3. Attend Construction Phase Cx Kick Off Meeting. The CxC and Project Manager from each major subcontractor shall attend.
  4. The CxC shall attend all Cx progress meetings unless otherwise agreed to by the CA.
  5. Remedy any deficiencies identified throughout construction.
  6. TAB shall submit sample balancing forms for approval prior to starting work.
  7. Schedule and coordinate Cx efforts into the construction schedule. Incorporate the precedent diagram provided by the CA into the construction schedule. Indicate at a minimum all tasks enumerated on the precedent diagram for all systems.
  8. Coordinate the work of subcontractors, vendors, manufacturers, and Testing Agencies provided with the bid, and ensure that they are informed of and are adhering to the requirements of the Cx process specified throughout the contract documents.



9. Contractor-Developed Documentation: Contractor shall develop and submit the following information as specified:
    - a. Draft Start-Up Documentation (submit along with the manufacturer's application, installation, and start-up procedures).
    - b. O&M Documentation content as specified.
    - c. Systems Manual content as specified.
    - d. Training Plan, and materials and documentation of training.
    - e. Temporary Operating and Conditioning Plan content as specified.
    - f. Piping Cleaning, Flush, and Fill Plan, content as specified.
    - g. Comprehensive integrated procedures for scheduling and task notification and documenting them in a common format.
  10. Provide assistance to the CA in preparation of the specific Functional Performance Test (FPT) procedures. Contractors, subcontractors and vendors shall review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during the tests. Damage caused to equipment performed in accordance with the approved procedures will be the responsibility of the Contractor.
  11. Thoroughly complete and inspect installation of systems and equipment as detailed throughout Contract Documents, as required by reference or industry standards, and as specifically indicated elsewhere in this Section.
  12. Start-up, test, adjust, and balance systems and equipment prior to verification and Functional Performance Testing by the CA. Start-Up Documentation shall be in accordance with Contract Documents, reference or industry standards, and specifically individual Cx specifications. Provide skilled technicians qualified to do the work required. Provide factory trained/authorized technicians where required by the contract documents and stated in the applicable technical section. Start-Up and Functional Performance Testing shall proceed from device checkout, to component checkout, to system checkout, to inter-system checkout.
  13. Prepare spaces with adequate security for on-site contractors to store equipment. Provide secure space with 120 volt AC power for the CA, TAB, and BAC to base their operations and store test equipment, drawings, files, and the like.
  14. Schedule for any required representative space mock-ups as early as possible to facilitate determining standards for closeout.
  15. Record Start-Up procedures on approved Start-Up Documentation and certify that the systems and equipment have been started and or tested in accordance with the requirements specified above. Each task or item shall be indicated with the party actually performing the task or procedure.
  16. Provide skilled technicians qualified to perform the work required.
  17. Provide factory-trained and authorized technicians where required by the Contract Documents.
  18. Tag equipment that is started with the Individual's name and date.
  19. Demonstrate the operation of all systems as specified.
  20. Certify that systems have been installed and are operating per Contract Documents prior to Functional Performance Testing.
  21. Maintain an updated set of Record Documentation as required by the Contract Documents.
  22. Copy the CA on indicated documentation.
  23. Conduct and document Equipment and Systems Training events as required by this Section and by applicable sections of the Specifications pertaining to each piece of equipment or system.
- B. Acceptance Phase: The following delineates the Cx-related responsibilities of the Contractor (and their subcontractors) during the Acceptance Phase.

1. Assist CA in Functional Performance Testing. Assistance will typically include the following:
    - a. Manipulate systems and equipment to facilitate Functional Performance Testing (as specified in Section 019110 and the Cx Plan; in some cases this will entail only an initial sample).
    - b. Provide any specialized instrumentation necessary for Functional Performance Testing.
  2. Correct any work not in accordance with Contract Documents.
  3. Participate in Training Events relative to use of O&M information and the preventative maintenance program.
  4. Maintain record documentation, and update and resubmit it when Acceptance Phase is completed.
  5. Compensate CA for additional site time incurred due to incompleteness of systems or equipment at time of Functional Performance Testing.
  6. Monitor systems, equipment, and areas throughout the Endurance Period. Log and diagnose all alarms during this period. Maintain trends and logs of all critical parameters. Forward the logs and trends on a weekly basis throughout all Endurance Periods.
- C. Warranty Phase: The following delineates the Cx-related responsibilities of the Contractor (and their subcontractors) during the Warranty Phase.
1. Provide warranty service.
  2. Conduct Final Systems Operation Training (BAC lead).
  3. Respond to and document warranty issues.
  4. Participate as required in opposite season testing.
  5. Correct any deficiencies identified throughout the Warranty Phase.
  6. Update record documentation to reflect any changes made throughout the Warranty Phase and resubmit final Record Drawings at the close of the Warranty Phase.

#### 1.13 EQUIPMENT SUPPLIER AND VENDOR RESPONSIBILITIES

- A. Construction Phase: The following delineates the Cx-related responsibilities of the Equipment Supplier (and their subcontractors) during the Construction Phase.
1. Provide shop drawings and product data in hard copy and electronic format.
  2. Provide manufacturer's application, installation, and start-up instructions within 30 days of shop drawing/product data approval.
  3. Where factory-authorized start-up is specified, coordinate, and participate in the specified Cx process and document start-up on the appropriate forms.
  4. Review and approve Functional Performance Test procedures affecting supplied equipment.
  5. Where training is to be provided by factory-authorized personnel, provide required Training Plan information including course content for approval prior to conducting the training.
  6. Conduct and document Equipment and Systems Training events as required by this Section and by applicable sections of the Specifications pertaining to each piece of equipment or system.
  7. Provide spare parts and materials as required by the specifications.
  8. Provide special tools as required by the specifications.

9. Provide Systems Manual content as required and develop project-specific O&M content as required by the Cx requirements.
  10. Provide all warranties.
- B. Acceptance Phase: The following delineates the Cx-related responsibilities of the Equipment Supplier (and their subcontractors) during the Acceptance Phase.
1. Participate in any Functional Performance Testing required.
  2. Consult on issues identified relative to the supplied equipment.]
- C. Warranty Phase: The following delineates the Cx-related responsibilities of the Equipment Supplier (and their subcontractors) during the Warranty Phase.
1. Provide any warranty service required to the supplied equipment as applicable with the agreement with the Contractor.
  2. Maintain Systems Manual content relative to supplied equipment.
  3. Provide technical support to the Owner's facilities personnel.

#### 1.14 COMMISSIONING KICK-OFF COORDINATION MEETING

- A. CA shall schedule and conduct a Cx coordination meeting near the beginning of construction. The following should be discussed at this meeting:
1. The commissioning documents (specifications and Cx Plan).
  2. Requirements and sequence of commissioning.
  3. Responsibilities of the construction parties.
  4. Management protocols.
  5. Required submittals.
  6. Schedule.

#### 1.15 START-UP AND START-UP CX PROCESS DOCUMENTATION

- A. Purpose: The Cx process requires that the normal quality control processes involved with preparing systems and equipment for operation are performed to a high standard of care and are thoroughly documented. The required Cx-related Start-Up Documentation is no more than that which would be provided for any good installation. These procedures shall be performed to all installed systems and equipment and no sampling strategy is used for the Start-Up process. The Cx process requires all Parties to collaborate to establish the optimal standard of care for starting systems and equipment. After the procedures are established, the Contractor performs them and documents them with the Start-Up Documentation that is developed through the joint effort of the Contractor and the CA.
- B. Creation of Start-Up Documentation: Start-Up Documentation (consisting of checklists and tests as defined above) shall be developed by the Contractor and appropriate manufacturers for each type of equipment and system being installed for this project. It shall be submitted to the CA for approval prior to actual equipment Start-Up. Contractor shall develop Start-Up Documentation based upon a combination of (i) the 'generic' procedures prepared by the CA (see below); (ii) existing procedures and checklists included in the Contractor's in-house quality assurance process, and (iii) those procedures required by the manufacturer. Contractor shall provide the CA with an electronic copy of manufacturer's application, installation, and start-up information at the time they submit the Start-Up Documentation. The CA shall then approve the Start-Up Documentation. Approved Start-Up Documentation shall reflect all project-specific values, settings, targets, acceptance

criteria, and other parameters as appropriate. Final approved Start-Up Documentation shall be provided in electronic format.

- C. 'Generic' Start-Up Documentation: Refer to Sections 230090 and 260090 for 'generic' Start-Up Documentation for a variety of HVAC, mechanical and electrical systems. The content of the 'generic' Start-Up Documentation shall provide the minimally acceptable content. Generic refers to the fact that these procedures and protocols are common for most types of equipment and systems across different manufacturers. The Contractor is responsible for customizing this material to reflect the actual equipment and systems selected.
- D. Manufacturer/Vendor Installation and Start-Up Documentation: Contractor and Vendors shall provide manufacturer's preprinted and standard installation checklists, forms, and protocols both for review early in the construction process and to as required to document the Start-Up process towards the end of the Construction Phase. After the approval of the shop drawings and product data, Contractor shall submit manufacturer's start-up procedures and application guidelines for all systems, equipment, and components. These shall be submitted in electronic PDF format for review and approval. Submittal of the information shall be within 30 days of the submittal approval.
- E. Content of Start-Up Documentation: Start-Up Documentation shall generally include the following for each item of equipment or system (as applicable):
1. Project-specific designation, location, and service.
  2. Indication of the Party performing and documenting the Start-Up.
  3. Clear explanation of the inspection, test, measurement, and outcome with a Pass/Fail indication and a record of measured parameters (as applicable).
  4. Include a checklist item indicating that all O&M Documentation, Warranties, and Record Documents have been completed and submitted.
  5. Include a Start-up Checklist item indicating that proper maintenance clearances have been maintained.
  6. Include a Start-up Checklist item indicating that special tools and/or spare tools required for normal operation and maintenance were turned over to the Owner.
  7. Include Start-up Checklist item indicating that all required dependent or prerequisite equipment and systems were previously started successfully.
- F. Manufacturer's Requirements: Start-Up Documentation shall incorporate all manufacturer-specified procedures. As applicable, include acceptance criteria specified therein. The manufacturer's start-up and checkout procedures shall be submitted to the CA along with the Contractor's draft Start-Up Documentation.
- G. Recording and Documentation of the Start-Up: Manufacturer's start-up protocols shall be executed, and forms shall be completed by a qualified/authorized technician. These shall be developed and submitted electronically or at the discretion of the CA they may be scanned and submitted electronically. Electronic documentation of manufacturer's start-up protocols shall be linked into the applicable test on the Portal.
- H. Recording and Completion of Start-Up Checklists and Tests: A qualified technician from the responsible installing Contractor or manufacturer's start-up technician shall document the Start-Up on the approved Start-Up Documentation forms. The individuals executing the Start-Up shall acknowledge acceptability of each item with the indication of who performed the associated task. The Start-Up is not considered complete until the Start-Up Documentation has been completed and entered electronically on the Portal. Information documented manually on paper in the field and/or installation or start-up information developed by the manufacturer must be transferred to the electronic file before Turn-Over

can be scheduled. The completed documentation shall be presented and reviewed at the System Turn-Over Meeting.

- I. CA Review: CA shall review the completed and submitted Start-Up Documentation and request any incomplete data or additional information required to meet the Cx program criteria. CA will also review and spot-check procedures during Functional Performance Testing.
- J. Systems Subject to Start-Up Documentation and Turn-Over: All (100% of) systems shall undergo a documented Start-Up per the approved procedures and NO sampling strategy is used. Completed Start-Up Documentation for all pieces of equipment shall be submitted to CA prior to Turn-Over or any associated Functional Performance Testing. Any outstanding item shall be clearly indicated, and an associated Action Item must be entered to track resolution.
- K. Owner Access: Contractor shall allow access by Owner representatives at any time to inspect the equipment and ensure its proper operation. Owner will be allowed to affix service tags to equipment to track the proper maintenance.
- L. Mechanical Contractor -Specific Documentation Requirements:
  - 1. The Division 23 Contractor shall provide the following documents as specified in Section 230090:
    - a. Piping Cleaning, Flush, and Fill Plan.
    - b. Temporary Operation and Conditioning Plan (if permanent systems are to be used to condition the building during Construction Phase).

#### 1.16 EQUIPMENT NAMEPLATE DATA

- A. Contractor shall provide as-installed specific product nameplate data, product numbers, serial numbers, and other information required to fully define the asset for Owner's use in maintenance management and asset tracking and BIM Modeling. This data shall be provided electronically to ease in the data transfer to the computerized maintenance management system. Coordination of the format required shall be arranged by the Contractor prior to initial construction implementation.
  - 1. Acceptable forms of electronic submittals are:
    - a. Microsoft Excel spreadsheet arranged with a separate 'Sheet' for each type of equipment and with individual pieces of equipment entered as rows and the applicable values to be recorded as column headings.
    - b. Microsoft Access database arranged with a separate 'Table' for each type of equipment and with individual pieces of equipment entered as rows and the applicable values to be recorded as fields. Field formats will be as determined at the Construction Phase Commissioning Kickoff Meeting.
    - c. Text document formatted as Comma Separated Values (csv) with a separate file for each type of equipment, the first row including the field or column names and subsequent entries for each individual piece of equipment as rows.
  - 2. Minimum nameplate data content shall include the following as applicable:
    - a. Construction document designation.

- b. Owner's designation if different than the construction document designation and if provided by the Owner.
  - c. Contact information identification which shall reference the project's Contact List for installing contractor, vendor or representative, and manufacturer. Contractor shall also provide identification for suppliers of parts if different from the previous parties.
  - d. Model Number.
  - e. Serial Number.
  - f. Date of Manufacture.
  - g. All performance and sizing data required to operate, diagnose, or replace the system, equipment, component, or systems with as a minimum that indicated in the construction documents.
  - h. General description or type classification of the system, equipment, component, or device.
- B. Contractor shall provide Equipment Nameplate Data for all equipment provided as work of this Division.

#### 1.17 FUNCTIONAL PERFORMANCE TESTING

- A. The objective of Functional Performance Testing is to demonstrate that each system is operating according to the documented OPR/Basis of Design and Contract Documents. Functional Performance Testing facilitates bringing the systems from completed Start-Up to Functional Completion. During the FPT, areas of deficient performance are identified and corrected, improving the operation, and functioning of the systems. System parameters are further tuned and optimized to provide for stable control and interrelated system effects are also addressed.

#### 1.18 FUNCTIONAL PERFORMANCE TESTING DEFICIENCIES

- A. Non-conformance deficiencies, e.g. test failures, installation, and configuration errors, etc., identified during Functional Performance Testing shall be resolved as follows:
- 1. The CA will record the results of the functional test in the project database. All deficiencies or non-conformance issues shall be noted as Action Items and reported to the Owner and A/E.
  - 2. Corrections of identified minor deficiencies may be made during the tests at the discretion of the CA. In such cases, both the deficiency and associated resolution will be documented in the database.
  - 3. Every effort will be made by the CA to expedite the FPT process and minimize unnecessary delays, while not compromising the integrity of the procedures.
  - 4. As tests progress and a deficiency is identified, the CA will discuss the issue with the executing Contractor.
    - a. When there is no dispute on the deficiency and the Contractor accepts responsibility to correct it:
      - 1) The CA shall document the deficiency along with the Contractor's response and intentions, and then proceed forward to another test. A copy/email of the deficiency shall be generated and provided to the Contractor and CA. The Contractor shall then correct the deficiency, complete the Action Item response certifying that the issue is resolved and /or the equipment is ready to be retested, and sends it back to the CA.

- 2) The CA reschedules the test, and the test is repeated until satisfactory performance is achieved. CA then closes the Action Item.
    - b. If there is a dispute about a deficiency, regarding whether it is a deficiency and/or who is responsible:
      - 1) The deficiency shall be documented as an Action Item with the Contractor's response and the Owner and A/E will be notified. The Owner will track this issue under the construction contract dispute resolution provisions.
      - 2) Final interpretive authority is with the A/E. Final acceptance authority is with the Owner.
      - 3) The CA documents the resolution to the Action Item.
      - 4) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, and responds to the Action Item indicating completion. The CA reschedules the test, and the test is repeated until satisfactory performance is achieved. CA then closes the Action Item.
- B. Failure Due to Manufacturer's Defects. If 10% or three, whichever is greater, of identical pieces of equipment fail to perform to the required Contract Document criteria (mechanically or substantively) due to manufacturing defect, all identical units may be considered unacceptable by the Owner. (For the purposes of defining 'identical equipment' for this Section, size or capacity alone does not constitute a difference.) In case of failure due to manufacturer's defects, the Contractor shall provide the Owner with the following:
1. Manufacturer's response in writing as to the cause of the failure and proposed resolution.
  2. Manufacturer shall implement their proposed resolution on a representative sample of the product.
  3. The Owner will determine whether a replacement of all identical units or a repair is acceptable.
  4. Upon acceptance, the manufacturer shall replace or repair all identical items at their expense and shall extend the warranty accordingly (if the original equipment warranty had begun).
  5. Manufacturer or Contractor shall pay the costs of all retesting necessitated by the failure.

#### 1.19 OBSERVATION PERIOD

- A. General: The Observation Period is defined as a period of time either prior to or immediately following Functional Performance Testing where the BAS is shown to operate properly without malfunction, without alarms caused by control action or device failure, and with smooth and stable control of systems and equipment in conformance with these specifications.
- B. Prerequisites: The CA will determine when the BAS has been substantially completed to allow for the start of an informal Observation Period as defined above. Observation Period may be witnessed in phases only on larger more complex projects where interdependencies between phases are not a factor.

#### 1.20 TRAINING

- A. General: Adequate and thorough training of the Operators and the facilities staff is vital to effective transition and early occupancy of the building. A key goal of the Cx program is to

ensure this is accomplished. Contractors, subcontractors, and Manufacturers/Vendors as specified shall prepare and conduct training sessions on the installed systems and equipment for which they are responsible. The Contractor shall be responsible for insuring all training is performed in accordance with the Contract Documents.

- B. Training Events Overview: Training Events include all classroom and field-based training sessions that result in the training or transference of design team or Contractor knowledge to the Owner. The following Training Events shall be executed as part of the Training Program:
1. Design Orientation Training: The purpose of the one-time Design Orientation Training event is to acquaint the Owner and Contractors with the facility design strategies and approach taken by the Design Team. The mechanical design engineer is responsible for conducting and documenting this training, with assistance and support from the CA. Material from the Owner's Project Requirements and Basis of Design Documents shall be covered during this training. An overview of the facility and its systems, the system design goals and the reasoning behind the selection of the equipment will be reviewed. The CA will also review the upcoming Start-Up process and FPT/Acceptance Testing procedures. An optional tour will be provided at the conclusion of the event.
  2. Equipment and Systems Training: The Contractor (or Manufacturer's Representative) shall provide training to the Owner/Operators on individual systems and equipment only after successful Start-Up. These training events cover proper operation, maintenance, repair, and diagnosis of the systems, equipment, and components installed by the Contractor. Details and required content are provided elsewhere in this Section.
  3. Final Systems Operation Training: The BAC shall provide this training to the Owner and Operators on whole-building operation. This training shall focus primarily on BAS control of building systems and operation and its impact on building performance, and shall be conducted after Functional Completion.
- C. Training Means, Methods, and Documentation: The Contractor must document all training sessions. Details on the means and methods for conducting and documenting training, including location requirements, preparation, methods for presentation, scheduling, recording, instructor qualifications, and other details are specified below.
1. Trainer must supply a Training Plan Document as detailed below, at least 2 weeks prior to the scheduled training session for approval by the Owner and CA.
  2. Setting: Training sessions should typically start and end in a classroom setting. Field demonstrations shall be conducted to demonstrate the hands-on aspects of the required tasks.
  3. Presentation: Training shall include electronic presentation materials. Presentation materials shall be submitted by the Contractor within the Training Plan. Contractor shall provide audio/visual equipment as required to communicate to a minimum of 10 attendees.
  4. Documentation: Subcontractors or Vendors must document the training sessions in a Training Record. Beyond that included in the Training Plan, documentation shall include the names of the attendees and their evaluations. Training shall follow handouts that list the key points in bullet form presentation style or follow detailed written documentation. Training will not be approved unless it contains accompanying handout documentation to every attendee for their own use and record, separate from the master copy for the Training Record. All documentation must be provided in PDF electronic format. All handouts and presentation slides shall be included in the documentation.



5. Evaluations: All training sessions must be evaluated by the participants. CA shall develop an evaluation form that assesses the quality of the presentation, the quality of the content, and provides a forum for feedback of items the attendee feels should be provided or expanded on. The Contractor that organizes the sessions is responsible for distributing the evaluations, ensuring they are completed, and compiling them and forwarding them to the CA.
- D. Training Plan Document.
1. The Training Plan shall outline the various Equipment and Systems Training events and Final Systems Operation Training event as proposed by the Contractors, and shall be approved by the CA. Contractor shall compile the individual training agendas of the subcontractors and vendors and submit a comprehensive Training Plan to the CA, Architect and the Owner for review. Training Plan shall summarize all Equipment and Systems Training events with topics to be covered and approximate training duration.
  2. The Training Plan shall include at a minimum:
    - a. Topic and applicable specification section.
    - b. Scheduled date(s) for the Events(s).
    - c. Location and setting (classroom or field).
    - d. Lead instructor and instructors qualifications.
    - e. Co-instructors and their qualifications.
    - f. Training objective.
    - g. Event outline/agenda.
    - h. Detailed breakout of content to be presented.
    - i. Anticipated duration.
    - j. Required attendees for each session.
  3. Review: Contractor shall submit the Training Plan to the CM, who will then disseminate it for review to the Cx Team. Contractor shall incorporate comments and requirements resulting from the review and resubmit the Training Plan prior to conducting any training sessions.
- E. Training Prerequisites: Equipment and Systems Training (“Training”) shall not be conducted until the subject system or equipment has completed Start-Up Documentation requirements and Turn-Over. If the Contractor wishes to schedule both Turn-Over and Training on the same day/visit and if the systems are discovered to not be fully functional at that time, Training shall be canceled and rescheduled.
- F. Equipment and Systems Training – Description and Content.
1. Description: Equipment and Systems Training events will typically occur over a period of time as systems and equipment are brought online and Turned Over. Training shall cover proper operation, maintenance, repair, and diagnosis of the systems, equipment, and components installed by the Contractor. The appropriate trade or manufacturer’s representative shall provide the instructions on each major piece of equipment. These sessions shall use the manufacturer’s printed installation, operation and maintenance instruction material and shall include a review of these instructions emphasizing safe and proper operating requirements and preventative maintenance. Training shall follow handouts that list the key points in bullet form presentation-style or follow detailed written documentation. Training will not be approved unless it contains accompanying written documentation.

2. Equipment Covered: Training shall be provided for all major items of equipment within the scope of commissioning and per the Specifications.
  3. Minimum Training Content: Equipment and Systems Training shall include as a minimum for each type of equipment:
    - a. Presentation of the equipment within the context of this facility. Typically, the responsible subcontractor shall provide this introduction to the session. The trainer shall review how the equipment serves this specific facility. Information shall include equipment amounts, numbers, capacities, sizes, and locations and shall show the equipment in applicable system schematics.
    - b. Conceptual overview of how the equipment works.
    - c. Names, addresses, phone numbers, websites of sources for information, tools, spare parts, and other details for the equipment.
    - d. Details of the warranty or guarantee.
    - e. Intended sequences of operation in all modes of operation.
    - f. Limits of responsibility (example: unit-mounted controls vs. BAS).
    - g. Sources of utility support.
    - h. Routine operator tasks involving monitoring and operation, covering all modes of operation and mode switching as applicable.
    - i. Relevant health and safety practices/concerns.
    - j. Common problems and their diagnosis and repair.
    - k. Proper maintenance schedules, tasks, and procedures with demonstrations.
    - l. Emergency response, documentation, and recovery procedures.
  4. Scheduling: These events shall be coordinated through the CA, but be scheduled by the CM.
  5. Attendees: Contractor shall insure that all appropriate subcontractors be present for these sessions. Any Cx Team member is eligible to attend. Required attendees include the applicable Contractors (Lead), CA, and the Owner/Operator.
- G. Final Systems Operation Training.
1. Description: Final Systems Operation Training provides the Owner and Operators a training session on whole-building operation. It shall focus primarily on BAS control of building systems and operation and its impact on building performance. System interactions shall be presented and discussed (such as a combined air handler, chiller, boiler, and terminal unit system), along with a detailed presentation of the sequences of operation and their relationship to the BAS. This training shall be conducted by the BAC with assistance from the CA, and shall be attended by the Owner, Operators, Contractor, Design Team, and by any other Cx Team members deemed necessary by the CA or the Owner.
  2. Coordination with BAS Training: Detailed BAS component training for the facility Operators shall be considered as part of Equipment and Systems Training. This training shall have been completed prior to Final Systems Operation Training.
  3. Scheduling: Final Systems Operation Training shall be conducted after all FPTs have been successfully executed.
  4. Attendees: Any Cx Team member is eligible to attend. Required attendees include the BAC (lead), CA (assist), CM, mechanical contractor, A/E, and Owner/Operators.

## 1.21 CONTRACTOR REQUIRED O&M DOCUMENTATION

- A. Contractors are responsible for submitting their own developed O&M Manuals per the Contract Documents and for developing installation-specific O&M Documentation.
- B. O&M Documentation Content: Content for one system and all associated equipment must be organized and made in one submission. However, systems may be submitted separately based on the progress of the project. Content shall be provided and indexed separately as 'Operations Manual' and 'Maintenance Manual' as specified below.
- C. This Part shall be organized by Division then system/subsystem using a systems approach.
  - 1. Contact Information: Provide contact cross-references to the Parties applicable to the system being described and contained in the main Contact Directory in the Commissioning Plan.
  - 2. Start-Up and Shutdown Procedures: Provide step-by-step instructions to bring systems from static to operational configurations and from operating to shutdown status. Installing Contractor or Vendor/Manufacturer shall author this specifically for this project.
  - 3. Normal Operating Instructions: Provide a discussion of the normal operation and control of the system. Address operating norms (for example, temperatures, pressures, and flow rates) expected at each zone or phase of the system. Supplement the discussion with control and wiring diagrams and data. Installing Contractor or Vendor/Manufacturer shall author this specifically for this project.
  - 4. Emergency Operating Instructions: Provide emergency operating procedures in the event of equipment malfunctions. Provide shutdown instructions for fires, explosions, spills, or other contingencies. Installing Contractor or Vendor/Manufacturer shall author this specifically for this project. This content shall be in the context of the systems themselves and support the Emergency Operations manual to be created by the Owner.
  - 5. Environmental Considerations: Provide a listing of the equipment that requires special operation, reporting, testing, analysis, or inspection to comply with federal, state or local environmental laws. Examples of possible list items include backflow preventer inspections, underground storage tank testing, hazardous material or waste usage/storage documentation and air pollution control devices. For each item, include requirements for environmental operation, reporting, testing, analysis, and inspection as well as references to respective implementing regulations, statutes or policies.
  - 6. Equipment and System Training Documentation: Include documentation of training for applicable system. Include training agenda, all handouts and presentation materials/content. Reference existence and index of DVD or video tape recording.
  - 7. Sequence of Operation/Control Schematic: Provide the written sequence of operation for the applicable system and the control schematic diagram. This information may be obtained from the A/E or design team members.
  - 8. Maintenance Service Agreements: Provide copies of maintenance service agreements where there pertain to systems involving multiple components and devices as indexed in Part 3.
  - 9. Testing, Adjusting, and Balancing Reports: Insert the TAB Reports provided under Section 230593 for the subject system.
- D. Maintenance Manual.
  - 1. Organize this section first by discipline then by equipment number or ID.
  - 2. Maintenance Index: Provide a summary table that indexes the equipment requiring maintenance and indicates the frequency each piece of equipment needs attention,

- and a reference to the number of the Procedure associated with that frequency. CM shall provide Contractors with an Excel spreadsheet that will be completed by each applicable subcontractor and returned to the CM for incorporation in the Systems Manual.
3. Maintenance Information: Maintenance Information for each indexed entry shall contain the following:
- a. Equipment Data Sheet: Provide a summary of key nameplate and performance data.
  - b. Procedures: Provide a 'Task Card' or step-by-step procedures for each individual maintenance procedure for a given frequency identified on the Maintenance Index. Include detailed PM procedures, safety instructions and precautions including Lock Out/Tag Out precautions, required skill level, number of personnel needed, frequency, special tools needed, parts needed and estimated time required to complete the task. These procedures shall be indexed in a manner approved by the Owner. These shall be provided as Microsoft Word files or scanned documents from the manufacturer's O&M Manual in either PDF or JPG formats).
  - c. Field Test Reports: Provide Field Test Reports that apply to equipment associated with the system.
  - d. Troubleshooting Instructions: Provide detailed troubleshooting instructions indexed by common/expected symptoms. Alternatively, make specific reference to page in the manufacturer's O&M Manual where this information is provided.
  - e. Extended Warranty Information: Include all warranties for products, equipment, components, and sub-components whose duration exceeds one year. Include warranties on components with the system they are contained within. Reference all specific operation and maintenance procedures that must be performed to keep the warranty valid.
  - f. Special Tools: Provide a listing of any special tools required for servicing, diagnosis, or repair. Alternatively, reference specific page in the manufacturer's O&M Manual where this information is provided.
  - g. Supply Inventory Requirements: Provide a list of maintenance and repair supplies (e.g., spare parts, fuels and lubricants) required to ensure continued operation without unreasonable delays. Identify and list parts and supplies that have long purchase lead times. Alternatively, reference specific page in manufacturer's O&M Manual that contains this information.
  - h. Sources of Spare Parts: Provide list or reference to recommended spare parts and contact information where spare parts can be obtained.
  - i. Lubrication Schedule: Provide a lubrication schedule indicating types, grades, and capacities of lubricants for specific temperature ranges and applications. Alternatively reference the specific page in the manual that contains this information.
  - j. Maintenance Service Agreements: Provide copies of maintenance service agreements where they pertain specifically to indexed equipment.
  - k. Manufacturer's O&M Manual: Include manufacturer's printed O&M information. These shall be provided in PDF format. If unavailable as PDF from the manufacturer, hardcopy manual shall be scanned and provided as a single file.
  - l. Application and Installation Instructions: Where applicable and separate from the O&M information, provide the Application and Installation Instructions that indicate how to correctly apply and install/setup the equipment.

- E. O&M Documentation Format: Content authored, developed, and compiled by the Contractor shall be available both electronically and hardcopy. Specific electronic format shall be coordinated with the CA. Acceptable electronic formats shall allow for editing and commenting, and include Microsoft Word, Excel, PowerPoint, Access, and Visio; Portable Document Format (PDF), AutoCAD, graphics/photo formats such as JPG,
- F. Mechanical Contractor O&M Documentation Submittal: The Division 22 and 23 Contractor shall compile and organize the content for all work of Divisions 22 and 23 and provide one organized submittal. Upon approval by the CA, the content may be provided in multiple system and equipment-level submittals. Each submission shall be provided at least one month prior to the start of the Acceptance Period. This submittal will be reviewed by A/E, CA, Owner, and CM within two weeks of the submission. Contractor shall incorporate comments and corrections and resubmit prior to the start of the Acceptance Period. Within two weeks of Functional Completion, the Division 22 and 23 Contractor shall provide the final version of all O&M Documentation information in one submittal.
- G. Other Contractor O&M Documentation Submittals: Submittals by all other Contractors (other than Div. 22 and 23 shall be provided per specifications within their respective Division of work.
- H. Maintenance and Updates of O&M Documentation Content: Contractors shall maintain the applicable O&M Documentation content throughout the Warranty Period. All hard copies will be retained at the Owner's facilities or electronically online at a web-based site. Changes throughout the Warranty Period shall be fully coordinated with the CA. Maintenance of O&M Documentation content shall include:
  - 1. Changing any indicated settings, parameters, and other operational parameters that were changed by the Contractor during the Warranty Phase.
  - 2. Changing any instructions as to procedures that needed to be changed during the Warranty Phase.
  - 3. Changing the Record Schedules and/or Sequences of Operation if they were changed during the Warranty Phase.
  - 4. Updating any O&M Documentation content if changed or updated by the manufacturer.
- I. Electronic Copies: Electronic copies may be posted to the Portal. When a posting is made, emails shall be sent to the receiving Parties (and copied to any other interested Parties) stating that the submission has been posted. Posting needs only to be the current submission. Contractor shall maintain all versions of the submission and provide upon request. When electronic submissions are made on electronic media such as CDs or memory sticks, six copies of the electronic media shall be provided.

## 1.22 SYSTEMS MANUAL PREPARATION AND LOGISTICS

- A. Definition: The Systems Manual is the final deliverable from the Cx process, and provides the information needed to understand, operate, and maintain the facility and its systems. It is typically developed by the CA but with content required to be provided by the design team and the Contractors. The Systems Manual expands the scope of standard O&M documentation to incorporate additional information developed through the Cx process. The Systems Manual should be the repository of all updates and corrections as they occur (even throughout Occupancy). It is narrative in nature and organized by system types and by area/usage of the facility (if applicable). Systems Manual content typically includes narrative descriptions of the facility and systems, sequences of operation, schematic

diagrams, cuts from design drawings and equipment literature, photos, and manual start/stop and emergency operating procedures for important equipment.

- B. **Systems Manual Lead Developer Responsibilities:** The lead developer of the Systems Manual for this project shall be the CA. The lead developer is responsible for organizing and producing the Systems Manual and for managing the content and contributions from the Parties responsible for providing technical content. The Party responsible for each topic shall assemble, author, develop, coordinate, or otherwise produce the content for that topic as specified below and provide to the lead developer. Requirements as specified include requiring the applicable Contractors to author project-specific information in a consistent format in addition to submission of standard pre-printed manufacturer's O&M and product information.
- C. **Systems Manual Contractor Responsibilities:** Contractor, Subcontractors and Vendors/Factory Representatives shall prepare, organize, and submit applicable content for the comprehensive and coordinated Systems Manual as specified below. Some of the material required from the Contractors will need to be authored or customized specifically for this project and facility. Contractor content is indicated by "CM" who is responsible for consolidating the content and materials from the various individual Contractors. Content for one system and all associated equipment must be organized and made in one submission. However systems may be submitted separately based on the progress of the project. Each submission shall be indexed as a sub-entity to the overall Systems Manual submission.
- D. **Division 22 and 23 Contractor Responsibilities:** The Division 22 and 23 Contractor shall compile and organize the content for all work of Divisions 22 and 23 and provide one organized submittal. Upon approval by the CA, the content may be provided in multiple system and equipment-level submittals. Each submission shall be provided at least one month prior to the start of the Acceptance Period. This submittal will be reviewed by A/E, CA, Owner, and CM within two weeks of the submission. Contractor shall incorporate comments and corrections and resubmit prior to the start of the Acceptance Period.
- E. **Final Systems Manual Content Submittal:** Within two weeks after Functional Completion, Contractors shall provide the final version of all Systems Manual information. Division 22 and 23 Contractor shall provide final version in one single submittal.
- F. **Maintenance and Updates of Systems Manual Content:** Contractors shall maintain the applicable Systems Manual content throughout the Warranty Period. All hard copies will be retained at the Owner's facilities and electronically online through the Portal. Changes throughout the Warranty Period shall be fully coordinated with the CA. Maintenance of Systems Manual content shall include:
1. Changing any indicated settings, parameters, and other operational parameters that were changed by the Contractor during the Warranty Phase.
  2. Changing any instructions as to procedures that needed to be changed during the Warranty Phase.
  3. Changing the Record Schedules and/or Sequences of Operation if they were changed during the Warranty Phase.
  4. Updating any Systems Manual content if changed or updated by the manufacturer.
- G. **Systems Manual Format and Submission:** The Systems Manual contents shall be provided in hard copy and electronic format.
1. **Electronic Version:** The electronic version of the Systems Manual will be a series of files organized in subdirectories with a summary index with hyperlinks to the various documents and or references to separate CDs that contain the information.

During authoring, sample format Microsoft Office documents (Word, Excel, or PowerPoint) will be provided to be used by vendors and contractors to provide the custom-authored content to the lead developer for final compilation. Electronic copies of the product data shall be in PDF format. Drawings shall be in AutoCAD or PDF format.

2. Electronic File Submissions. Electronic files of Systems Manual content may be posted to the project website. When a posting is made, emails shall be sent to the receiving Parties (and copied to any other interested Parties) stating that the submission has been posted. Posting should only include the current submission, although the Contractor shall maintain all versions of the submission and provide upon request. When electronic submissions are made on electronic media such as CDs, six copies of the electronic media shall be provided.

### 1.23 SYSTEMS MANUAL CONTENT AND ORGANIZATION

- A. Systems Manual Scope: The Systems Manual format and content requirements shall be as follows. Documents developed or otherwise provided as specified in the Contract Documents should be used directly or referenced to the extent possible, including but not limited to OPR/BOD narratives, shop drawings, submittals, and O&M Manuals. Responsible parties are as indicated in square brackets; tasks not delineated by a responsible party are the responsibility of the lead developer.
- B. Part 1 – Facility Information.
  1. Directory of Entire Manual: Provide a directory indexing the entire set of documents that comprise the Systems Manual.
  2. Contact Directory: Include the contact information for all contractors, subcontractors, vendors, manufacturers, and any other entity that has provided goods or services installed at the facility. Contact information should include name, website, address, phone numbers, and technical support phone numbers and email addresses.
  3. General Facility and System Description: A/E Describe the function of the facility. Detail the overall dimensions of the facility, number of floors, foundations type, expected number of occupants, and facility category code. List and generally describe all the facility systems listed in Part II - Primary Systems Information and any special building features (for example, cranes, elevators, and generators). Include photographs, marked-up and labeled to show key operating components and the overall facility appearance.
  4. Floor Plans: A/E Provide uncluttered, legible 11 x 17 inch floor plans. Exact copies of the design plans are usually not acceptable because of extraneous information. Include only room numbers, type or function of spaces, and overall facility dimensions on the floor plans. Do not include construction instructions, references, frame numbers, etc.
  5. Utility Connection and Cutoff Plans: Provide utility site and floor plans that indicate the exterior and main interior connection and cutoff points for all utilities. Include enough information to enable someone unfamiliar with the facility to quickly locate the connection and cutoff points. Do not include items such as contour lines, elevations, and subsurface information on the site plans. Indicate the room number, panel number, circuit breaker, valve number, etc., of each connection and cutoff point, and what that connection or cutoff point controls. These plans are in addition to the floor plans.
- C. Part 2 - Primary Systems Operating Information.

1. This Part shall be organized by Division then system/subsystem using a systems approach. Part 2 contains system information, whereas Part 3 contains equipment information.
  2. System Description: Provide a detailed discussion of the system composition and operation. Include technical details that are essential for an understanding of the system. A/E shall provide narratives to the CM who shall provide these to the major subcontractors for use in preparation of their required content. Also cross-reference O&M data contained in Part 4 and product data and submittals contained in Part 4.
  3. Contact Information: Provide contact cross-references to the Parties applicable to the system being described and contained in the main Contact Directory in Part 1.
  4. System Flow Diagrams : Provide a flow diagram indicating system liquid, air (do not include ductwork) or gas flow during normal operations. Integrate all system components into the diagram. Note that a compilation of non-integrated flow diagrams for the individual system components is not acceptable.
  5. Diagrammatic Plans: Provide floor plans indicating the location of equipment and configuration of the system installation. Include the configuration of associated piping or wiring, subordinating structural features to utility features.
  6. Start-Up and Shutdown Procedures: Provide step-by-step instructions to bring systems from static to operational configurations and from operating to shutdown status. Installing Contractor or Vendor/Manufacturer shall author this specifically for this project.
  7. Normal Operating Instructions: Provide a discussion of the normal operation and control of the system. Address operating norms (for example, temperatures, pressures, and flow rates) expected at each zone or phase of the system. Supplement the discussion with control and wiring diagrams and data. Installing Contractor or Vendor/Manufacturer shall author this specifically for this project.
  8. Emergency Operating Instructions: Provide emergency operating procedures in the event of equipment malfunctions. Provide shutdown instructions for fires, explosions, spills, or other contingencies. Installing Contractor or Vendor/Manufacturer shall author this specifically for this project. This content shall be in the context of the systems themselves and support the Emergency Operations manual to be created by the Owner.
  9. Environmental Considerations: Provide a listing of the equipment that requires special operation, reporting, testing, analysis, or inspection to comply with federal, state or local environmental laws. Examples of possible list items include backflow preventer inspections, underground storage tank testing, hazardous material or waste usage/storage documentation and air pollution control devices. For each item, include requirements for environmental operation, reporting, testing, analysis, and inspection as well as references to respective implementing regulations, statutes or policies.
  10. Equipment and System Training Documentation: Include documentation of training for applicable system. Include training agenda, all handouts and presentation materials/content. Reference existence and index of DVD or video tape recording.
  11. Sequence of Operation/Control Schematic: Provide the written sequence of operation for the applicable system and the control schematic diagram.
  12. Maintenance Service Agreements: Provide copies of maintenance service agreements where there pertain to systems involving multiple components and devices as indexed in Part 3.
  13. Testing, Adjusting and Balancing Reports: Insert the TAB Reports provided under Section 230593 for the subject system.
- D. Part 3 - Maintenance Manual.
1. Organize this section first by discipline then by equipment number or ID.



2. Maintenance Index: Provide a summary table that indexes the equipment requiring maintenance and indicates the frequency each piece of equipment needs attention, and a reference to the number of the Procedure associated with that frequency. CM shall provide Contractors with an Excel spreadsheet that will be completed by each applicable subcontractor and returned to the CM for incorporation in the Systems Manual.
3. Maintenance Information: Maintenance Information for each indexed entry shall contain the following:
  - a. Equipment Data Sheet: Provide a summary of key nameplate and performance data.
  - b. Procedures: Provide a 'Task Card' or step-by-step procedures for each individual maintenance procedure for a given frequency identified on the Maintenance Index. Include detailed PM procedures, safety instructions and precautions including Lock Out/Tag Out precautions, required skill level, number of personnel needed, frequency, special tools needed, parts needed and estimated time required to complete the task. These procedures shall be indexed in a manner approved by the Owner. These shall be provided as Microsoft Word files or scanned documents from the manufacturer's O&M Manual in either PDF or JPG formats).
  - c. Field Test Reports: Provide any Field Test Reports that apply to equipment associated with the system.
  - d. Troubleshooting Instructions: Provide detailed troubleshooting instructions indexed by common/expected symptoms. Alternatively, make specific reference to page in the manufacturer's O&M Manual where this information is provided.
  - e. Extended Warranty Information: Include all warranties for products, equipment, components, and sub-components whose duration exceeds one year. Include warranties on components with the system they are contained within. Reference all specific operation and maintenance procedures that must be performed to keep the warranty valid.
  - f. Special Tools: Provide a listing of any special tools required for servicing, diagnosis, or repair. Alternatively, reference specific page in the manufacturer's O&M Manual this information is provided.
  - g. Supply Inventory Requirements: Provide a list of maintenance and repair supplies (e.g., spare parts, fuels, and lubricants) required to ensure continued operation without unreasonable delays. Identify and list parts and supplies that have long purchase lead times. Alternatively, reference specific page in manufacturer's O&M Manual that contains this information.
  - h. Sources of Spare Parts: Include reference to contact information where spare parts can be obtained.
  - i. Lubrication Schedule: Provide a lubrication schedule indicating types, grades, and capacities of lubricants for specific temperature ranges and applications. Alternatively reference the specific page in the manual that contains this information.
  - j. Maintenance Service Agreements: Provide copies of maintenance service agreements where they pertain specifically to indexed equipment.
  - k. Manufacturer's O&M Manual: Include manufacturer's printed O&M information. These shall be provided in PDF format. If unavailable as PDF from the manufacturer, hardcopy manual shall be scanned and provided as a single file.
  - l. Application and Installation Instructions: Where applicable and separate from the O&M information, provide the Application and Installation

Instructions that indicate how to correctly apply and install/setup the equipment.

- E. Part 4 - Construction Documentation.
1. Record Drawings: Provide an index of all Record Drawings with drawing number, title, and electronic file name(s) including electronically referenced drawings.
  2. Record Specifications: Provide a detailed index of the Record Specification. Include sections and major items in the specification all indexed to the appropriate page number.
  3. Approved Product Data and Shop Drawings.
    - a. Provide an index of all product data and shop drawings. This shall list all equipment with the associated submittal number.
    - b. Organize and compile only APPROVED product data and shop drawings. Providing these in a filing format is acceptable provided all files are identified and organized for easy access.
    - c. This information is required for this Part in its entirety regardless of inclusion in any other sections of the Systems Manual.
  4. Commissioning Record: Provide complete Cx records including all Start-Up Documentation and Functional Performance Test documentation.
- F. Part 5 – Preventative Maintenance / Recommissioning Manual.
1. Preventative Maintenance Specification: Specification for day-to-day maintenance of the facility, including operating log requirement, reports, and preventative maintenance tasks for each system, including recommended inspections, and tests.
  2. Recommissioning Test Log: Blank testing plan for future use in recommissioning.

## PART 2 - PRODUCTS

### 2.01 INSTRUMENTATION

- A. General: All testing equipment used in the Cx process shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified. All equipment shall be calibrated according to the manufacturer's recommended intervals. Calibration tags shall be affixed or certificates readily available.
- B. Standard Testing Instrumentation: Standard testing instrumentation normally used for performance assessment and diagnosis will be provided by the CA. Refer to Sections 230090 and 260090 for a list of applicable test equipment.
- C. Special Tools: Special equipment, tools and instruments (only available from a vendor, and specific to a piece of equipment) that are required for testing equipment in accordance with these Contract Documents shall be included in the base bid price to the Contractor and turned over to the Owner upon completion of the project.

## 2.02 TEST KITS FOR METERS AND GAUGES

- A. Test kits for meters and gauges shall be provided to the Owner new and in good condition. Previously used test kits will be unacceptable. Kits shall be submitted prior to the Acceptance Phase. Kits required are specified in the individual technical specifications and in 230090 and 260090.

## PART 3 - EXECUTION

### 3.01 GENERAL STARTUP STANDARD OF CARE

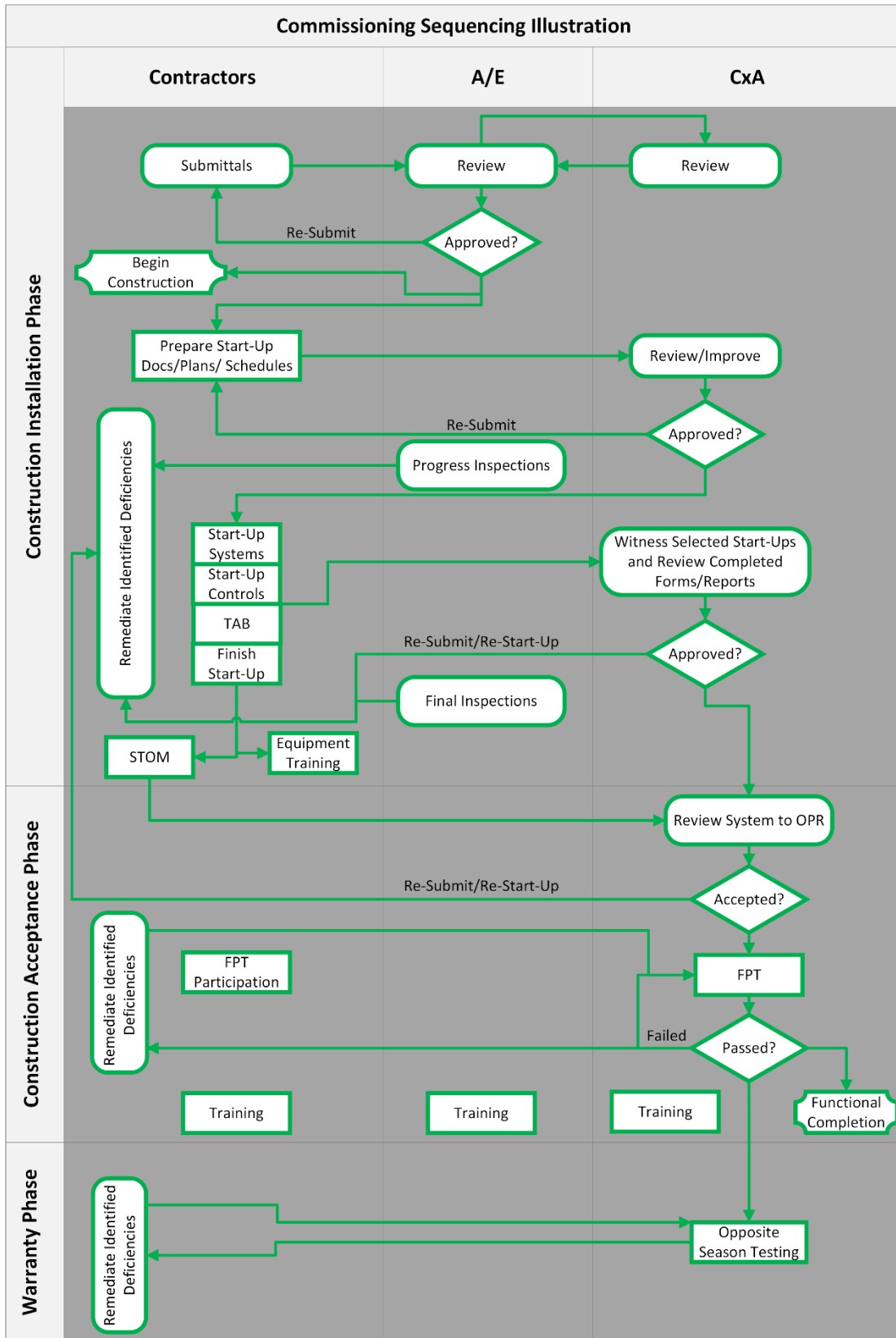
- A. Procedures that establish a minimum Standard-of-Care for the start-up, checkout and testing of applicable equipment are specified in the individual technical specifications, each commissioning section and in Section 019110. Contractor shall apply this Standard-of-Care and document per the Cx requirements.

### 3.02 FUNCTIONAL PERFORMANCE TESTING

- A. Functional Performance Testing procedures are specified in Section 019110. Contractor shall participate in the development and approval of the testing procedures, as well as participate as required in the initial sample of tests as indicated herein.

### 3.03 WORK SEQUENCE ILLUSTRATION

- A. See next page:



END OF SECTION 019100



## SECTION 019110 – GENERAL COMMISSIONING REQUIREMENTS FOR FUNCTIONAL PERFORMANCE TESTING

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Functional Performance Testing (FPT or 'testing') of systems.
- B. Documentation of FPTs.
- C. Acceptance criteria.

#### 1.02 SCOPE

- A. This section describes the Functional Performance Testing (FPT) process, procedures, and requirements. It is intended to illustrate (i) the Contractor's requirements for assisting the Commissioning Authority (CA) with the Functional Performance Testing of systems, and (ii) to demonstrate the level at which systems and equipment will be tested prior to being deemed 'Acceptable' to the Owner.
- B. The CA will prepare itemized and detailed FPT plans and procedures that:
  - 1. Specify individual tests and procedures that meet the general requirements of the Cx Plan and commissioning (Cx) process;
  - 2. Serve to document and record the testing procedures and the results of the tests.
- C. The Contractor shall provide technical input to the CA as needed during the development of the final project FPTs.
- D. Example (referred herein to as 'generic') FPTs are provided as illustration for the Contractors to represent the level of detail to which FPTs will be conducted.

#### 1.03 RELATED WORK AND DOCUMENTS

- A. The Cx process references many related Sections, particularly Section 019100 - General Commissioning. It is important for all Contractors subject to the Cx process to be familiar with Section 019100.
- B. Refer to Section 019100 for a complete list of Sections on Related Work.

#### 1.04 DEFINITIONS AND ABBREVIATIONS

- A. Refer to Section 019100 for a complete list of Definitions and Abbreviations. This paragraph includes a comprehensive list of acronyms describing the various required Parties referred to in the Section for individual FPTs.

## 1.05 REFERENCE STANDARDS

- A. Refer to Section 019100 for a complete list of Reference Standards.
- B. FUNCTIONAL PERFORMANCE TESTING
- C. Objectives and Scope: Systems shall be tested to ensure proper operation through all modes of operation including normal expected operation, maintenance operation as well as proper response to system and component failures that are considered abnormal operation as indicated below.
  - 1. Normal Operation: Each system shall be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load) where there is a specified system response. Verifying each sequence in the sequences of operation is required. These series of tests will demonstrate that the systems and equipment operate throughout typical operation including normal adjusting, cleaning, media replacement, and maintenance.
  - 2. Abnormal Operation: Test each system to simulate possible abnormal conditions and verify proper responses to such modes and conditions as power failure, equipment and component failure, freeze condition, deviation of operating parameters outside of normal, no flow, supporting utility failure, human error, etc. Abnormal operation tests shall demonstrate proper and safe response to the subject systems and the other systems that it affects or integrates with. These tests shall also demonstrate proper enunciation of abnormal conditions to quickly and effectively notify users and operators of such condition. Specific modes required in this project are given in this section and any other sections where test requirements are found.
- D. Development of Test Procedures: CA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Prior to execution, the CA shall provide a copy of the test procedures to the Contractor who shall review the tests for feasibility, safety, equipment and warranty protection, and scope. The CA will also submit the tests to the A/E for review.
  - 1. Contractor shall review the FPTs in detail and approve them.
  - 2. The CA shall review Owner-contracted testing, factory testing, or required Owner acceptance tests for which the CA is not responsible to oversee. Review shall include content, scope, and documentation format, and shall determine what further testing or format changes may be required. Redundancy of testing shall be minimized.
  - 3. The purpose of any given specific FPT is to verify and document compliance with the stated criteria of acceptance.
- E. Scheduling: Owner shall schedule the Functional Performance Testing after system 'Turn-Over' occurs (Turn-Over or STOM is the official Contractor notification that systems have completed Start-Up and are ready for testing with all required submissions and reviews of all the required submittals has occurred). To the extent practical, tests shall be scheduled to allow efficient and contiguous testing of inter-related systems and equipment.
- F. Participation: CA will direct and conduct Functional Performance Tests after Start-Up Documentation of systems and equipment has been reviewed and accepted and system 'Turn-Over' occurs. Conceptual procedures for the Functional Performance Testing are outlined elsewhere in this Section. CA will execute the FPTs unless otherwise specified. Contractor shall assist as described above with manipulation of the systems or equipment, provision of supporting equipment or materials (lifts, ladders, specialty test equipment,



safety equipment), and on-the-spot remediation of minor identified deficiencies whenever possible. Required participation is outlined in the generic FPTs provided elsewhere in this Section.

1. Any Cx Team member may attend any FPT. Required Parties are as described below.
  2. Required participating Parties shall be indicated with the individual FPT. Typically, multiple Parties are required for any given test, yet participation for any given Party is only required for the respective portion of the test for which the Party is responsible. For instance, BAC does not have to be present for capacity testing of an air handler, only the control-related portion of the test. In many cases, the maximum required time in hours is indicated in parenthesis for any given test. The time is typically per unit system unless indicated otherwise (i.e.: 1-hr per air handler tested). If no time is indicated, participation is required throughout the entire test.
  3. Frequently, on multiple samples where a given Party does not directly conduct the test, the participation of that Party will only be required for an initial quantity of systems/equipment. Whenever practical and at the discretion of the CA, the CA will continue with the remaining portion of the sample without assistance from the Contractor. In this case the time requirement will be indicated as total. However, the Contractor is allowed to be present at their option for any or all FPTs conducted.
  4. It is required that the required Parties be available on-site throughout the testing of any given system for which they are required participants. Therefore, time for which they are not directly involved can be spent performing other work (typically addressing identified punch list items or failed tests).
  5. No Party involved with the project is prohibited from participation in or witnessing of any tests. Any Contractor may elect to witness all tests on their systems even if their involvement is not directly required (for instance, BAC involvement is sometimes required on the first few of a sample and not on the entire sample).
  6. CA will endeavor to coordinate effectively with the individual Contractors throughout FPT and minimize their required involvement.
  7. Contractor assumes responsibility for damage to systems conducted in accordance with the approved procedures.
- G. Detailed FPT Development and Contractor Review: CA will prepare detailed and itemized testing procedures to define and document the FPT. These will typically be developed during the Construction Phase and completed during the Acceptance Phase. The CA shall submit these procedures to the Contractor for review. Contractor shall indicate all required limitations, safety procedures, maximum thresholds, and any other parameters during the FPT development. Contract shall be responsible for any damage to the equipment caused by Functional Performance Testing done per the procedures and within the limitations of the approved procedures.
- H. Completeness: All systems must be completed and ready for FPT. All Start-Up Documentation, factory-authorized field testing, independent testing agency tests, and TAB procedures must be complete and the control systems must be tested and started for the respective system or component.
- I. Test Documentation: CA will conduct tests, and/or witness tests as applicable. CA will record all test results on the forms developed for the testing. CA will 'Pass' or 'Fail' the testing and record the date and time of the test. Deficiencies shall clearly be indicated when the test is failed. When all related testing is completed successfully, CA shall recommend acceptance of the system or component.
- J. Deficiencies and Retesting: When deficiencies are identified during testing, depending on their extent or magnitude, they can be corrected during the test and the testing can continue

to successful completion. More significant deficiencies will require failure of the test and re-testing. Deficiencies of this magnitude will result in an Action Item on the Action List. The resolution of the deficiency will then subsequently be tracked by the CA via the Action List. All tests shall be repeated until successful completion. Refer to more specific provisions below.

- K. Sampling: Some types of identical equipment (such as terminal devices) will be tested using a sampling strategy. The sample percentage is indicated in the generic FPT provided elsewhere in this Section.
- L. Max Failure Limit and Sample Percentages: A 'Maximum Failure Limit' is indicated along with the 'Sampling Percentages'. The Max Failure Limit indicates the maximum percentage of the tested devices that may have any test that fails before an entirely new sample must be tested. This is based on the concept that if many failures occur, it is a result of inadequate start-up by the Contractor. When the maximum number of failures is reached, testing on that sample will be terminated and re-testing will be scheduled.
  - 1. If no Max Failure Limit is indicated, all tested samples must pass (Max Failure Limit = 0%).
  - 2. Where sample tests involve multiple systems (i.e., checking strainers on different hydronic systems), the Maximum Failure Limit will apply per system.
  - 3. The responsible Contractors shall pay the CA cost of that sample test, and redo the startup/TAB for the applicable devices/systems.
  - 4. All work necessitated by sample failures shall be at no cost to the Owner.
- M. Opposite Season Testing: Testing procedures shall be repeated and/or conducted as necessary during appropriate seasons. Opposite Season testing will be required where scheduling prohibits thorough testing in all modes of operation. Air handler and central heating system testing for heating-related modes of operation and control loops shall be tested during outside air temperatures below 40 °F.
- N. Approval. The CA passes each test and subsequently recommends approval to the Owner who reviews and approves the FPT.

#### 1.06 COORDINATION BETWEEN TESTING PARTIES

- A. Factory Start-Ups: For many systems and equipment, Factory Start-Ups are specified. These Factory Start-Ups will be reviewed and checked during Functional Performance Testing. All costs associated with the Factory Start-Ups are included with the bid unless otherwise noted. Contractor shall make notification of when Factory Start-Ups are occurring and coordinate these with witnessing Parties. The CA and other Cx Team members may witness Factory Start-Ups at their discretion. Aspects of Functional Performance Testing accomplished during the Factory Start-Ups may be accomplished and approved by the CA if they meet the intent of the FPT.
- B. Independent Testing Agencies: For systems where Independent Testing Agencies are specified, the cost of this testing shall be included with the bid unless otherwise noted. Much of the testing performed by Independent Testing Agencies will cover aspects required in the Start-Up Documentation and Functional Performance Tests.
  - 1. Contractor and testing agencies shall coordinate with the CA so that the CA can witness the testing and approve the applicable aspects of the FPTs.
  - 2. The CA may in some cases independently spot-check work of the testing agencies if the tests were not witnessed. However, it is not the intent for the CA to re-

accomplish testing by others that is specified in the construction specifications. For instance, much of the testing requirements for the electrical systems will be performed by the independent electrical testing agency provided under the bid. The CA shall witness the indicated sample of the testing and record the results in the record of Functional Performance Tests.

3. Contractor is responsible for coordinating the efforts of testing agency with that of the Cx process. Documentation shall be contiguous and seamless and duplication should be avoided. Testing agencies shall complete the documentation of the Cx process as required.

- C. Specialized Testing by Contractor: Where Specialized Testing is specified in the technical specifications, the Contractor, subcontractor, vendor, or factory representative as applicable shall conduct the Specialized Testing and provide all specialized instrumentation and equipment. CA and other Cx Team members may witness tests at their discretion. The CA may in some cases independently spot-check the results of the tests if the tests were not witnessed. However, it is not the intent for the CA to re-accomplish testing that is specified in the construction specifications. All Specialized Testing procedures shall be integrated with the Cx process and all documentation shall be coordinated and integrated with the documentation of the Cx process. Examples of Specialized Testing include but are not limited to:

1. Generator load testing (not including building power outage testing which will be administered by CA).
2. Acceptance testing of the fire alarm system.
3. Fire suppression system hydraulic tests.
4. Electrical system testing per NETA.

#### 1.07 FPT ACCEPTANCE CRITERIA

- A. The Acceptance Criteria shall be as follows unless more specifically indicated within individual tests. CA may exercise professional judgment to relax requirements and pass tests and recommend approval when appropriate.

1. Capacity: Capacity and/or equipment performance will generally be as specified  $\pm 5\%$ .
2. Efficiency: Efficiency where specifically indicated in the documents will be  $\pm 5\%$ . When inferred from manufacturer's catalogue data, criteria will be  $\pm 10\%$ .
3. Balancing: Balancing-related criteria will be  $\pm 5\%$  for water and  $\pm 10\%$  for air.
4. Accuracy: Accuracy/repeatability on sensing devices will be as specified for the device. CA and TAB will use calibrated gages for independent validation and use judgment in passing or failing the devices. In many cases, the coordination of multiple related sensors is more important than absolute accuracy.
5. Controls: Control feedback loop response and setpoint deviation criteria will be as specified in Sections 238060.
6. Sequences: HVAC sequence-related criteria will be as explicitly specified in the documents and as interpreted by the CA. Code required sequencing shall be per the applicable code.
7. System sequences shall be as required by the approved shop drawings.
8. Motor Phase Imbalance: Shall be no more than 2% (Amps and Volts).
9. Noise Levels:
  - a. Occupied Spaces: As indicated in the Owner's Project Requirements or Basis of Design (OPR/BOD) document. Otherwise, noise level shall be as

- recommended in the most current version of the ASHRAE Handbooks for the applicable occupancy.
- b. Max 77dBa at 3' from a UPS.
  - c. Max 65dBa at 7' from an Engine Generator Set.
  - d. At limits of the enterprise or facility: As required by current local ordinances.
10. Indoor Environmental Parameters (T, RH, CO<sub>2</sub>, VOC): Shall be as indicated in the Basis of Design document. Otherwise, as recommended in the most current version of the ASHRAE Handbooks for the applicable occupancy.
  11. Air Pressurization: As indicated in the OPR/BOD document. Otherwise, as indicated in the most current version of the ASHRAE Handbooks for the applicable occupancy. Smoke/shaft pressurization shall be as required by NFPA to maintain maximum door opening forces and to restrict the passage of smoke.
  12. Indoor Lighting Levels: As indicated in the OPR/BOD document. Otherwise, as recommended in the most current version of the IES Handbooks for the applicable occupancy.
  13. Electrical Systems: Shall be in accordance with manufacturer's recommendations of individual components and devices, NFPA 70B and International Electrical Testing Association (NETA) testing specifications NETA ATS-Latest Version.
  14. Inter-system interfaces and coordination: As specified and generally to ensure safe, reliable, and robust operation.

## PART 2 - PRODUCTS

### 2.01 INSTRUMENTATION

- A. General: All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance within the tolerances specified. All equipment shall be calibrated according to the manufacturer's recommended intervals. Calibration tags shall be affixed or certificates readily available. Supplier of instrumentation shall submit the calibration certificates along with the startup documentation.
- B. Standard Testing Instrumentation: Standard instrumentation normally used for performance assessment and diagnosis will be provided by the CA for tests being conducted by CA. All other instrumentation shall be provided by the Contractor. The instrumentation to be provided by the CA includes:
  1. Electronic manometer (for air and flow hood).
  2. Electronic manometer (for water).
  3. Temperature instruments and gauges.
  4. Humidity instruments and gauges.
  5. CO<sub>2</sub> instrument.
  6. Sound meter.
  7. Light level meter.
  8. Electronic multimeter.
  9. Receptacle tester.
- C. Special Tools: Special equipment, tools and instruments (only available from vendor, specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and provided to the Owner.

1. Provide a temporary license to software needed to access the BAS at both the terminal equipment and on the primary LAN/at primary controllers. Provide all configuration utilities needed to read all parameters and set up terminal boxes. Provide temporary graphic interface software license for use during the Acceptance Phase.

### PART 3 - FUNCTIONAL PERFORMANCE TESTS (SYSTEMS AND EQUIPMENT RELATED)

#### 3.01 REREQUISITES

- A. All equipment, components, and devices applicable to the FPT must be started and operational and systems must have completed a STOM successfully or be 'Turned Over' to the Cx Team. This includes completion of Start-Up Documentation, pressure testing of equipment, duct, piping; flushing/cleaning of applicable systems; completed labeling and identification; completed insulation of applicable systems; and all other requirements for placing system into dynamic operation.
- B. Unless specifically agreed upon by the Owner and CA, all support systems shall be complete prior to FPT. For instance, an air handler will require that:
  1. The electrical system serving it is completed and tested;
  2. The hydronic systems serving it have been pressure tested, flushed, and functional performance tested;
  3. Balancing has been accomplished on the air and water sides;
  4. The control systems have been started and calibrated.
- C. The CA shall determine the optimal sequence of testing.

#### 3.02 FUNCTIONAL TESTING PROCESS

- A. Functional Performance Testing ('Functional Testing') on any given system shall typically begin with testing device-level elements such as sensors and actuators; progress to component-level assemblies of devices; then to system-level, then to inter-system level, then to building-level.
- B. Functional Testing of systems shall generally proceed from the utilities to the central systems, to the distribution systems, to the zone terminal units and services. CA shall plan this process and communicate it through a precedent diagram (in Gantt or Pert format). Construction Manager shall reflect that process in the Construction Schedule. Subcontractors shall perform work in accordance with the schedule.

#### 3.03 COMMON ELEMENTS FOR ALL SYSTEMS

- A. Required submittal documentation shall be present and located convenient to testing area. Validate that all required documentation has been submitted and is per the contract requirements.
- B. Contractor shall provide the completed Start-Up Documentation and shall follow Turn-Over procedures as specified in Section 019100. CA shall review the Start-Up Documentation and spot-check the installation prior to or at the beginning of the FPT.

- C. Contractor shall demonstrate that access is sufficient to perform required maintenance.
- D. BAS trends shall have been established as required in the documents. These shall be available for review prior to or during the FPT.
- E. All dynamic systems powered by electricity shall be tested to simulate a power outage to ensure proper sequencing. Those on emergency power or uninterruptible power shall be tested on all sources.
- F. Capacities and adjusted/balanced conditions as applicable shall be subject to check.
- G. Sequencing Verification: All modes of operation and actions shall be verified for equipment/system samples.
- H. System and equipment configurations shall be compared against the contract documents.
- I. Verify functions (such as heating and cooling) are coordinated and do not overlap or 'fight'.
- J. All adjusted, balanced, controlled systems shall be assessed to determine the optimal setting for the system as applicable. The optimal settings should be determined to establish reliable, efficient, safe and stable operation.
- K. BAS or Local Panel Dynamic Graphics: The graphic displays for all components, systems, and areas required to be represented by a BAS graphic shall be checked for adequacy and accuracy. Furthermore, when setpoints or other parameters are required to be adjustable, CA shall verify that they can be adjusted directly from the graphic screen.
- L. Emergency power tests for mechanical systems will be conducted in concert with the testing of the emergency power systems. Mechanical contractor shall be available for the power outage test to test mechanical systems under a power outage. This is in addition to the requirements specified for the mechanical system.
- M. Where system and zones are designed for various modes of operations, test representative systems in all modes of operation. This includes:
  - 1. Seasonal Modes.
  - 2. Sequencing Modes.
  - 3. Emergency Modes.

### 3.04 TAB VERIFICATION OF MECHANICAL SYSTEMS

- A. CA shall review TAB reports.
- B. Participants shall include: CA, Owner's Representative, and TAB.
- C. The CA will select up to 10% of the readings from the Balancing Reports and spot-check them. The maximum failure rate for this sample is 10% and the system shall be re-balanced and re-documented if this rate is exceeded. The readings selected by the CA may include supply air diffuser readings (both minimum and maximum readings for VAV boxes), main and branch supply duct traverse readings, outside/return air flow readings, exhaust air flow readings, water flow readings, amp readings, and water pressure drop readings through coils, heat exchangers, and other hydronic elements. For all readings, a deviation

of more than 10% between the verification reading and reported data shall be considered as failing the FPT. All readings that fail the FPT shall require re-balancing.

### 3.05 HVAC SYSTEM PUMPS

- A. Participants shall include: CA, MC (1), TAB (1), and BAC (1) (BAC only where pumps are automatically controlled).
- B. Sample: 50%; max failure limit: 20%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. CA shall review Start-Up Documentation and TAB report.
- E. Contractor shall demonstrate that strainers are clean.
- F. CA shall spot-check Start-Up Documentation.
- G. Pumps shall be manually started individually. Pressure differential, kW (or slip on the motor), and flow shall be checked at shut-off, wide open, and balanced (or controlled) condition. Typically, the reading from the instrumentation provided with the pump (thermometers and pressure gages and flow meters as applicable) will be acceptable if used to validate an action as opposed to checking balancing.
- H. For pumps designed with automatic starting of back-up pumps upon primary pump failure, test shall include (1) Enable automatic controls; (2) Start primary pump; (3) Open disconnect switch of primary pump; and (4) Validate that standby is energized. This test shall be performed on all pumps.
- I. For variable speed pumps, manipulate control valves to change flow conditions and observe control response. Ensure stable control response to step-change in flow conditions. Check for the applicable acceleration and deceleration of the pumps. Manually ramp the pump speed from minimum to maximum speed to ensure stable operation of pumps and record/defeat any critical frequencies. Record representative part-load output from the drive (using VSD read out). Check calibration of control input. Check drive bypass operation if applicable.
- J. Simulate power outage and ensure orderly and automatic restart.

### 3.06 HYDRONIC DISTRIBUTION SYSTEMS

- A. Participants shall include: CA, MC (1).
- B. Sample: All systems, 20% (of strainers), Max Failure Limit: 5%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. Check system make-up and pressurization. Record optimal settings. Ensure air is removed by bleeding the sample rate of coils or high points. Ensure expansion tanks are properly charged.
- E. CA shall review Start-Up Documentation, pressure test documentation, and TAB report.

- F. Refer to 'HVAC Systems Pumps' for pump testing. Additionally, establish a trend on the pump control loop. Observe normal control function. Introduce one setpoint step-change and observe response.
- G. Verify sequencing of all pumps. Simulate pump failure and restart, pumps capacity stage up and stage down as applicable, and automatic rotation of lead/priority.
- H. Blow off selected strainers to ensure the system is flushed and clean.
- I. Verify or spot-check TAB results (Refer to 'TAB Verification of Mechanical Systems')
- J. Simulate and observe maximum and minimum loading conditions on the system from a flow and thermal perspective.

### 3.07 VARIABLE SPEED DRIVES (VSD)

- A. Participants shall include: CA, MC (2), BAC (2), EC (1). Additional time is generally included with the systems that include the drives.
- B. Sample: 50%; max failure limit: 20%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. CA shall review Start-Up Documentation.
- E. Verify the overload protection.
- F. Test the operation of the controller local and remote start/stop and speed control. Spot-check insulation resistance on the controller bus and control circuits.
- G. Validate VSD setup parameters are coordinated with motor application.
- H. Validate VSD acceleration and deceleration rates on start and stop.
- I. Verify ranging of control input and coordination with that displayed on Operator Interfaces.
- J. Verify 'Bypass' functionality where applicable.
- K. Verify restart after power outage.
- L. Verify any 'Skipped Frequencies' are programmed and recorded.
- M. Verify alarming and shutdown sequences.
- N. Conduct insulation resistance, short circuit, and ground tests of motors.

### 3.08 AIR-COOLED CHILLER

- A. Participants shall include: CA, MC (1), TAB (1), and BAC (2).
- B. Sample: 100%.



- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. Enable the chiller and associated equipment and control system and increase the load on the chilled water system by starting the air handling units, fan coil units, etc.
- E. Verify that flow is established by the chilled water proof-of-flow switch or device.
- F. Verify the chiller start sequence.
- G. Verify operation of the air-cooled condensing unit and associated components.
- H. Verify functioning of 'soft start' sequences, record motor amperage as a time function.
- I. Record chiller amperage and voltage at full load and part load conditions. Confirm that the control system calculates the chiller load and provides a trend log of the load imposed.
- J. Verify the chiller shutdown sequence occurs properly when loads are removed from the chilled water system.
- K. Verify the operation of the chilled water pumps and the air-cooled condensing unit when the loads are restarted on the chilled water system.
- L. Verify proper stage-up and stage-down sequence of multiple chillers. Check for excessive chiller cycling at part load for chillers with staged capacity control.
- M. Check capacity and efficiency of the chiller.
- N. Check calibration of remote current limit or remote setpoint indication.
- O. Verify proper suction, head, and oil pressures.
- P. Verify the rotation and re-prioritization of the chillers per the sequence.
- Q. Simulate power outage and ensure automatic and orderly restart.

### 3.09 PRIMARY CHILLED WATER SYSTEM

- A. Participants shall include: CA, MC (1), TAB (1), and BAC (8).
- B. Sample: 100%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. CA shall review Start-Up Documentation and TAB reports.
- E. Verify the cooling enable/disable sequences.
- F. Verify proper stage-up and stage-down of the chillers by the control system as load is varied. Load can be varied by manipulating valves, starting/stopping chilled water terminals and/or changing the staging control parameters.
- G. Verify proof and enunciation of individual chillers upon failure. Simulate failures that cause both an automatic reset of the chiller (typically temporary condenser water flow loss) and

manual reset of the chillers. Verify that chiller requests are removed appropriately and the next chiller in rotation is energized.

- H. Refer to 'HVAC Systems Pumps' for pump testing. Additionally, establish a trend on the pump control loop. Observe normal control function. Introduce one setpoint step-change and observe response.
- I. Verify rotation and/or re-prioritization of multiple chillers as applicable, whether manual or automatic rotation is employed.
- J. Ensure the static pressure setting of the make-up water system is coordinated and that the entire system is under positive pressure throughout all modes of operation.

### 3.10 PRIMARY HEATING SYSTEM

- A. Participants shall include: CA, MC (2), TAB (4), and BAC (8).
- B. Sample: 100%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. CA shall review Start-Up Documentation and TAB reports.
- E. Verify the heating enable/disable sequences.
- F. Verify proper stage-up and stage-down of the boilers by the control system as load is varied. Load can be varied by manipulating valves, starting/stopping hot water terminals and/or changing the staging control parameters.
- G. Verify proof and enunciation of individual boilers upon failure. Verify that boiler requests are removed appropriately and the next boiler in rotation is energized.
- H. Verify rotation and/or re-prioritization of multiple boilers as applicable, whether manual or automatic rotation is employed.
- I. Ensure the static pressure setting of the makeup water system is coordinated and that the entire system is under positive pressure throughout all modes of operation.

### 3.11 HOT WATER BOILER

- A. Participants shall include: CA, MC (1), TAB (1), and BAC (2).
- B. Sample: 100%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. CA shall review Start-Up Documentation and TAB report.
- E. Contractor shall start and warm-up the boiler.
- F. Verify that burner modulates/stages to maintain water temperature.

- G. Verify proper operation of makeup water system, including chemical treatment, flow regulation, and other parameters.
- H. Observe combustion efficiency tests conducted by the Contractor for boiler at full load and part load conditions.
- I. Verify combustion controls, fuel rate input and range, flame failure cutouts, gas train safeties, and other firing controls.
- J. Check for gas leaks.
- K. Test all applicable safeties and verify remote enunciation.
- L. Simulate power outage and ensure automatic and orderly restart.

### 3.12 AIR HANDLING UNIT

- A. Participants shall include: CA, MC (2), TAB (4), and BAC (8). Hours indicated are for first of each AHU type for all Parties.
- B. Sample: 50%, Max Failure Limit: 10%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. CA shall review Start-Up Documentation and TAB reports.
- E. Verify automatic start/stop of fan and open/close of outdoor air damper(s).
- F. Start heating and cooling system, manipulate control device to obtain maximum cooling and heating. Measure temperatures and pressures to determine capacity.
- G. Weather permitting, cause all applicable modes of operation using false loading where practical. Check proper sequence for switching modes and proper operation within a mode.
- H. Check calibration of control devices and for stable control response and component performance including chilled water coils, hot water coils, steam coils, humidifiers, economizer cycles, and others. Ensure proper coordination of control loops and that no fighting or energy wastes result.
- I. Check for free and adequate flow of cooling coil condensate.
- J. For variable speed fans, manipulate air terminal units to change flow conditions and observe control response. Ensure stable control response to step-change in flow conditions. Manually ramp fan speed from minimum to maximum to ensure stable operation of fans. Record representative part load output from the drive. Check calibration of control input. Check drive bypass operation if applicable.
- K. For fans with inlet vanes, manipulate air terminal units to change flow conditions and observe control response. Ensure stable control response to step-change in flow conditions. Manually modulate vanes from minimum to maximum to ensure stable operation of fans. Record representative part-load power draw on the motor. Check calibration of control input.

- L. Ensure minimum required ventilation rates are maintained across the full range of control (where applicable).
- M. Test all interfaces with the fire alarm system and all smoke control sequences.
- N. Verify interlocks with exhaust fans where applicable.
- O. Test proof alarming where applicable.
- P. Test operation of applicable safeties including freezestats, high and low static devices, smoke detection, duct humidity, and others. Check AHU component status in each event.
- Q. Check system status and operation in the Off, Unoccupied, and Occupied modes of operation. Validate proper start up and shut down sequences.
- R. Test all 'Fireman Control and Override' sequences.
- S. Simulate power outage and ensure automatic and orderly restart.

### 3.13 COMPUTER ROOM AIR HANDLING UNIT (DX)

- A. Participants shall include: CA, MC (2), TAB (2), and BAC (4).
- B. Sample: 100%.
- C. CA shall review Start-Up Documentation and TAB reports.
- D. Verify automatic start/stop of fan.
- E. Start heating and cooling system (as applicable), and manipulate control device to obtain maximum cooling and heating. Measure temperatures and pressures to determine capacity.
- F. Cause all applicable modes of operation using false loading where practical. Check proper sequence for switching modes and proper operation within a mode. Minimum modes shall include:
  - 1. Full cooling.
  - 2. Dehumidification (cooling and reheat).
  - 3. Heating.
  - 4. Humidification.
  - 5. Free cooling (if applicable).
- G. Check proper operation and charge of refrigerant circuit.
- H. Confirm compressor cycling is within allowable frequency.
- I. Check calibration of control devices and for stable control response and component performance including condensing water coils, electric reheat coils, humidifiers, and others. Ensure proper coordination of control loops and that no fighting or energy wastes result.
- J. Check for free and adequate flow of cooling coil condensate.

- K. Check proper operation of underfloor water detectors.
- L. Ensure minimum required ventilation rates are maintained to the computer room.
- M. Test all interfaces with the Fire Alarm System and all smoke control sequences.
- N. Test proof alarming. Where applicable, verify interface between unit's packaged controls and BAS.
- O. Test operation of applicable safeties including refrigerant pressure safeties, condenser flow interlocks, smoke detection, humidity cutouts, temperature cutouts and others. Check component status in each event. Verify proper alarming is indicated.
- P. Check system status and operation in the Off, Unoccupied, and Occupied modes of operation. Validate proper start-up and shutdown sequences.
- Q. Test all 'Fireman Control and Override' sequences.
- R. Simulate power outage and ensure automatic and orderly restart.
- S. In winter, verify operation of low ambient heat rejection control.

#### 3.14 VAV AIR TERMINAL (HVAC)

- A. Participants shall include: CA, MC, TAB, and BAC.
- B. Sample: 20%; Max Failure Limit: 10%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. CA shall review Start-Up Documentation and TAB reports.
- E. Check the calibration of zone temperature sensors.
- F. Set boxes for both minimum and maximum flow (typically by setting the space temperature setpoint up and down) and check the calibration of the flow settings.
- G. Check the stability of the zone temperature control loop for the damper and any associated heating devices by changing the space setpoints and observing the response.
- H. Cause all applicable modes of operation using false loading where practical. Check proper sequence for switching modes and proper operation within a mode.
- I. Determine the optimal settings for the control parameters.
- J. Simulate and test the unoccupied and emergency mode response of the VAV box where applicable.
- K. Check the capacity of the heating device where applicable.

### 3.15 FAN COIL UNIT

- A. Participants shall include: CA, MC (2), TAB (2), and BAC (2).
- B. Sample: 20%, Max Failure Limit: 10%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. CA shall review Start-Up Documentation and TAB reports.
- E. Verify automatic start/stop of fan and open/close of outdoor air damper.
- F. Start heating and cooling systems, manipulate control device to obtain maximum cooling and heating. Measure temperatures and pressures to determine capacity.
- G. Weather permitting, cause all applicable modes of operation using false loading where practical. Check proper sequence for switching modes and proper operation within a mode.
- H. Check calibration of control devices and for stable control response.
- I. Check for free and adequate flow of cooling coil condensate.
- J. Simulate power outage and ensure automatic and orderly restart.
- K. Verify changeover for two-pipe systems as applicable.

### 3.16 FAN/AIR SYSTEM (GENERIC)

- A. Participants shall include: CA, MC, TAB, and BAC.
- B. Sample: 50%, Max Failure Limit: 10%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. CA shall review Start-Up Documentation and TAB reports.
- E. Verify start/stop control sequences.
- F. Check the capacity of the fan at maximum conditions.
- G. Cause all applicable modes of operation using false loading where practical. Check proper sequence for switching modes and proper operation within a mode.
- H. For variable speed fans, manipulate air terminal units to change flow conditions and observe control response. Ensure stable control response to step-change in flow conditions. Manually ramp fan speed from minimum to maximum to ensure stable fan operation. Record representative part-load output from the drive. Check calibration of control input. Check drive bypass operation if applicable.
- I. For fans with inlet vanes, manipulate air terminal units to change flow conditions and observe control response. Ensure stable control response to step-change in flow conditions. Manually modulate vanes from minimum to maximum to ensure stable

operation of fans. Record representative part-load power draw on the motor. Check calibration of control input.

- J. Verify interlocks with exhaust fans where applicable.
- K. Test all interfaces with the fire alarm system and all smoke control sequences.
- L. Test proof alarming where applicable.
- M. Simulate failures of fans and ensure proper start-up of backup fans.
- N. Test operation of applicable safeties including freezestats, high and low static devices, smoke detection, duct humidity, and others.
- O. Simulate power outage and ensure automatic and orderly restart.

### 3.17 NATURAL GAS SYSTEMS

- A. Participants shall include: CA and MC.
- B. Sample: 100% systems and 20% of outlets.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. CA shall review Startup Documentation.
- E. Validate successful results of the cross-contamination testing.
- F. Test operation of safety devices including earthquake shut-off and electrically operated shutoff valves.
- G. Test outlets to ensure proper pressure and delivery. Test pressures throughout systems.

### 3.18 BUILDING AUTOMATION SYSTEM (BAS)

- A. Participants shall include: CA and BAC (Time is typically included in the individual systems. However, an additional 8 hrs. shall be for workstation and administrative aspects.)
- B. Refer to Section 230860 for BAS Commissioning requirements.
- C. Refer to Section 230900 for General BAS Performance Requirements.
- D. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- E. CA shall review Start-Up Documentation.
- F. Controls system sampling will typically correspond to the sampling rate of a system or piece of equipment. These sampling rates are indicated above for the respective item.
- G. Operate the equipment and subsystems through all specified modes of control and sequences of operation including full and part load conditions, and emergency conditions.

- H. Verify that equipment operates in accordance with design intent and approved control diagrams. This shall include checking the operation of dampers, valves, smoke detectors, high and low limit controls, of a sample of 25% of components with a maximum failure limit of 10%.
- I. Analog Input (AI) Sensors: (at a sample of 50% of the inputs on the sampled devices (see above for device samples) with a maximum failure rate of 10%). Spot-check AI sensors (space temperature sensors, outside, return, and mixed air temperature sensors, discharge air temperature sensors, chilled water and hot water temperature sensors, and humidity sensors, air and water differential pressure sensors, airflow monitoring stations, etc.) for acceptable accuracy (which is generally as specified for the device).
- J. Analog Outputs - Valves, Dampers and Actuators: (at a sample of 50% of the inputs on the sampled devices (see above for device samples) with a maximum failure rate of 10%) Ensure that valves and dampers and their actuators close-off or seal against the maximum pressure differential. Ensure that the actuators stroke throughout the correct range (correlated with the programmed range) under operations pressures anticipated and that the positioners are set correctly where applicable.
- K. Trends: Establish trends of control system points for a minimum of a two-week period prior to and throughout the Acceptance period. Trends shall be analyzed to identify any control problems, lack of capacity, control loops fighting or unstable, or other operational anomalies.
- L. Automatic Switches: Spot-check (at a sample of 50% of the inputs on the sampled devices (see above for device samples) with a maximum failure rate of 10%) the operation of all automatic switches (pressure switches, current switches, flow switches, and others) to ensure that they are adjusted to proper make and break settings.
- M. Verify the standalone functionality of the controllers. Typically this will involve disconnecting LAN communication wiring and ensure that the controller functions properly and that the loss of communication is acknowledged by the interface. Restore communications and ensure an orderly restoration to normal control.
- N. Verify that the BAS interface, BAS software, graphics and functions are in accordance with design intent and approved control diagrams.
- O. Check dial-in communications and internet access where applicable to ensure functionality.

3.19 31.2KV PRIMARY SWITCH

- A. Participants shall include: CA and EC.
- B. Sample: 100%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. Review Start-Up Documentation.
- E. Inspect the labeling and ensure it is in conformance with the contract documents.
- F. Review short circuit coordination study and the Electrical Testing Agency Report.



### 3.20 BUS DUCTS

- A. Participants shall include CA and EC.
- B. Sample: 100%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. Review Start-Up Documentation.
- E. As applicable, review the Independent Electrical Testing Agency report.
- F. Refer to Building Power Outage Test.

### 3.21 SWITCHGEAR

- A. Participants shall include CA and EC.
- B. Sample: 100%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. Review Start-Up Documentation.
- E. As applicable, review the Independent Electrical Testing Agency report.
- F. Refer to Building Power Outage Test.

### 3.22 DISTRIBUTION TRANSFORMERS DRY TYPE

- A. Participants shall include: CA and EC.
- B. Sample: 20%; Failure Limit 10%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. Review Start-Up Documentation.
- E. Review the Independent Electrical Testing Agency report (as applicable).
- F. Review thermographic images (as applicable).
- G. Measure current, voltage and harmonics under peak load conditions.

### 3.23 DISTRIBUTION PANELBOARDS AND ASSOCIATED LOADS

- A. Participants shall include: CA and EC.
- B. Sample: 20%; Failure Limit 10%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.

- D. Review Start-Up Documentation.
- E. Review the Independent Electrical Testing Agency report (as applicable).
- F. Spot-check phase balance. Ensure proper, thorough, and accurate identification of load. Trip breakers and validate load identified. Test GFI breakers.
- G. Circuit Labeling Test – Connected Equipment (excluding Lighting): Check labeling of circuits with connected equipment by opening circuit breaker and inspecting equipment shutdown or by measuring loss of power at the equipment. Check labeling for consistency with existing facilities and/or record drawings.
- H. Circuit Labeling Test – Receptacles and Lighting: Panelboard circuit labeling and grounding continuity shall be verified (up to 10% of circuits in each panel). Check circuit labeling by de-energizing circuits while circuit tester is in the receptacle.
- I. Receptacle Polarity Test: Spot-check receptacles installed or reconnected under this contract with a receptacle circuit tester. Tester shall test for open ground, reverse polarity, open hot, open neutral, hot and ground reversed, hot or neutral and hot open.
- J. As applicable, review the Independent Electrical Testing Agency report.

### 3.24 GROUND-FAULT RECEPTACLE CIRCUIT INTERRUPTER TESTS

- A. Participants shall include: CA and EC.
- B. Sample: 100%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. Test each receptacle or branch circuit breaker having ground-fault circuit protection to assure that the ground-fault circuit interrupter will not operate when subjected to a ground-fault current of less than 4 mA and will operate when subjected to a ground-fault current exceeding 6 mA. Perform testing using an instrument specifically designed and manufactured for testing ground-fault circuit interrupters. 'TEST' button operation shall not be acceptable as a substitute for this test. Replace receptacles that do not shutoff power with 5/1000 of an ampere within 1/40th of a second and retest. Submit test report signed by the Test Engineer who performed this test.

### 3.25 TIE BREAKERS

- A. Participants shall include: CA and EC.
- B. Sample: 100%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. Test operation by opening normal breakers. Record timing parameters of breaker closure and coordination with other breakers.
- E. Test manual tie operation and key lock out.

### 3.26 EMERGENCY GENERATOR AND EMERGENCY DISTRIBUTION SYSTEM

- A. Participants shall include: CA and EC (entire test).
- B. Sample: 100% of generators; 100% Utility feeds; 25% Distribution breakers; 100% Automatic Transfer Switches.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. Witness specified Factory-Certified Start-Up Documentation and demonstrations.
- E. Review and check Start-Up Documentation and Factory-Certified Tests.
- F. Record system settings and parameters.
- G. Coordinate this test with facility power outage test.
- H. Open normal breakers to simulate various levels of power outages including all utility feeds, single feed, transformers, and distribution panels.
- I. With each outage test configuration, observe generators start and take load. Record volts, amps, frequency, power factor phase angle for all phases and for all generators. Monitor engine temperatures. Monitor battery charge.
- J. With each outage test configuration, fail generators successively (by simulating different support system component failures including fuel delivery as well as engine safety trips including high temp, high oil pressure, low oil pressure, and over-speed) and observe priority demand control dump load to the highest priority. Restore generators and see the demand control restore all priority blocks. Ensure generator support systems remain to highest priority.
- K. Observe fuel delivery capacity at peak loads. Fail sample delivery systems de-energizing the feed pumps. Verify low level alarms on the day tanks.
- L. With systems operating on emergency power, spot-check power parameters of all systems on emergency power. Emergency testing of individual systems are covered under those systems.
- M. Measure and document noise levels.
- N. Restore normal breakers and observe systems re-transfer to normal. Observe generator cool down and shutdown sequence and record parameters.
- O. Verify paralleling gear sequence of operation including generator start up, generator synchronizing, operation of all relaying and instrumentation.
- P. As applicable, review the Independent Electrical Testing Agency report.

### 3.27 AUTOMATIC TRANSFER SWITCH (ATS)

- A. Participants shall include: CA, EC.
- B. Sample: 100%.

- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. Observe the ATS during power outage simulation (both during outage and retransfer to normal). Validate timing and sequences.
- E. Test the 'load test' function and the 'maintenance bypass' function.
- F. Open normal power overcurrent device to simulate various levels of power outage at transfer switch.
- G. Verify generator start signal is provided at transfer switch.
- H. Restore normal power overcurrent device and observe system re-transfer to normal power.

### 3.28 LIGHTING AND LIGHTING CONTROL SYSTEM

- A. Participants shall include: CA and EC.
- B. Sample: 20%, Failure Limit 10%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. Witness specified Factory-Certified Start-Up Tests and demonstrations.
- E. Spot-check the lighting systems Start-Up Documentation and ensure that all luminaires and lamps are operational, and fixtures are clean.
- F. Spot-check occupancy sensor placement and test reliability of activation/deactivation.
- G. Test photocells for functionality and accuracy.
- H. Spot-check switches to ensure proper operation and circuiting.
- I. Spot-check lighting schedules to ensure they are programmed per the Design Engineer's direction.
- J. Spot-check lighting levels to ensure compliance with IES and/or the design requirements for the respective occupancy.
- K. Test operation of circuits by changing system Date and Time to cause various circuits to switch modes. For rooms with occupancy sensors, validate the circuit energizes with occupancy in the space after the lights have been swept off. Test warning flicker prior to off sweep. Test cleaning and shed features.
- L. Test operation of daylight dimming control system if applicable.
- M. For exterior fixtures, simulate 'Night Mode' to validate function. Measure and record light level to ensure they meet the requirements and are generally provide adequate security. Check for excessive light level fluctuations or dark spots.

3.29 ELECTRIC DISTRIBUTION POWER MONITORING SYSTEM

- A. Participants shall include CA and EC (Time required will be dictated by certifying agencies).
- B. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- C. Witness specified factory-certified start-ups, testing, demonstrations and other commissioning activities.
- D. Review start up documentation.
- E. Test all functions as outlined in the applicable Division 26 specifications.
- F. Verify interfaces with all other inter-related systems or equipment.

3.30 TRANSIENT VOLTAGE SURGE SUPPRESSOR

- A. Participants shall include: CA and EC.
- B. Sample: 20%, Failure Limit 10%.
- C. FPT shall include 'Common Elements for All Systems' (above) to the extent applicable.
- D. Review the installation documentation from the Electrical Testing Agency.
- E. Spot-check installation and device placement for conformance with the design documents.



## SECTION 019119 – BUILDING ENCLOSURE COMMISSIONING

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Commissioning requirements common to all Building Enclosure-Related Sections.
- B. Validation of proper and thorough installation of Building Enclosure components.
- C. Building enclosure component and system performance verification.
- D. Documentation of tests, check lists, and installations.
- E. Coordination and requirements for field mock-up, trial installation and limited Performance Testing events.
- F. Preparation and coordination of Building Enclosure Commissioning Report.

#### 1.02 GENERAL DESCRIPTION

- A. Statement of Building Enclosure Design Intent (BEDI): The design intent of this building enclosure is to provide a façade and roof assembly which limits air infiltration to the specified levels as required by the individual Building Enclosure (BE) technical sections in Divisions 03 through 09, that eliminates uncontrolled water infiltration (including condensation), provides thermal insulation continuity; and includes products and assemblies that are technically sound, durable, and serviceable.
- B. Building Enclosure Commissioning (BECx) facilitates a quality-oriented process to verify that all building enclosure components are installed and perform collectively according to the BEDI and that the installation is adequately tested and that the specified performance is verified and documented. It serves as a tool to identify deficiencies in the building enclosure during the preconstruction and construction phases in an effort to advance the building enclosure components from mock-up installations, through installation of the separate components on the structure, to a fully integrated, weather-tight assembly prior to occupancy, thereby reducing impact on the building end user.
- C. The Building Enclosure Commissioning Coordinator (BECxC) shall work with the Contractor and Contractor's Quality Assurance and Quality Control Plan and personnel to oversee the BECx processes and performance testing. The BECx will observe tests as deemed appropriate. All required testing, unless otherwise specified in each building enclosure related section will be performed and paid for by the Owner.

#### 1.03 SCOPE

- A. This Section includes building enclosure commissioning procedures, including exterior facade enclosure, and roofing or other construction that protects climate-controlled interior spaces from unconditioned spaces and the exterior environment, as follows:

1. Building enclosure construction, above grade including exterior opaque walls, windows, and doors including sheathing, framing, insulation, and vapor barrier (as required).
  2. Roofing, including roofing system, roofing insulation, and skylights, hatches, and other roof openings and penetrations.
  3. Foundation water proofing systems and sub-drainage.
  4. Exterior joint sealants.
  5. The aforementioned items including continuity between all sections (where applicable).
- B. Materials, Product and Assembly Performance Testing as required by individual sections, and/or as outlined in Part 3 of this specification. All performance values shall be as described within each relevant section of the Project Specification.
- C. Record Documents related to BECx.

#### 1.04 RELATED WORK AND DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Commissioning Specifications: See Division 01 Section 019100 - General Commissioning Requirements for general requirements for MEP commissioning including definitions, means and methods for conducting the commissioning process, commissioning team members, Owner's responsibilities, Contractor's responsibilities, and Commissioning Authority's responsibilities.
- C. Individual Building Enclosure Specification Sections: Individual building enclosure technical sections (Divisions 03-09) stipulate requirements for material testing, and warranties for the material, product or assembly specified in the Section. Installation, product testing, and assembly testing are stipulated in each section and/or Part 3 of this section.

#### 1.05 DEFINITIONS AND ABBREVIATIONS

- A. Refer to Section 019100 for a complete list of Definitions and Abbreviations.

#### 1.06 REFERENCE STANDARDS

- A. ASHRAE NIBS Guideline 3-2012, "Exterior Enclosure Technical Requirements for the Commissioning Process".
- B. ASTM E2813, "Standard Practice for Building Enclosure Commissioning".
- C. ASTM C 1521 Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.
- D. ASTM D 7234 Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.



- E. ASTM E 1105 Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference.
- F. ASTM E 1105 (Modified): Similar test to above without the test chamber and air pressure difference. The modified test consists of an approved spray grid for 1 hour to simulate local rainstorm conditions.
- G. Reference standards as identified in the individual Building Enclosure technical sections of this specification.

#### 1.07 DOCUMENTATION

- A. BECxA shall perform a constructability review and provide comments related to the durability, performance, and BE conformance with the Owner Project Requirements for consideration by the Owner, A/E and Contractor.
- B. The Contractor shall provide to the BECxA the following per the procedures specified herein and in other BE Technical Sections of the specification (Divisions 03-09) for review and comment by the BECxA:
  - 1. Shop Drawings and Product Data: Provide shop drawings and submittal data for materials, products, systems, and equipment that will be part of the BECx process. Refer to Section 019100 for additional requirements.
    - a. The Contractor shall forward to the BECxA one copy of Shop Drawings and Product Data concurrent with distribution to the A/E. BECxA shall review and provide comments to the Owner and A/E, who will then review and incorporate the BECxA comments at their discretion and return to the Contractor. The Contractor shall then copy BECxA with the reviewed submittal with A/E submittal review stamp.
    - b. Any action taken by the A/E or Contractor based in whole or in part on the comments and recommendations provided by the BECx as part of its submittal review shall be the sole responsibility of the A/E or Contractor.
  - 2. Factory/Laboratory Test Reports: The Contractor shall provide any factory or laboratory testing documentation or certified test reports required by the specifications. These shall be provided prior to acceptance and installation of the specific item.
  - 3. Schedule Updates: The Contractor shall issue periodic updates to the construction schedule every two week or less as appropriate. Contractor shall use schedule to notify BECx team of scheduled tests and milestone installation events. Contractor shall coordinate with BECxA for meetings as appropriate prior to and during construction.
  - 4. Action Item Response: Respond to Action Items to which BECx team members assign the Contractor responsibility within 10 business days of issue.
  - 5. Testing Agency Reports. Provide all documentation of work of independent testing agencies required by the specification. These shall be provided prior to acceptance by A/E and installation.
- C. Record Drawings: The Contractor shall maintain at the site an updated set of record or 'As-Built' documents reflecting actual installed conditions and all approved changes and modifications to the contract documents. The Contractor shall provide access to the

BECxA to review the As-Built and Record Drawings. The Record Drawings shall be maintained concurrently with construction.

## 1.08 COORDINATION MANAGEMENT PROTOCOLS

- A. Unless otherwise defined and agreed to by the parties to the contract documents for this project, coordination responsibilities and management protocols relative to BECx are defined below, subject to further refinement during the Construction Phase BECx pre-construction meeting.
1. Submittals and Shop Drawings: The BECx shall review submittals and shop drawings in accordance with paragraph 1.7.B.1 above and Section 019100.
  2. Deficiencies Identified by the BECx: When the BECx identifies a deficiency, the Contractor shall make a good faith assessment of responsible parties. Those parties shall be notified of the perceived deficiency. This communication is for information only and is not a direction to resolve the deficiency. Contractor may accept responsibility and resolve the deficiency voluntarily. If Contractor contests either the deficiency or responsibility for that deficiency, Contractor shall respond to that effect in writing to the BECx. If a consensus is not reached as a result of this process, then the Contractor shall issue a work directive or RFI response via the normal contractual channels to resolve the issue.
  3. Requests for Meetings (beyond regularly scheduled meetings): In general request by the Contractor for additional meetings with the BECx shall be routed through the Owner who will then confirm the necessity for the meeting. Note that every attempt should be made to deal with BECx issues at regularly scheduled BECx Meetings.
  4. Scheduling Coordination – Contractor shall review the BE technical specifications, identify required BECx items (including field and laboratory test requirements, specified test standards, mock-ups, product submissions, milestone installations and similar) and provide a schedule to the BECx with anticipated dates for each. It is the responsibility of the Contractor to provide adequate time from submission of each BECx requirement to response from the BECx, and resolution of any identified deficiencies without unnecessary deleterious impact on the project schedule.
  5. Notification of Completion Milestones – Contractor shall notify Owner and BECx at least two weeks prior to an anticipated BECx activity or BECx milestone (such as installation of a new façade component). Contractor and BECx shall then coordinate the scheduling of the activity between all required parties as applicable. Notification shall be via e-mail.
  6. Action List: BECx maintains a categorized Action List which tracks the BECx related action items. All content of the Action List will be available to all parties who have credentials on the portal. Any party with credentials may post an Action Item. Any party that is copied on an email resulting from an Action Item posting may respond to it and contribute to the dialogue.

## 1.09 CONTRACTOR'S RESPONSIBILITIES

- A. As defined in this Section and in the individual BE technical sections, including but not limited to the following:
1. Attend the routine BECx meetings.
  2. Coordinate and Chair preconstruction and construction-phase coordination meetings.

3. Provide summary and schedule of laboratory and field quality control tests and inspections required by the Contract Documents to BECxA.
4. Participate in Pre-construction Mock-Up and Field testing coordination meetings.
5. Coordinate with the BECxA pre-construction and construction testing and submit laboratory and field quality control testing, field checklists and inspection reports on building enclosure construction to the BECxA. Perform out of sequence work as required to facilitate field tests.
6. Develop and maintain check lists for building enclosure assemblies.
7. Submit maintenance data for products, assemblies, and components to the BECxA.
8. Provide test data, inspection reports, and certificates to BECxA.
9. Review and respond to AI in a timely manner (typically within 10 business days).
10. Contractor is responsible for the cost of all re-tests and compensation of time for Architect and BECxA related to all additional work necessitated by re-testing of specimens following an initial test failure.
11. Provide input for final commissioning documentation.

#### 1.10 A/E RESPONSIBILITIES

- A. As defined in this Section and in the individual BE technical sections, including but not limited to the following:
  1. Attend the routine BECx meetings.
  2. Attend preconstruction and construction-phase coordination meetings.
  3. Participate in Pre-construction Mock-Up and Field testing coordination meetings.
  4. Provide resolution to items for which the BECxA and Contractor may be in disagreement.
  5. Provide input for final commissioning documentation.

#### 1.11 BECXA RESPONSIBILITIES (BECXA IS NOT TO BE RETAINED BY THE CONTRACTOR)

- A. Develop Construction Phase BECx plan.
- B. Provide review comments on the 100% CD's related to the BE for compliance with the design intent and Owner's Project requirements. Refer to Part 1.7A for further information. The CA shall review the design, identify design issues and/or conflicts that would present a problem for the total system commissioning.
- C. Provide comments on submittals related to building enclosure. Provide written comments to A/E for their consideration in their review of the submittals. Refer to Part 1.7B for further information.
- D. Convene Preconstruction Commissioning Conference: BECxA will schedule a preconstruction BECx conference before construction of the building enclosure starts, at a time convenient to Owner, A/E and Contractor. The BECxA will conduct the meeting to review commissioning responsibilities and personnel assignments.
  1. Attendees: Authorized representatives of Owner, BECxA, Contractor, A/E, and Contractor's superintendent; major BE subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to commissioning.

2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Commissioning Plan and related Specifications.
    - b. Tentative construction schedule per Contractor.
    - c. Phasing and "Building Dry" milestone per Contractor.
    - d. Critical work sequencing and long-lead items per Contractor.
    - e. Designation of key personnel and their duties.
    - f. Field testing schedule, including any special provisions necessary for tests.
    - g. Procedures for testing and inspecting.
    - h. Submittal procedures.
    - i. Coordination of Record Documents.
    - j. Owner's occupancy requirements.
  3. Minutes: BECxA will record and distribute meeting minutes.
- E. Participate in Project-Specific mock-ups and outline the commissioning process and Performance Test procedures. Attend the construction and testing of the mock-up to observe progress and provide written summary report.
  - F. Witness building enclosure component testing, milestone installations, and perform periodic site visits to document that work is being performed in compliance with the project specifications and Part 3. Conduct visits no less than weekly during construction of the BE.
  - G. Conduct routine BECx meetings to review progress on AI list/ Portal and resolve issues affecting the building enclosure. Conduct meetings no less than every two weeks during construction of the BE.
  - H. Compile test data, inspection reports, and certificates and provide them to the CxA for inclusion in the final Commissioning Report.

#### 1.12 PERFORMANCE TESTING (BUILDING ENCLOSURE)

- A. Quality Assurance and Control: Specific BECx quality-assurance and quality-control requirements for individual Building Enclosure and materials, methods, and assemblies are specified in the BE Technical Sections relating to those activities. Specified commissioning tests, inspections, and related actions are specified in Part 3 of this section, do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
- B. The objective of Performance Testing is to demonstrate that each Building Enclosure system, and system-to-system interfaces meet or exceed the performance requirements of the Contract Documents and the BEDI.
- C. Costs associated with re-testing caused by failure of the building enclosure tests, during mock-up or construction phase work shall be the responsibility of the Contractor.

#### 1.13 DEFICIENCIES IDENTIFIED DURING BE FUNCTIONAL PERFORMANCE TESTING

- A. Non-Conformance. Non-conformance deficiencies identified during Periodic Site Visits or Performance Testing shall be resolved as follows:

1. The BECxA will record the results of the review / functional performance test in the BECx Software project database. All deficiencies or non-conformance issues shall be noted as Action Items and reported to the Contractor.
  2. Corrections of identified minor deficiencies may be made during the review / tests at the discretion of the BECxA. In such cases the deficiency and associated resolution will be documented in the database.
  3. Every effort will be made by the BECxA to expedite the review / testing process and minimize unnecessary delays, while not compromising the integrity of the procedures.
  4. As reviews / tests progress and a deficiency is identified, the BECxA will discuss the issue with the Contractor for follow-up and resolution.
    - a. When there is no dispute with respect to the deficiency and the Contractor accepts responsibility to correct it:
      - 1) The BECxA shall document the deficiency and the Contractor's response. A copy/email/portal issue of the deficiency shall be generated and provided to the Contractor. The Contractor corrects the deficiency, completes the Action Item response certifying that the issue is resolved and /or the product, material or assembly is ready to be retested and notifies the Project Team.
      - 2) The Contractor reschedules the test, and the test is repeated. This process is repeated until the test result(s) meets or exceeds the requirements of the contract documents and, at the discretion of the Owner, the remedial action taken will be implemented on a project-wide basis where applicable. The Contractor is responsible for all retest costs incurred by the BECxA, test agency, Owner and A/E.
    - b. If there is a dispute about a deficiency:
      - 1) The deficiency shall be documented as an Action Item with the Contractor's response and the Contractor will be notified. The Contractor will track this issue under the construction contract dispute resolution provisions.
      - 2) Final interpretive authority is with the Owner. Final acceptance authority is with the Owner or A/E.
      - 3) The BECxA documents the resolution to the Action Item.
      - 4) Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, and responds to the Action Item indicating completion. The Contractor reschedules the review / test, and the review / test is repeated until satisfactory performance is achieved. The Action Item is then considered as closed.
- B. Failure: As defined in each BE Technical Sections (Divisions 03-09) and/or Part 3. In event of test failure the Contractor shall provide the Owner with the following:
1. Installer/Manufacturer's response in writing as to the cause of the failure and proposed resolution.
  2. Installer/Manufacturer shall implement their proposed resolution on a representative sample of the product.
  3. The Owner will determine whether a replacement of all identical units is required or if a repair is acceptable.
  4. Upon acceptance, the responsible Party shall replace or repair all identical items at their expense and shall extend the warranty accordingly.

5. Systemic or frequent failures may result in additional testing beyond originally identified to verify performance. Additional costs to test systems due to deficiencies is to be borne by the responsible Contractor.

#### 1.14 COMMISSIONING REPORT CONTENT

- A. Report content and format shall be as specified in Section 019100.
- B. Commissioning Report
  1. Maintenance Schedule: Contractor will provide a summary table that indexes the building enclosure component requiring maintenance and indicates the frequency each component will require repair or replacement (i.e. replacement of sealants, gaskets, IGUs, repair of paints or coatings). Contractor will provide subcontractors with an *Excel* spreadsheet that will be completed by each applicable subcontractor and returned to the Contractor for incorporation in the Commissioning Report by the BECxA.
  2. Maintenance Information Contractor shall provide Maintenance Information for each entry containing the following:
    - a. Product Data Sheet: Provide a summary of performance data.
    - b. Extended Warranty Information: Include all warranties for products, equipment, components, and sub-components whose duration exceeds one year. Include warranties on components with the system they are a part of. Reference all specific operation and maintenance procedures that must be performed to keep the warranty valid.
    - c. Sources of Material: Include reference to contact information where specific materials can be obtained.
    - d. Installation and Maintenance Instructions: For each material, component, or system.
- C. Construction Documentation.
  1. Record Drawings: Contractor shall provide an index of all record drawings with drawing number, title, and electronic file name(s) including electronically referenced drawings.
  2. Record Specifications: Contractor shall provide a detailed index of the record specification. Include sections and major items in the specification all indexed to the appropriate page number.
  3. Approved Product Data and Shop Drawings:
    - a. Contractor shall provide an index of all product data and shop drawings. This shall list all BE materials, components, or systems with the associated submittal number.
    - b. Contractor shall organize and compile only approved product data and shop drawings. Providing these in a filing format is acceptable provided all files are identified and organized for easy access.
    - c. Inclusion of any of this information in previous sections of the Commissioning Report does not allow exclusion in this section.
  4. Commissioning Record: BECxA shall provide complete commissioning records including all Performance Test documentation, in both written and electronic format at the discretion of the Owner.

## PART 2 - PRODUCTS (NOT USED)

## PART 3 - EXECUTION

### 3.01 TESTING VERIFICATION

- A. Contractor shall perform the following:
1. Certify that building exterior enclosure systems, subsystems, and construction have been completed according to the Contract Documents.
  2. Certify that field quality control procedures have been completed, field quality control reports have been submitted, discrepancies have been corrected, and corrective work approved.
- B. BECxA will witness and document field quality-control tests and inspections.
1. Verify that field quality-control testing of building exterior enclosure has been completed and approved, that discrepancies have been corrected and corrective work re-inspected and retested.
  2. Promptly notify Architect and Contractor of irregularities and deficiencies in the work that are observed during performance of services.
  3. Annotate checklist or data sheet when a deficiency is observed.
- C. BECxA is not authorized to perform any of the following:
1. Release, revoke, alter, or expand requirements of the Contract Documents.
  2. Approve or accept any portion of the work.
  3. Perform any duties of the Contractor.
- D. Deferred Testing:
1. If tests cannot be completed because of a deficiency outside the scope of the building exterior enclosure, the deficiency shall be documented and reported to the Owner. Deficiencies shall be resolved and corrected by Contractor and tests rescheduled.
- E. Testing Reports:
1. Reports shall include measured data, data sheets, and a comprehensive summary describing the building exterior enclosure systems at the time of testing.
  2. Prepare a preliminary test report. Deficiencies will be evaluated by Architect to determine corrective action. Deficiencies shall be corrected, and test repeated.

### 3.02 BUILDING ENCLOSURE TESTING

- A. Site Testing: In coordination with the Contractor, the BECxA will evaluate in-service performance of building enclosure assemblies and construction, and submit reports.
1. Provide site testing as scheduled at the end of this Section.
  2. Carry out testing in accordance with Section 019100.

- B. Adhesion Tests: Arrange for field tests to take place with joint-sealant and adhered membrane manufacturer's technical representative present. Field test sealant joints and self-adhering membranes for adhesion to substrates as follows:
1. Test each type of sealant/membrane in each installation at every substrate indicated.
  2. Perform sealant tests in compliance with ASTM C1521 Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints, Method A or ASTM D4541 Standard Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers.
  3. Perform weather barrier and fluid applied roofing membrane tests in compliance with ASTM D4541 Standard Test Method for Pull-off Strength of Coatings Using Portable Adhesion Testers.
  4. Test field installed sealant / membrane systems throughout construction period as defined by testing schedule.
  5. For joints between dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
  6. For sealants that fail adhesively, retest until satisfactory adhesion is obtained. Do not use sealants that fail to adhere to joint substrates during testing.
- C. Fenestration Field Air/Water Leakage Tests:
1. Test installed fenestration systems and interfaces with adjacent substrates according to ASTM E-1105: Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Differential,
  2. Complete testing prior to installation of interior insulation, gypsum wall board and interior finishes or systems that may impede the completion of the tests.
  3. Test specimen to include the perimeter material substrate and the perimeter seals.
  4. Contractor to provide powered scaffold, hose, water supply, communication and manpower to perform tests.
  5. Contractor will work with the Test Engineer and BECxA to determine necessity for additional test methods and for field chamber tests based upon evaluation of initial test results. The CA will interpret marginal results and re-write the test procedures as appropriate.
  6. Contractor to perform out-of-sequence work as required facilitating system tests. Contractor to install all air seals / dams concealed within the mullions to facilitate air tests at curtain wall assemblies.
- D. Roof Field Water and Air Leakage Tests:
1. Test penetrations through installed roofing systems according to AAMA 501.2 Hose Nozzle Water Spray Testing
  2. Complete testing prior to installation of interior insulation, gypsum wall board and interior ceiling finishes.
  3. Contractor will work with the Test Engineer and CA to determine necessity for revised or supplemental test methods. The CA will interpret marginal results and adjust the test procedures as appropriate.



### 3.03 PRE-FUNCTIONAL CHECKLISTS

- A. Pre-functional checklists consist of procedures and checks to ensure systems and assemblies are ready for testing and/or inspection, and are provided by the CxA to the Contractor.
1. The Contractor and appropriate subs provide their standard installation checklists to the CxA who will use them to develop the pre-functional checklists the contractors will complete prior to testing or inspection.
  2. Subs shall complete pre-functional checklists as sections of work are completed and submit completed checklists to the CxA through the Contractor. Completion of the pre-functional checklist is notification that the specific system is complete and ready for testing or inspection.
  3. Each assembly being commissioned receives full construction checkout by the Contractor following the approved plan and forms. No sampling strategies are used. Only individuals that have direct knowledge and witnessed that a line item task in the pre-functional checklist was actually performed shall initial or check that item off. It is not acceptable for non-witnessing supervisors to fill out the forms.
  4. The Contractor determines which trade is responsible for executing and documenting each of the line item tasks on the checklists and notes that trade on the checklist form.
  5. The Contractor and subs, under their own direction, execute and document the pre-functional checklists were completed according to the approved drawings prior to acceptance testing or inspection.
  6. The Contractor and Subs shall complete pre-concealment procedures before concealing any assembly. The Contractor shall notify the CxA at least five days in advance of any assembly concealment, providing the CxA a copy of the pre-concealment sections of the pre-functional checklists.
  7. The CxA performs periodic construction observations of selected systems and procedures on the checklists will be spot-checked by the CxA prior to testing.
  8. The test procedures for the project have been coordinated with the testing requirements specified in each specification Section.
  9. Items of non-compliance in material, installation, or setup are corrected at the Contractor's expense and the system or building enclosure assembly retested.
  10. The Contractor shall correct all areas that are deficient or incomplete in the checklists in a timely manner.
- B. Sample Checklists: Construction and Industry checklists shall be developed by the Contractor for the building exterior enclosure, including the following:
1. Waterproofing.
  2. Membrane air barriers.
  3. Aluminum storefront systems.
  4. Multi-ply roof systems.
  5. Exterior joint sealants.
- C. General Checklist Commentary: The manufacturers' or contractors' checklists shall include a systematic series of events appropriate to the specific systems, including but not limited to the following:
1. Verify product specified is appropriate to the site conditions.
  2. Verify installer is authorized by manufacturer to apply product.
  3. Verify that weather conditions, substrates, and construction contiguous to assemblies are acceptable for application of product.

4. Verify that construction is within specified tolerances where systems will be installed.
5. Verify that stored materials are protected against moisture.
6. Verify that products are undamaged prior to installation.
7. Verify that products are correct size, shape, thickness, and color.
8. Verify that components are preassembled, including factory installed sealant, as indicated on the approved shop drawings.
9. Verify proper fasteners and adhesives are used.
10. Verify that isolation is provided between dissimilar metals.
11. Verify that proper safety measures are employed by installers.
12. Verify that materials are in accordance with approved submittals, including shop drawings, product data, and samples.
13. Verify that dimensions are correct.
14. Verify product installation is in accordance with manufacturer's written instructions.
15. Verify that erection tolerances are maintained regarding horizontal and vertical alignment and plumbness.
16. Verify anchorage to structure is secure for transfer of wind load.
17. Verify provisions for thermal expansion.
18. Verify provisions for deflection of structural members.
19. Verify that flashings, end dams, sub sills, and sealants are in place, including weep holes.
20. Verify that final cleaning is performed as required, and repairs are satisfactory. Verify that unsuitable repairs are replaced with new materials.
21. Verify that finished work is protected.
22. Verify that operating components of systems comply with accessibility requirements.
23. Verify that systems are ready for air leakage and water penetration test procedures.
24. Verify that warranties can be obtained.
25. Verify operation and maintenance data has been submitted.

### 3.04 TESTING PROCEDURES

- A. The testing procedures are the step-by-step process which must be executed by the Contractor to fulfill the test requirements that are specified in the Contract Documents by the Architect in Divisions 03 – 08.
- B. Objectives and Scope: Performance testing is to demonstrate that each system is operating or functioning according to documented Government objectives and Contract Documents.
- C. Performance Test Procedures: Testing shall verify the performance of the assembly in its installed state under conditions specified in the testing requirements. Areas of deficient performance shall be identified and corrected.
- D. Random Testing of Exterior Walls: Additional testing will be performed on a minimum of three window assemblies and adjacent wall assemblies. Testing will be done in accordance with modified ASTM E 1105.

### 3.05 FIELD TESTING PROCEDURES

- A. General:

1. Contractor and subcontractors for each building enclosure assembly shall review the test procedures for feasibility, safety, and warranty protection.
2. Contractor and subcontractors shall provide assistance to the commissioning agent in preparing specific functional performance test procedures (answering questions about assemblies and sequences, etc.) as specified in individual specification Sections.
3. Contractor shall arrange a startup orientation meeting before construction begins to reiterate to the subcontractors exactly what will be required of them, and to allow them to voice any concerns prior to the commencement of the work.
4. Contractor shall review his quality control procedures, quality assurance inspection and testing procedures, review drawings and specifications, review shop drawings and submittals, review construction schedule and sequencing, material selection and compatibility, and other installation concerns.
5. Contractor shall not install any components of the building enclosure, until product submittals have been approved.
6. Contractor shall certify materials comply with specified laboratory testing prior to installation of any building enclosure materials. Field testing assumes materials comply with laboratory tests.
7. Contractor shall complete pre-functional checklists and certify that systems are ready for functional testing prior to any testing.
8. Contractor shall address punch list items before functional testing.
9. Field testing shall be performed by an approved independent testing agency qualified to conduct the specified tests. The commissioning agent will not perform any tests, but will witness the tests.
10. In the event that a functional test fails, the Contractor shall determine the cause of the failure, and the appropriate and affected trades shall correct all deficiencies as soon as possible.
11. Contractor shall provide retesting for all failed tests. If more than two functional tests of the same system are required, the Contractor shall reimburse the Government and their subconsultants for all associated costs.
12. The commissioning agent may recommend solutions to problems found, however the burden of responsibility to solve, correct, and retest problems is the Contractor's responsibility.
13. Test performance requirements shall be as described in each individual Section where the testing requirements are specified.
14. The testing agency will record the results of the functional test on the test procedure form. Deficiencies or non-conformance issues shall be noted and reported to the Contractor.
15. Corrections of minor deficiencies identified may be made during the test at the discretion of the commissioning agent.
16. As tests progress and a deficiency is identified, the testing agency and commissioning agent will discuss the issue with the Contractor, document the deficiency and the Contractor's response and intentions for correction.
17. The testing agency notes each satisfactory demonstrated function on the test form. The Contractor, Architect, and Government's representative give final approval on each test using the same form, providing a signed copy to the commissioning agent.

B. Air and Moisture Barriers:

1. Complete construction checklist.
2. Perform membrane thickness verification inspections (dry or wet film thickness) at a minimum of five locations on the mockup panel to comply with manufacturer's requirements. Dry film thickness measurements may be done by removing samples and measuring with a micrometer.

3. Verify continuity of membrane at interconnections between materials, assemblies of materials, and penetrations.
  4. Verify structural integrity of the substrate.
  5. Perform bond to substrate test according to ASTM D 7234.
- C. Aluminum Storefront Systems:
1. Install typical full size storefront assembly
  2. Complete construction checklist.
  3. Test storefront assembly for water penetration according to ASTM E 1105 (at 10 percent and 50 percent completion for each system).
- D. Multi-ply Roof System:
1. Complete construction checklist.
  2. Complete roof installation inspections.
  3. Test penetrations through installed roofing systems according to AAMA 501.2 Hose Nozzle Water Spray Testing
- E. Exterior Joint Sealants:
1. Complete construction checklist of the joint sealant installation.
  2. Allow joint sealants to fully cure prior to testing.
  3. Test joint sealant adhesion according to ASTM C 1521. (Joint sealants to be tested for each different substrate).
  4. Repair tested sealants prior to further testing.

3.06 FIELD PERFORMANCE TEST SCHEDULE

- A. Performance testing locations to be determined by A/E and BECxA.
- B. Performance testing to be performed by a Testing Agency contracted by the General Contractor.
- C. Supplementary performance testing schedule.

Location / Test Type	Testing Standard	Description	Criteria	Schedule & Number of Tests
<b>Field Water leakage testing:</b>				
Aluminum Storefront Systems	ASTM E1105	Field water leakage test	no water at 0.67x of design pressure	1 location @ 10%, 50% (2 total tests).
<b>Field Adhesion Test</b>				

Location / Test Type	Testing Standard	Description	Criteria	Schedule & Number of Tests
Sealant Adhesion	ASTM C1521, Method A	Sealant adhesion	Per Manufacturer adhesion test data	10 locations throughout construction. Needs to include all types of substrates
<b>Roof Water Penetration Test:</b>				
Roof Penetrations	AAMA 501.2	Field water testing with hose	no leaks	Testing of all roof pipe penetrations

END OF SECTION 019119



**SECTION 02 41 00**  
**BUILDING AND STRUCTURE DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Building demolition excluding removal of hazardous materials and toxic substances.
- B. Selective demolition of built site elements.
- C. Selective demolition of building elements for alteration purposes.
- D. Abandonment and removal of existing utilities and utility structures.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 50 00 - Construction Facilities and Temporary Controls: Site fences, security, protective barriers, and waste removal.
- B. Section 02 82 00 - Hazardous Materials Remediation: Other hazardous material remediation.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

**1.04 SUBMITTALS**

- A. Site Plan: Showing:
  - 1. Vegetation to be protected.
  - 2. Areas for temporary construction and field offices.
  - 3. Areas for temporary and permanent placement of removed materials.
- B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
  - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
  - 2. Identify demolition firm and submit qualifications.
- C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

**1.05 QUALITY ASSURANCE**

- A. Demolition Firm Qualifications: Company specializing in the type of work required.

**PART 2 PRODUCTS -- NOT USED**

**PART 3 EXECUTION**

**3.01 SCOPE**

- A. Remove all buildings or portions thereof designated to be demolished as indicated in the Drawings.
- B. Remove paving and curbs as required to accomplish new work as indicated in the drawings.
- C. Within area of new construction, completely remove all existing (found) foundation walls and footings to the extent that they must be removed not to compromise new structural foundations shown for new construction. All foundation elements planned (or decided) to remain are to be documented and reported the structural engineer for approval first. The structural engineer has the final approval of any existing foundation components to remain with in the new construction area.
- D. Remove manholes and manhole covers, curb inlets and catch basins as directed in Civil Drawings.
- E. Remove fences and gates only when shown to be demolished.
- F. Remove other items indicated, for salvage, relocation, and recycling.

### 3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public (where applicable).
  - 1. Obtain required permits.
  - 2. Use of explosives is not permitted.
  - 3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
  - 4. Provide, erect, and maintain temporary barriers and security devices.
  - 5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
  - 6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  - 7. Do not close or obstruct roadways or sidewalks without permit.
  - 8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
  - 9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin demolition until receipt of notification to proceed from State of Mississippi.
- C. Do not begin demolition until built elements to be salvaged or relocated have been removed.
- D. Do not begin demolition until vegetation to be relocated has been removed and specified measures have been taken to protect vegetation to remain.
- E. Protect existing structures and other elements that are not to be removed.
  - 1. Provide bracing and shoring.
  - 2. Prevent movement or settlement of adjacent structures.
  - 3. Stop work immediately if adjacent structures appear to be in danger.
- F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- G. If hazardous materials are discovered during removal operations, stop work and notify Albert & Robinson Architects and State of Mississippi; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.
- H. Perform demolition in a manner that maximizes salvage and recycling of materials.
  - 1. Dismantle existing construction and separate materials.
  - 2. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.
- I. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

### 3.03 EXISTING UTILITIES

- A. While underground utility locations are shown within the drawings for reference, it is the ultimate responsibility of the General Contractor to utilize whatever approved means necessary to locate existing underground utilities on and/or adjacent to the site to fulfill the contract scope of work; this includes, but may not be limited to, the use of ground penetrating radar. The General Contractor shall be responsible for any damage to existing underground utilities throughout the duration of construction due to its failure to properly identify their locations.
- B. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- C. Protect existing utilities to remain from damage.
- D. Do not disrupt public utilities without permit from authority having jurisdiction.
- E. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to State of Mississippi.



- F. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to State of Mississippi.
- G. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- H. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.
- I. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

### **3.04 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as indicated.
  - 2. Report discrepancies to Albert & Robinson Architects before disturbing existing installation.
  - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Separate areas in which demolition is being conducted from other areas that are still occupied.
  - 1. The Contractor shall maintain a temporary second Means of Egress throughout the entirety of the project, constructed in accordance with OSHA standards. It shall extend from the portion of the building being occupied directly to the exterior of the building.
  - 2. Provide dust proof and sound retardant partitions as required to separate occupied and non-occupied areas.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- D. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove items indicated on drawings.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
  - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
  - 2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
  - 3. Verify that abandoned services serve only abandoned facilities before removal.
  - 4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- F. Protect existing work to remain.
  - 1. Prevent movement of structure; provide shoring and bracing if necessary.
  - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  - 3. Repair adjacent construction and finishes damaged during removal work.
  - 4. Patch as specified for patching new work.

### **3.05 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**



## **SECTION 02 41 19**

### **DEMOLITION (CIVIL)**

#### **PART 1 - GENERAL**

- 1.01 SCOPE: Contractor to provide all labor, materials, equipment, etc to perform demolition of existing structures to be abandoned or removed as noted on the plans.
- 1.02 REGULATORY REQUIREMENTS:
- A. Conform to all applicable State and Local codes for demolition of structures, safety of adjacent structures, dust control, run off control, and disposal.
  - B. Obtain required permits from authorities.
  - C. Notify affected utility companies before starting work and comply with their requirements.
  - D. Do not close or obstruct roadways, sidewalks, or fire hydrants without permits.
  - E. Conform to applicable regulatory procedures when discovering hazardous or contaminated materials.
  - F. Conform to Environmental Protection Agency and Mississippi Bureau of Pollution Control requirements for hazardous materials.

#### **PART 2 - PRODUCTS**

- 2.01 Materials not desired by Using Agency shall become property of the contractor. Any materials or equipment desired by Using Agency will be salvaged and made available to Using Agency. Contractor shall coordinate with Using Agency any materials he desires salvaged prior to construction commencement. Contractor shall store salvaged materials in temporary facilities until which time owner chooses to utilize them.

#### **PART 3 - EXECUTION**

##### **3.01 SITE PREPARATION**

- A. Provide, erect, and maintain temporary barriers and security devices around perimeter of demolition site.
- B. Protect existing landscaping materials, appurtenances, and structures which are not to be demolished.

- C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring.
- D. Mark location of utilities. Markers to remain in place after completion of demolition operations.
- E. Maintain and protect existing utilities to remain in service before proceeding with demolition, providing bypass connections to other parts of the site.
- F. Locate, identify, shut-off, disconnect, and cap off utility services to be demolished.

### 3.02 DEMOLITION REQUIREMENTS:

- A. Conduct demolition to minimize interference with adjacent structures, occupancies, and normal operations.
- B. Cease operations immediately if adjacent structures appear to be in danger. Notify authority having jurisdiction. Do not resume operations until directed.
- C. Conduct operations with minimum interference to public or private accesses. Maintain egress and access at all times.
- D. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon or limit access to their property.
- E. Sprinkle work with water to minimize dust. Provide hoses and water connections for this purpose.

### 3.03 DEMOLITION OF STRUCTURES:

- A. Disconnect utilities within demolition areas. Remove utility lines within demolition areas, cap lines beyond demolition areas and install markers showing end of utility line.
- B. Remove existing building structure, foundation walls and footings.
- C. Remove concrete slabs on grade.
- D. Backfill areas excavated, open pits and holes caused as a result of demolition.
- E. Rough grade and compact areas affected by demolition to maintain site grades and contours, and to ensure water drainage away from buildings and site.

**END OF SECTION 02 41 19**

## SECTION 02 82 00

### HAZARDOUS MATERIALS REMEDIATION

#### PART ONE - GENERAL

##### 1.01 CONTRACTOR REQUIREMENTS

- A. The Contractor shall be licensed by the State of Mississippi as an asbestos abatement contractor and a lead paint abatement contractor.
- B. The Contractor must be covered with general liability insurance including:
  - 1. Workmen's Compensation
  - 2. Public Liability
  - 3. Property Damage
  - 4. Fire and extended coverage.
- C. The Contractor shall submit documentation that the insurance carrier is aware that this project involves the removal of asbestos, lead paint containing materials and pigeon droppings.

##### 1.02 DESCRIPTION

- A. The Hazardous Materials are identified in the Hazardous Materials Assessment that is provided by the State of Mississippi Military Department and included in the Contract Documents for reference.

*Items containing lead paint may or may not be removed from the building according to the drawings. The Mississippi Department of Environmental Quality does not monitor lead paint abatement activities within this building type (MDEQ only monitors facilities primarily occupied by children and residential type buildings). Where items containing lead paint are to be abated, the Contractor shall abide by safety guidelines indicated within this specification. Where items containing lead paint are to be stripped or repainted the Contractor shall utilize OSHA procedures to ensure the safety of all workers from contamination.*

- B. Applicable Standards and Guidelines:
  - 1. General Requirements
    - a. All work under this Contract shall be done in strict accordance with all applicable Federal, State and Local regulations, standards and codes governing asbestos and lead paint abatement and any other trade work done in conjunction with the abatement.
    - b. The most recent edition of any relevant regulation, standard, document or code shall be in effect. Where conflict among the requirements or with these specifications exists, the most stringent requirements shall be utilized.
    - c. Copies of all standards, regulations, codes and other applicable documents, including this specification shall be available at the worksite.
  - 2. Specific requirements
    - a. Title 29 Code of Federal Regulations Section 1910.1001 - General Industry Standard for Asbestos.
    - b. Title 29 Code of Federal Regulations Section 1910.134 - General Industry Standard for Respiratory Protection.
    - c. Title 29 Code of Federal Regulations Section 1926 - Construction Industry.
    - d. Title 29 Code of Federal Regulations Section 1910.2 - Access to Employee Exposure and Medical Records.
    - e. Title 29 Code of Federal Regulations Section 1910.1200 - Hazard Communication

## 02 82 00

### HAZARDOUS MATERIALS REMEDIATION

3. Environmental Protection Agency (EPA)
  - a. Title 40 Code of Federal Regulations Section 61 Subparts A and M (Revised Subpart B) - National Emission Standard for Asbestos
  - b. Title 40 Code of Federal Regulations Section 763 Subpart G - Asbestos Hazard Emergency Response Act
- C. These specifications and any applicable drawings in their entirety are to be a part of any subcontract let by the prime Contractor on this project. The prime Contractor will be held responsible for the whole actions by any of his subcontractors or their employees. All sections and provisions of this specification and any drawings that are a part of this specification are to be adhered to by any subcontractor on this project. The prime Contractor will be responsible for supervising his subcontractors.

### 1.03 SUBMITTALS AND NOTICES

#### A. Contractor shall:

1. Prior to Commencement of Work:
  - a. The Contractor will send notification in accordance with 40 CFR Part 61.146 of Subpart M, to the appropriate State or Federal air pollution control agency responsible for the enforcement of the National Emission Standard for Asbestos at least ten (10) days prior to the commencement of any on-site project activity. Provide Owner with a copy of the notice.
  - b. Submit proof satisfactory to the Owner that required permits, site location and arrangements for transport and disposal of asbestos containing waste materials have been made. Obtain and submit a copy of handling procedures and list of protective equipment utilized for asbestos disposal at the landfill, signed by the landfill Owner.
  - c. Submit documentation satisfactory to the Owner that the Contractor's employees, including foreman, supervisors and any other company personnel or agents who may be exposed to airborne asbestos fibers or who may be responsible for any aspects of abatement activities, have received the appropriate licensure from the Mississippi Department of Environmental Quality.
  - d. Document NIOSH approval for all respiratory protective devices utilized on-site. Include manufacturer certification of HEPA filtration capabilities for all cartridges and filters.
2. During Abatement Activities
  - a. Submit weekly job progress reports detailing abatement activities. Include review of progress with respect to previously established milestones and schedules, major problems and action taken, injury reports, equipment breakdown and bulk material and air sampling results conducted by Contractor's Air Sampling Professional.
  - b. Submit copies of all transport manifests, trip tickets and disposal receipts for all asbestos waste materials removed from the work area during the abatement process.
  - c. Submit daily, copies of worksite entry logbooks with information on worker and visitor access.
  - d. Submit logs documenting filter changes on respirators, HEPA vacuum, negative pressure ventilation units, and other engineering controls.
  - e. Submit results of bulk material analysis and air sampling data collected during the course of the abatement including OSHA compliance air monitoring results.
  - f. Post in the clean room area of the worker decontamination enclosure a list containing the names, addresses, and telephone numbers of the Contractor, the Owner, the Asbestos Project Officer, the General Superintendent, the Air Sampling Professionals, the testing laboratory and any other personnel who may be required to assist during abatement activities.

- g. The Contractor will maintain "ON SITE" and available for inspection at any time by authorized persons: The COPIES of all Accreditation Certificates for each and every person working on this Project, for which accreditation is required.

**B. Owner Shall:**

**1. Prior to Commencement of Work:**

- a. Submit to the Contractor, results of pre-abatement air sampling (if conducted) including location of samples, names of the Air Sampling Professional, equipment utilized and method of analysis.
- b. Provide to the Contractor information concerning access, shutdown and protection requirements of certain equipment and systems in the work area.

**2. During Abatement:**

- a. Submit to the Contractor, results of bulk material analysis and air sampling data collected during the course of the abatement. These sample results are for information only. They serve only to monitor Contractor performance during the project and shall not release the Contractor from any responsibility to sample for OSHA compliance.

**1.04 SITE SECURITY**

- A. The work area is to be restricted only to authorized, trained and protected personnel. These may include the Contractor's employees, employees of Subcontractors, Owner employees and representatives, State and Local inspectors and any other designated individuals. A list of authorized personnel shall be established prior to job start and posted in the clean room of the worker decontamination facility.
- B. Entry into the work area by unauthorized individuals shall be reported immediately to the Owner by the Contractor.
- C. A logbook shall be maintained at the job site. Anyone who enters the work area must record name, affiliation, time in, and time out for each entry.
- D. Contractor should have control of site security during abatement operations whenever possible, in order to protect work efforts and equipment.

**1.05 EMERGENCY PLANNING**

- A. Emergency planning shall be developed prior to abatement initiation and agreed to by Contractor and Owner.
- B. Emergency procedures shall be in written form and prominently posted in the clean change areas and equipment room of the worker decontamination area. Everyone prior to entering the work area must read and sign these procedures to acknowledge receipt and understanding of work site layout, location of emergency exits and emergency procedures.
- C. Emergency planning shall include written notification of police, fire and emergency medical personnel of planned abatement activities, work schedule and layout of work area, particularly barriers that may affect response capabilities.
- D. Emergency planning shall include considerations of fire, explosion, toxic atmospheres, electrical hazards, slips, trips and falls, confined spaces and heat related injury. Written procedures shall be developed and employee training in procedures shall be provided.
- E. Employees shall be trained in evacuation procedures in the event of workplace emergencies.

1. For non-life-threatening situations - employees injured or otherwise incapacitated shall decontaminate following normal procedures with assistance from fellow workers if necessary, before exiting the workplace to obtain proper medical treatment.
2. For life-threatening injury or illness, worker decontamination shall take least priority after measures to stabilize the injured worker, remove him from the workplace and secure proper medical treatment.
3. At least one Supervisory person having a CURRENT Certificate indicating that they have successfully completed an OSHA approved "Standard First Aid Course" as presented by the American Red Cross MUST be ON SITE at the Abatement Site at ANY time there are workers performing any function as part of this Abatement Project. At least one (1) COMPLETE First Aid kit must be on site at all times for the duration of this Abatement Contract.

F. Telephone numbers of all emergency response personnel shall be prominently posted in the clean change area and equipment room, along with the location of the nearest telephone.

### **1.06 PRE-START MEETING**

- A. The AAC shall attend a pre-start job meeting which will be coordinated by the Architect. Attending this meeting will be representatives of the Owner and the Owner's agents along with the successful Bidder.
- B. The Contractor and supervisory personnel who will provide on-site direction of the abatement activities must attend.
- C. At this meeting the Contractor shall provide all submittals as required. In addition he shall be prepared to provide detailed information concerning:
  1. Preparation of work area
  2. Personal protective equipment including respiratory protection and protective clothing.
  3. Employees who will participate in the project, including delineation of experience, training, and assigned responsibilities during the project.
  4. Decontamination procedures for personnel, work area and equipment.
  5. Abatement methods and procedures to be utilized.
  6. Required air monitoring procedures.
  7. Procedures for handling and disposing of waste materials.
  8. Procedures for final decontamination and cleanup.
  9. A sequence of work and performance schedule.
  10. Procedures for dealing with heat stress.
  11. Emergency procedures.

## **PART TWO - PRODUCTS**

### **2.01 MATERIALS**

- A. General (all abatement projects)
  1. Deliver all materials in the original packages, containers or bundles bearing the name of the manufacturer and the brand name (where applicable).
  2. Store all materials subject to damage off the ground, away from wet or damp surfaces and under cover sufficient enough to prevent damage or contamination. Replacement materials shall be stored outside of the work area until abatement is completed.
  3. Damaged, deteriorating or previously used materials shall not be used and shall be removed from the worksite and disposed of properly.
  4. Polyethylene sheeting shall be a minimum of 4-mil thick
  5. Disposal bags shall be of 6-mil polyethylene, pre-printed with labels as required by EPA regulation 40 CFR 61.152 (b) (I) (iv) or OSHA requirement 29 CFR 1910.1001 (g) (2) (ii). Disposal bags will be "TRANSLUCENT" or "CLEAR", OPAQUE bags not approved.



6. Disposal drums, if used, shall be metal or fiberboard with locking ring tops.
7. Stick-on labels as per EPA or OSHA requirement (see 2.1.2.7) for disposal drums.
8. Warning signs as required by OSHA 29 CFR 1910.1001 (g) (I) (ii) or as proposed in 29 CFR 190.1001 Asbestos Proposed Rule, Federal Register and Vol. 49, Tuesday, April 10, 1984 (recommended).

**B. Removal**

1. Surfactant (wetting agent) shall be a 50/50 mixture of polyoxyethylene ether and polyoxyethylene ester, or equivalent, mixed in a proportion of 1 fluid ounce to 5 gallons of water or as specified by manufacturer. (An equivalent surfactant shall be understood to mean a material with a surface tension of 29 dynes/cm as tested in its properly mixed concentration, using ASTM method D1331-56 - "Surface and Interfacial Tension of Solutions of Surface Active Agents.") Where work area temperature may cause freezing of the amended water solution, the addition of ethylene glycol in amounts sufficient to prevent freezing is permitted.

**2.02 EQUIPMENT**

**A. General (all abatement projects)**

1. Spectacle kits and eyeglasses must be provided for employees who wear glasses and who must wear full face piece respirators. Respirators shall be provided that have been tested and approved by the National Institute of Occupation Safety and Health for use in asbestos contaminated atmospheres.
2. Full body disposable protective clothing, including head, body and foot coverings (unless using footwear as described in 2.2.1.6.) consisting of material impenetrable by asbestos fibers ("Tyvek" or equivalent) shall be provided to all workers and authorized visitors in sizes adequate to accommodate movement without tearing.
3. Additional safety equipment (e.g. hard hats meeting the requirements of ANSI Standard Z89.1-1981, eye protection meeting the requirements of ANSI Standard z87.1-1979, safety shoes meeting the requirements of ANSI z41.1-1967, disposable PVC gloves), as necessary, shall be provided to all workers and authorized visitors.
4. Non-skid footwear shall be provided to all abatement workers. Disposable clothing shall be adequately sealed to the footwear to prevent body contamination.

**B. Removal**

1. A sufficient supply of scaffolds, ladders, lifts and hand tools (e.g. scrapers, wire cutters, brushes, utility knives, wire saws, etc.) shall be provided as needed.
2. Sprayers with pumps capable of providing 500 pounds per square inch (psi) at the nozzle tip at a flow rate of two (2) gallons per minute for spraying amended water.
3. Rubber dustpans and rubber squeegees shall be provided for cleanup.
4. Brushes utilized for removing loose asbestos containing material shall have nylon or fiber bristles, not metal.
5. A sufficient supply of HEPA filtered vacuum systems shall be available during cleanup.

## **PART THREE - EXECUTION**

### **3.01 PREPARATION**

#### **A. Work Areas**

1. Post caution signs meeting the specifications of OSHA 29 CFR 1910.101 (g) (l) (ii) at any location and approaches to a location where airborne concentrations of asbestos may exceed ambient background levels. Signs shall be posted at a distance far enough away from the work area to permit an employee to read the sign and take the necessary protective measures to avoid exposure. Additional signs may need to be posted following construction of workplace enclosure barriers.
2. Provide necessary electric power and access to the electric breakers and switch gear in this work area. Provide temporary power and lighting. Insure safe installation (including ground faulting) of temporary power sources and equipment by compliance with all applicable electrical code requirements and OSHA requirements for temporary electrical systems.
3. Shut down and lock out all heating, cooling and air conditioning system (HVAC) components that are in, supply or pass through the work area. Appropriate equipment and control measures shall be utilized to prevent contamination of building spaces during this operation. Seal all intake and exhaust vents in the work area with tape and 6-mil polyethylene.
4. The Contractor shall provide sanitary facilities for abatement personnel outside of the enclosed work area (containment area) and maintain them in a clean and sanitary condition throughout the project.
5. The Owner will provide water for construction purposes. Contractor shall connect to existing Owner system.
6. Clean all fixed objects in the work area using HEPA filtered vacuums and/or wet cleaning techniques as appropriate. Careful attention must be paid to machinery behind grilles or gratings where access may be difficult but containment is significant.

B. Isolation of the work area from occupied areas of the building: The AAC shall isolate the work from the other areas of the building by the use of 4-mil polyethylene sheeting and negative air machines.

#### **C. Commencement of work shall not occur until:**

1. All pre-abatement submissions, notifications, postings and permits have been provided and are satisfactory to the Owner.
2. All equipment for abatement, clean-up and disposal are on hand.
3. All worker training (and certification) is completed.
4. Contractor receives permission from Owner to commence abatement.

### **3.02 WORKPLACE ENTRY AND EXIT PROCEDURES**

#### **A. Personnel entry and exit**

1. All personnel who enter the work area must sign the entry log, located in the clean room, upon entry and exit.
2. All personnel, before entering the work area, shall read and be familiar with all posted regulations, personal protection requirements (including workplace entry and exit procedures) and emergency procedures. A sign-off sheet shall be used to acknowledge that these have been reviewed and understood by all personnel prior to entry.
3. All personnel shall proceed first to remove all street clothes and appropriately don respiratory protection (as deemed adequate for the job conditions) launderable and/or disposable coveralls, head covering and foot covering. Hard hats, eye protection and gloves shall also be utilized if required. Clean respirators and protective clothing shall be provided and utilized by each person for each separate entry into the work area.
4. Before leaving the work area all personnel shall remove gross contamination from the outside of respirators and protective clothing by HEPA Vacuum and/or wet wiping procedures.

5. Personnel shall proceed to remove all protective equipment except respirators. Deposit disposable (and launderable) clothing into appropriately labeled containers for disposal (and laundering.)

### **3.03 PERSONNEL PROTECTION REQUIREMENTS**

#### **A. Training**

1. Prior to commencement of abatement activities all personnel who will be required to enter the work area or handle containerized asbestos containing materials must have received adequate training.
2. Special on-site training on equipment and procedures unique to this job site shall be performed as required.
3. Training in emergency response and evacuation procedures shall be provided.

#### **B. Respiratory Protection**

1. All respiratory protection shall be provided to workers in accordance with the submitted written respiratory protection program, which includes all items in OSHA 29 CFR 1910.134 (b) (1-11). This program shall be posted in the clean room of the worker decontamination enclosure system.
2. Workers shall be provided with personally issued, individually identified (marked with waterproof designations) respirators.
3. Respirators shall be selected that meet the following level of protection requirements: The Contractor is responsible for assuring that the exposure level to the worker within the mask does not exceed .01 fibers/cc. 8 hour TWA.
4. Fit testing
  - a. Workers must perform positive and negative air pressure fit tests each time a respirator is put on, whenever the respirator design so permits. Powered air-purifying respirators shall be tested for adequate flow as specified by the manufacturer.
  - b. Workers shall be given a qualitative fit test in accordance with procedures detailed in the OSHA Lead Standard (29 CFR 1910.1025, Appendix D, Qualitative Fit Test Protocols) for all respirators to be used on this abatement project. An appropriately administered quantitative fit test may be substituted for the qualitative fit test.
  - c. Documentation of adequate respirator fit must be provided to the Owner.
5. No one wearing a beard shall be permitted to don a respirator and enter the work area.
6. Additional respirators (minimum of two (2) of each type) and training on their donning and use must be available at the work site for authorized visitors who may be required to enter the work area.

#### **C. Protective Clothing**

1. Disposable clothing including head, foot and full body protection shall be provided in sufficient quantities and adequate sizes for all workers and authorized visitors. The Owner, his representative and the Air Monitoring Professional will be furnished protective clothing, duct tape, disposable toweling, respirator equipment and respirator wipes and all other required disposables at no additional charge by this Contractor.
2. Launderable clothing, if required, shall be provided in sufficient quantities and adequate sizes for all workers and authorized visitors.
3. Hard hats, protective eyewear, gloves, rubber boots and/or other footwear shall be provided as required for workers and authorized visitors. Safety shoes may be required for some activities.

### **3.04 REMOVAL PROCEDURES**

- A. Clean and isolate the work area in accordance with 3.01, A.
- B. Wet all asbestos containing material with an amended water solution using equipment capable of providing a fine spray mist, in order to reduce airborne fiber concentrations when the material is disturbed. Saturate the material to the substrate; however, do not allow excessive water to accumulate in the work area. Keep all removed material wet enough to prevent fiber release until it can be containerized for disposal. Maintain a high humidity in the work area by misting or spraying to assist in fiber settling and reduce airborne concentrations. Wetting procedures are not equally effective on all types of asbestos containing materials but, shall none-the-less be used in all cases.
- C. Saturated asbestos containing material shall be removed in manageable sections. Removed material should be containerized before moving to a new location for continuance of work. Surrounding areas shall be periodically sprayed and maintained in a wet condition until visible material is cleaned up.
- D. Material removed from building structures or components shall not be dropped or thrown to the ground. Material should be removed as intact sections or components whenever possible and carefully lowered to the ground.
- E. Containers (6-mil polyethylene bags or drums) shall be sealed when full. Wet material can be exceedingly heavy. Double bagging of waste material is usually necessary. A determination of need for single or double bags must be made early in the abatement process and agreed to by the Owner.) Bags shall not be overfilled. They should be securely sealed to prevent accidental opening and leakage by tying tops of bags in an overhand knot or by taping in gooseneck fashion. Do not seal bags with wire or cord. (Bags may be placed in drums for staging and transportation to the landfill. Bags shall be decontaminated on exterior surfaces by wet cleaning and HEPA vacuuming before being placed in clean drums and sealed with locking ring tops).
- F. Large components removed intact maybe wrapped in two (2) layers of 6-mil polyethylene sheeting secured with tape for transport to the landfill.
- G. Asbestos containing waste with sharp-edged components (e.g. nails, screws, metal lathe, tin sheeting) which would tear the polyethylene bags and sheeting shall be placed into drums for disposal.
- H. After completion of all stripping work, surfaces from which asbestos containing materials have been removed shall be wet brushed and sponged or cleaned by some equivalent method to remove all visible residues.

### **3.05 CLEAN-UP PROCEDURE**

- A. Inspect the work area for visible residue.
- B. The work area shall be cleaned until it is in compliance with State and Local requirements and any more stringent criteria agreed upon by the Contractor and Owner prior to initiation of abatement activities (criteria should be in the form of visual inspections and airborne fiber concentrations). Additional cleaning cycles shall be provided, as necessary, at no cost to the Owner until these criteria are met.

### **3.06 CLEARANCE AIR MONITORING**

- A. The asbestos abatement contractor shall include in his price quote to the general contractor an allowance for one TEM air clearance test and 1 PCM air clearance tests to be conducted for this project. The owner will select and arrange for a licensed air monitor to perform these clearance tests. The air monitor will then bill the asbestos abatement contractor directly for these clearance tests. If the AAC fails an air test, then the

AAC will be responsible for paying for any additional test required to obtain clearance. If the AAC divides the work up into more containment areas requiring additional clearance tests, then the AAC shall add \$1000.00 per extra clearance to his allowance.

### **3.07 DISPOSAL PROCEDURES**

- A. As the work progresses, to prevent exceeding available storage capacity on-site, sealed and labeled containers of asbestos containing waste shall be removed and transported to the prearranged disposal location.
- B. Disposal must occur at an authorized site in accordance with regulatory requirements of NESHAP and applicable State and Local guidelines and regulations.
- C. All dump receipts, trip tickets, transportation manifests or other documentation of disposal shall be delivered to the Owner for his records. A recommended record keeping format utilizes a chain-of-custody form which includes the names and addresses of the Generator (Owner), Contractor, pickup site, and disposal site, the estimated quantity of the asbestos waste and the type of containers used. The form should be signed by the Generator, the Contractor, and the Disposal Site Operator, as the responsibility for the material changes hands. If a separate hauler is employed, his name, address, telephone number and signature should also appear on the form.
- D. Transportation to the landfill
  - 1. Once drums, bags and wrapped components have been removed from the work area, they shall be loaded into an enclosed truck for transportation.
  - 2. When moving containers, utilize hand trucks, carts and proper lifting techniques to avoid back injuries. Trucks with lift gates are helpful for raising drums during truck loading.
  - 3. The enclosed cargo area of the truck shall be free of debris and lined with TWO (2) LAYERS OF 6-mil polyethylene sheeting to prevent contamination from leaking or spilled containers. Floor sheeting shall be installed first and extend up the side walls a minimum of TWENTY FOUR (24) inches. Wall sheeting shall be overlapped and securely taped into place.
  - 4. Drums shall be placed on level surfaces in the cargo area and packed tightly together to prevent shifting and tipping. Large structural components shall be secured to prevent shifting and bags placed on top. Do not throw containers into truck cargo area.
  - 5. Personnel loading asbestos containing waste shall be protected by disposable clothing including head, body and foot protection and at a minimum, half-face piece, air-purifying, dual cartridge respirators equipped with high efficiency filters.
  - 6. Any debris or residue observed on containers or surfaces outside of the work area resulting from clean-up or disposal activities shall be immediately cleaned-up using HEPA filtered vacuum equipment and/or wet methods as appropriate.
  - 7. Large metal dumpsters are sometimes used for asbestos waste disposal. These should have doors or tops that can be closed and locked to prevent vandalism or other disturbance to the bagged asbestos debris and wind dispersion of asbestos fibers. Unbagged material shall not be placed in these containers. These containers shall not be used for non-asbestos waste. Bags shall be placed, not thrown, into these containers to avoid splitting.
- E. Disposal at the landfill
  - 1. Upon reaching the landfill, trucks are to approach the dump location as closely as possible for unloading of the asbestos containing waste.
  - 2. Bags, drums and components shall be inspected as they are off-loaded at the disposal site. Material in damaged containers shall be repacked in empty drums or bags as necessary. (Local requirements may not allow the disposal of asbestos waste in drums. Check with appropriate agency and institute appropriate alternative procedures.)

3. Waste containers shall be placed on the ground at the disposal site, not pushed or thrown out of trucks (weight of wet material could rupture containers.)
4. Personnel off-loading containers at the disposal site shall wear protective equipment consisting of disposable head, body and foot protection and, at a minimum, half-facepiece, air-purifying, dual cartridge respirators equipped with high efficiency filters.
5. Following the removal of all containerized waste, the truck cargo area shall be decontaminated using HEPA vacuums and/or wet methods to meet the no visible residue criteria. Polyethylene sheeting shall be removed and discarded along with contaminated cleaning materials and protective clothing, in bags or drums at the disposal site.
6. If landfill personnel have not been provided with personal protective equipment for the compaction operation by the landfill operator, Contractor shall supply protective clothing and respiratory protection for the duration of this operation.

### **3.08 RE-ESTABLISHMENT OF THE WORK AREA AND SYSTEMS**

- A. Reestablishment of the work area shall only occur following the completion of clean-up procedures and after clearance air monitoring has been performed and documented.
- B. At the discretion of the Contractor, mandatory requirements for personal protective equipment may be waived following the removal of all barriers.
- C. Re-secure mounted objects removed from their former positions during area preparation activities.
- D. Relocate objects that were removed to temporary locations back to their original positions.
- E. Reestablish HVAC, mechanical and electrical systems in proper working order. Remove contaminated HVAC system filters and dispose of as asbestos contaminated waste. Decontaminate filter assembly using HEPA vacuums and wet cleaning techniques. Install new filters in HVAC systems. Dispose of old filters as asbestos waste.
- F. Repair all areas of damage that occurred as a result of abatement activities.
- G. The Contractor will touch up or repaint any and all areas from which paint has been removed or damaged in the process of removing tape or other methods used in attachment of polyethylene sheets or other barriers.
- H. The Contractor will remove all traces of materials used to attach barrier material to the building structure. Care must be exercised when attaching barrier materials to porous building materials such as brick or cement block. All evidence of attachment or encapsulant materials must be removed upon completion of project.

### **3.09 SUPPORT ACTIVITIES AND PERSONNEL**

- A. Training shall be provided by the Contractor to all employees or agents who may be required to disturb asbestos containing or asbestos contaminated materials for abatement and auxiliary purposes and to all supervisory personnel who may be involved in planning, execution or inspection of abatement projects.
- B. Training shall provide, at a minimum, information on the following topics:
  1. The health hazards of asbestos including the nature of various asbestos related diseases, routes of exposure, known dose-response relationships, the synergistic relationship between asbestos exposure and cigarette smoking, latency periods for disease and health basis for standards.
  2. The physical characteristics of asbestos including fiber size, aerodynamic properties, physical appearance and uses.
  3. Employee personal protective equipment including the types and characteristics of respirator classes, limitations of respirators, proper selection, inspection, donning, use, maintenance and storage of

respirators, field testing the face-piece-to-face seal (positive and negative pressure fitting tests), qualitative and quantitative fit testing procedures, variations between laboratory and field fit factors, factors that affect respirator fit (e.g. facial hair), selection and use of disposable clothing, use and handling of launderable clothing, non-skid shoes, gloves, eye protection and hard hats.

4. Medical monitoring requirements for workers including required and recommended tests, reasons for medical monitoring and employee access to records.
  5. Air monitoring procedures and requirements for workers including description of equipment and procedures, reasons for monitoring, types of samples and current standards with recommended changes.
  6. Work practices for asbestos abatement including purpose, proper construction and maintenance of air-tight plastic barriers, job set-up of airlocks, worker decontamination systems and waste transfer airlocks, posting of warning signs, engineering controls electrical and ventilation system lockout, proper working techniques, waste clean-up, storage and disposal procedures.
  7. Personal hygiene including entry and exit procedures for the work area, use of showers and prohibition of eating, drinking, smoking and chewing in the work area.
  8. Special safety hazards that may be encountered including electrical hazards, air contaminants (CO, wetting agents, encapsulants, materials for Owner's operation), fire and explosion hazards, scaffold and ladder hazards, slippery surfaces, confined spaces, heat stress and noise.
  9. Workshops affording both supervisory personnel and abatement workers the opportunity to see (and experience) the construction of containment barriers and decontamination facilities.
  10. Supervisory personnel shall, in addition, receive training or contract specifications, liability insurance and bonding, legal considerations related to abatement, establishing respiratory protection medical surveillance programs, EPA, OSHA (and State) record keeping requirements, and other topics as requested by the Owner.
- C. Training must be provided by individuals qualified by virtue of experience and education to discuss the topic areas in 3.10.
- D. Training is to have occurred within 12 months prior to the initiation of abatement activities.
- E. Contractor must document training by providing date of training, training entity, course outline, and names and qualifications of trainers.

### **3.10 MEDICAL MONITORING**

- A. Medical monitoring must be provided by the Contractor to any employee or agent that may be exposed to asbestos in excess of background levels during any phase of the abatement project. (Due to the synergistic effects between smoking and asbestos exposure, it is highly recommended that only non-smokers be employed in positions which may require them to enter asbestos contaminated atmospheres.)
- B. Medical monitoring shall include at a minimum:
1. A work/medical history to elicit symptomatology of respiratory disease.
  2. A chest x-ray (posterior - anterior, 14 x 13 inches) evaluated by a Certified B-reader.
  3. A pulmonary function test, including forced vital capacity (FVC) and forced expiratory volume at one second (FEV)<sub>1</sub>, administered and interpreted by a certified Pulmonary Specialist.
- C. Employees shall be given an opportunity to be evaluated by a physician to determine their capability to work safely while breathing through the added resistance of a respirator. (Examining physician shall be aware of the nature of respiratory protective devices and their contributions to breathing resistance. They shall also be informed of the specific types of respirators the employee shall be required to wear and the work he will be required to perform, as well as special workplace conditions such as high temperatures, high humidity, and chemical contaminants to which he may be exposed.)

### 3.11 ASBESTOS PROJECT MANAGER

- A. The Asbestos Project Manager shall be the Owner or a designated representative paid by the Owner. (Also known as the Clerk-of-the-Works or Competent Person, this person could be an administrator, architect, engineer, industrial hygienist or other individual(s) possessing the qualifications detailed in 3.11, B.)
- B. The Asbestos Project Manager shall be able to demonstrate through special education, training, skills, knowledge or experience satisfactory to the Owner to indicate the ability to carry out the following activities as required:
  - 1. Assist in decision making regarding selection of procedures.
  - 2. Assist in writing contract specifications for the abatement
  - 3. Assist in evaluation of bids and selection of a Contractor.
  - 4. Enforce contract specifications.
  - 5. Tour work area with the Contractor and agree on pre-abatement conditions of the work area.
  - 6. Inspect and sign off on barriers and decontamination enclosure systems.
  - 7. Observe activities at all times during the course of abatement.
  - 8. Meet with the Contractor daily to review work progress and solve problems or adjust procedures as appropriate.
  - 9. Perform bulk material or air sampling and all workplace inspection clearance inspections for the Owner.
  - 10. Report on abatement to the Owner.
  - 11. Request, review and maintain Contractor submittals.
  - 12. Provide training and/or respirator fit testing to personnel.
- C. The Asbestos Project Manager shall have the authority to stop any job activities if they are not being performed in accordance with applicable regulations or guidelines or the requirements of this specification. These will be reported to the Owner with description of activity, reason for stopping it and alternatives for correcting the problem. (Note: The Asbestos Project Manger should be selected as early as possible prior to selection of the Contractor to enable participation during the pre-bid conference, walk-through, and pre-construction conference.)

### 3.12 AIR SAMPLING PROFESSIONAL (ASP)

- A. The Contractor shall engage the services of an Air Sampling Professional to conduct Air sampling procedures in accordance with all pertinent OSHA, EPA, NIOSH or other regulations.
- B. The ASP shall conduct air sampling in accordance with the NIOSH Standard Analytical Method 7400 or other acceptable methods as otherwise agreed upon.
- C. The Air Sampling Professional shall be experienced and knowledgeable about the methods for asbestos air sampling and be able to select representative numbers and locations of samples.
- D. The Air Sampling Professional shall have adequate liability insurance to protect against errors and omissions in the performance of support activities.

### 3.13 LABORATORY SERVICES

- A. Laboratory utilized for analyzing air samples by NIOSH shall be satisfactory participants in the NIOSH Proficiency Analytical testing (PAT) program asbestos analysis.
- B. Laboratories used for bulk material identification shall be satisfactory participants in the EPA quality assurance program for bulk asbestos analysis.



- C. The period of time permitted between the collection of air samples and the availability of results shall be less than 24 hours for samples collected during abatement activities.

**3.14 PERSONNEL MANAGEMENT:**

- A. The Contractor shall exercise complete control over all actions of his employees while on the project site or while off site from the start of work to completion of the entire project.
1. The Contractor shall warn his employees that unauthorized removal from the site of any property owned or controlled by the owner shall result in immediate prosecution by the owner or his authorized representative.
  2. The Contractor will control employee actions and behavior to ensure that there is no unprofessional interaction with the owner's employees or occupants during the entire project.
  3. The Contractor must control all operations and employees to assure that they are limited to the space parameters allowed by the Owner. Employees, equipment, vehicles and supplies are restricted to areas designated by the Owner for the duration of the project.
  4. The special attention of the Contractor is drawn to the following statements. These statements are to be considered prior to bidding on this project.
  5. The following conditions are accepted and agreed to by the Contractor when he signs a contract to provide the services and materials spelled out in this specification.
  6. The Owner or any of his representatives reserve the right to eject from the project site any employee of the Contractor or his subcontractor for adequate reason. The Owners decision will be final with no appeal. In addition the Owner reserves the right to obtain professional assistance in maintaining law and order in or on the Project site. Such reasons include but are not limited to the following:
    7. Intoxication.
    8. Nonprofessional actions.
    9. Theft.
    10. Indications of Drug usage.
    11. Any unlawful action.
    12. Destruction of Owners or other property.
  13. The Contractor MUST advise ALL of his employees and Sub Contractors that SMOKING OR THE USE OF ANY TOBACCO PRODUCT WITHIN THE BUILDING IS PROHIBITED. THE POSSESSION OR USE OF ANY CHEMICAL SUBSTANCE OR ALCOHOLIC BEVERAGE ON THE WORK SITE IS PROHIBITED. Violation of this rule is sufficient cause for IMMEDIATE ejection from the building and the project.
  14. If any person employed or directed by the Contractor elects to smoke on the grounds (if permitted) the Contractor WILL provide appropriate vessels for the placement of waste smoking materials. The Contractor will direct his people to use the vessels and not to dispose of waste material by placement directly on the grounds. The Contractor will dispose of all waste material in an appropriate manner and police the entire Project Area (inside and outside) prior to final inspection of the project.

**3.15 PIGEON DROPPING REMOVAL**

- A. The Contractor shall abate all pigeons and pigeon waster in accordance with the Mississippi Department of Environmental Quality.

**3.16 COPY OF THE HAZARDOUS MATERIALS REPORT**

- A. A copy of the Hazardous Materials Report follows this section.

**END OF SECTION**

August 4, 2020

Mr. Chris Robinson, Principal  
Albert and Robinson Architects PLLC  
514 Main Street  
Hattiesburg, MS 39401  
[chris@ar-architects.com](mailto:chris@ar-architects.com)

RE: **SEMS Project No. 1326-0001**

A Materials Survey for Asbestos, Lead-Containing and Other Hazardous Materials  
of the State of Mississippi Office Building, 660 North Street, Jackson, Mississippi

Dear Mr. Robinson:

**Southern Environmental Management & Specialties, Inc. (SEMS)** is pleased to  
present the attached reports for the above-referenced project.

If you have any questions regarding these reports or if we can offer additional  
environmental services, please contact me at (601) 922-0766.

Sincerely,

**SEMS, Inc.**



Joseph M. Drapala, CIH, CHMM, CIEC  
Industrial Hygiene Manager

JMD/llm

Attachments





**A REPORT FOR A NESHAP SURVEY  
FOR  
ASBESTOS-CONTAINING MATERIALS**

**OF THE  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET  
JACKSON, MISSISSIPPI**

Requested by:

**ALBERT AND ROBINSON ARCHITECTS PLLC  
514 MAIN STREET  
HATTIESBURG, MS 39401**

For

**MS DEPARTMENT OF FINANCE AND ADMINISTRATION  
501 NORTH WEST STREET, #1201a  
Jackson, Mississippi**

Prepared on:

August 4, 2020

**SEMS Project #1326-0001.1**

Prepared by:  
Joseph M. Drapala, CIH, CHMM, CIEC  
Industrial Hygiene Manager

	160 Upton Drive Jackson, MS 39209		601.922.0766		info@semsinc.net www.semsinc.net
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**A REPORT FOR A NESHAP SURVEY  
FOR  
ASBESTOS-CONTAINING MATERIALS**

**OF THE**

**STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET  
JACKSON, MISSISSIPPI**

**Requested by:**

**ALBERT AND ROBINSON ARCHITECTS PLLC  
514 MAIN STREET  
HATTIESBURG, MS 39401**

**For**

**MISSISSIPPI DEPARTMENT OF FINANCE AND ADMINISTRATION  
501 NORTH WEST STREET, #1201a  
Jackson, Mississippi**

Prepared by:



**Southern Environmental Management & Specialties, Inc.**  
160 Upton Drive  
Jackson, Mississippi 39236-6485  
(601) 922-0766

**SEMS, Inc.** Report No. 1326-0001.1  
August 2020





## TABLE OF CONTENTS

	<u>Page</u>
<b>EXECUTIVE SUMMARY .....</b>	<b>ii</b>
<b>1.0 PURPOSE AND SCOPE OF SERVICES.....</b>	<b>1</b>
<b>2.0 SITE DESCRIPTION .....</b>	<b>2</b>
<b>3.0 DISCUSSION OF SAMPLING RESULTS.....</b>	<b>3</b>
3.1 Asbestos-Containing Materials: Friable .....	4
3.2 Asbestos-Containing Materials: Non-Friable.....	4
3.3 Non-Asbestos-Containing Materials .....	6
<b>4.0 SUMMARY OF RECOMMENDATIONS.....</b>	<b>12</b>
<b>5.0 QUALIFYING STATEMENT.....</b>	<b>13</b>

### APPENDICES:

Appendix A:	Professional Credentials
Appendix B:	Laboratory Analytical Results, Bulk Asbestos Report
Appendix C:	Schematic Floor Plan: ACM Location

## EXECUTIVE SUMMARY

**Southern Environmental Management and Specialties, Inc. (SEMS)** was retained by Albert and Robinson Architects PLLC, Hattiesburg, Mississippi, on behalf of the Mississippi Department of Finance and Administration, Jackson, Mississippi, to conduct a facility survey to identify and sample suspected Asbestos-Containing Materials (ACM) at the State of Mississippi Office Building at 660 North Street, Jackson, Mississippi.

**SEMS** collected forty-six (46) multi-layer and singular bulk samples on July 9, 2020 of suspect asbestos-containing materials (ACM) from the interior areas of the building. The samples were collected by Joseph M. Drapala, CIH, Inspector I.D. number ABI-00003042, expiration date July 22, 2020. The samples were submitted to EMSL Analytical, Inc., Baton Rouge, Louisiana, for analysis by Polarized Light Microscopy (PLM). The laboratory is accredited under National Voluntary Laboratory Accreditation Program ID Number 200375-0.

### Summary of Findings

The following summary of findings is based on the results from the laboratory analysis and field investigation:

## **Asbestos**

1. **SEMS** presents the following table, summarizing the results of the asbestos-containing materials (ACM) survey:

<b>Sample #</b>	<b>Material</b>	<b>Location (Sample Point)</b>	<b>Asbestos Present</b>
AR-660-0001	Wood Grain Patterned Flooring	Suite 100C Hall	NAD
AR-660-0002	Wood Grain Patterned Flooring	Suite 100C Hall	NAD
AR-660-0003	Base Cove and Mastic	Suite 100C Breakroom	NAD
AR-660-0004	12" Tan Floor Tile	Suite 100C Breakroom	NAD
AR-660-0005	12" Tan Floor Tile	Suite 100C Men's Restroom	NAD
AR-660-0006	12" Brown Floor Tile	Suite 100C Men's Restroom	NAD
AR-660-0007	Drywall Mud	Suite 100C Breakroom	NAD

<b>Sample #</b>	<b>Material</b>	<b>Location (Sample Point)</b>	<b>Asbestos Present</b>
AR-660-0008	Drywall Mud	Suite 100C Men's Restroom	2% Chrysotile
AR-660-0009	Perimeter Wall Texture Finish	Suite 100C Hall	NAD
AR-660-0010	Perimeter Wall Texture Finish	Suite 100C Conference Room #1	NAD
AR-660-0011	Drywall Mud	Suite 100C Hall	2% Chrysotile
AR-660-0012	2'x2' Ceiling Panel	Suite 100C Hall	NAD
AR-660-0013	HVAC Duct Mastic	Suite 100C Hall	NAD
AR-660-0014	HVAC Duct Mastic	Suite 100C Hall	NAD
AR-660-0015	12" Sand Patterned Floor Tile	Suite 100B Multi-use Restroom	NAD

<b>Sample #</b>	<b>Material</b>	<b>Location (Sample Point)</b>	<b>Asbestos Present</b>
AR-660-0016	12" Sand Patterned Floor Tile	Suite 100B Multi-use Restroom	NAD
AR-660-0017	Base Cove and Mastic	Suite 100B Multi-use Restroom	NAD
AR-660-0018	2'x2' Ceiling Panel	Suite 100B Throughout	NAD
AR-660-0019	Drywall Mud	Suite 104 Reception Desk	NAD
AR-660-0020	12" Tan Floor Tile	Suite 104 Breakroom	NAD
AR-660-0021	12" Tan Floor Tile	Suite 104 Ladies Restroom	NAD
AR-660-0022	12" Off-White Floor Tile	Suite 104 Men's Restroom	NAD
AR-660-0023	12" Off-White Floor Tile	Suite 104 Men's Restroom	NAD

<b>Sample #</b>	<b>Material</b>	<b>Location (Sample Point)</b>	<b>Asbestos Present</b>
AR-660-0024	Pipe Joint TSI (old)	Suite 104 Hall	NAD
AR-660-0025	Pipe Insulation with joint compound	Suite 104 Hall	NAD
AR-660-0026	2'x2' Ceiling Panel	Suite 104 Hall	NAD
AR-660-0027	12" Sand Patterned Floor Tile	State Parole Board Suite Men's Restroom	NAD
AR-660-0028	12" Sand Patterned Floor Tile	State Parole Board Suite Men's Restroom	NAD
AR-660-0029	12" Gray Floor Tile	State Parole Board Suite Breakroom	NAD
AR-660-0030	12" Gray Floor Tile	State Parole Board Suite Flower's Office	NAD
AR-660-0031	Pipe Joint TSI (old)	State Parole Board Suite Hall at Breakroom	NAD

<b>Sample #</b>	<b>Material</b>	<b>Location (Sample Point)</b>	<b>Asbestos Present</b>
AR-660-0032	Pipe Joint TSI (old)	State Parole Board Suite Hall at Breakroom	NAD
AR-660-0033	Drywall Mud	State Parole Board Suite Hall at Breakroom	2% Chrysotile
AR-660-0034	2'x2' Ceiling Panel	State Parole Board Suite Hall at Breakroom	NAD
AR-660-0035	Perimeter Wall Texture Finish	Suite 102C Bench Test Room	NAD
AR-660-0036	Drywall Mud	Suite 102C Hall	NAD
AR-660-0037	12" Brown Floor Tile	Suite 300 Breakroom	NAD
AR-660-0038	12" Sand Patterned Floor Tile	Suite 300 Breakroom	NAD
AR-660-0039	Drywall Mud	Suite 300 Storage	NAD

<b>Sample #</b>	<b>Material</b>	<b>Location (Sample Point)</b>	<b>Asbestos Present</b>
AR-660-0040	Base Cove and Mastic	Suite 300 Storage	NAD
AR-660-0041	2'x2' Ceiling Panel	Suite 400 Hall	NAD
AR-660-0042	Drywall Mud	Suite 400 Hall	NAD
AR-660-0043	Drywall Mud	Suite 400 Hall	NAD
AR-660-0044	12" Sand Patterned Floor Tile	VA Suite Breakroom	NAD
AR-660-0045	Drywall Mud	VA Suite Storage	NAD
AR-660-0046	Base Cove and Mastic	VA Suite Storage	NAD

NAD = No Asbestos Detected

See Appendix B, Laboratory Analytical Results, Bulk Asbestos Report.

There was no floor tile found under the carpets on the second floor.



### **Inspection Report Limitations**

**This inspection report shall not be used as a substitute for asbestos abatement specifications, and are not to be used in formal bid documents as a specification.**

**A specific Division for Asbestos Abatement should accompany this inspection report in formal bid documentation.**

### **Summary of Recommendations:**

The following recommendation is made concerning the building materials located at the State of Mississippi Office Building, 660 North Street, Jackson, Mississippi.

1. **SEMS** recommends that at least ten (10) days prior to demolition or renovation a "Demolition/Renovation Notification Form" as referenced in 40 CFR Part 61, Subpart M, be submitted to Mississippi Department of Environmental Quality (MDEQ). Asbestos abatement should be designed by a Mississippi Certified Asbestos Designer and conducted by a Mississippi Certified Asbestos Contractor.

## 1.0 PURPOSE AND SCOPE OF SERVICES

**Southern Environmental Management & Specialties, Inc. (SEMS)** was retained by Albert and Robinson Architects PLLC, Hattiesburg, Mississippi, on behalf of the Mississippi Department of Finance and Administration, Jackson, Mississippi, to conduct a facility survey to identify and sample suspected Asbestos-Containing Materials (ACM) at the State of Mississippi Office Building, 660 North Street, Jackson, Mississippi.

Specifically, the scope of services rendered included the following:

### Scope of Work:

1. Conduct an inspection of the building interior spaces to survey, identify and sample a statistically valid number of suspect asbestos-containing building materials within the designated project area. Additionally, perform a visual investigation to determine the existing condition of building materials.
2. Conduct analysis on all samples of materials suspected to contain asbestos by utilizing Polarized Light Microscopy (PLM) with dispersion staining techniques performed in accordance with the Environmental Protection Agency (EPA) bulk analysis protocol utilizing EPA Method 600/M4-82-020.
3. Review all field, survey, and analytical data to provide a comprehensive facility assessment.
4. Prepare a final report with observations and recommendations relating to the facilities' conditions identified.

## 2.0 SITE DESCRIPTION

**SEMS**, under the direction of the Albert and Robinson Architects PLLC, Hattiesburg, Mississippi, on behalf of the Mississippi Department of Finance and Administration, Jackson, Mississippi conducted a site investigation on July 9, 2020, to identify and sample suspected Asbestos-Containing Materials (ACM), located at 660 North Street, Jackson, Mississippi. The inspection was conducted by Joseph M. Drapala, CIH, CHMM, CIEC, Asbestos Inspector I.D. number ABI-00003042, expiration date July 22, 2020. The suspect ACM samples were submitted to EMSL Analytical, Inc., Baton Rouge, Louisiana, for analysis by PLM.

### 3.0 DISCUSSION OF SAMPLING RESULTS

**SEMS** conducted materials sampling at 660 North Street, Jackson, Mississippi in accordance with the proposed scope of services. The following suspect materials sampled were analyzed for asbestos.

#### Surfacing Materials

- Interior Surface Coating

#### Thermal System Insulation

- Pipe Insulation (Glass Fiber)
- Pipe Joint
- HVAC Insulation Sealing Mastic

#### Miscellaneous

- Floor Tiles and Mastic
- Base Cove Mastic
- Drywall systems
- Ceiling Panels

A total of forty-six (46) multi-layer and singular bulk samples of suspect ACM were collected.

#### 3.1 Asbestos-Containing Materials: Friable

No Friable asbestos-containing materials were identified during this survey.

### 3.2 Asbestos-Containing Materials: Non-Friable

Non-Friable asbestos-containing materials were found or sampled during this survey and are presented in the following table.

Sample Number	Sample Description	Location	NESHAP Category	Type of Asbestos	Percent (%) Asbestos	OSHA Removal Class
AR-660-0008	Drywall Mud	Suite 100C Men's Restroom	Category with RACM Potential	Chrysotile	2	2
AR-660-0011	Drywall Mud	Suite 100C Hall	Category with RACM Potential	Chrysotile	2	2
AR-660-0033	Drywall Mud	State Parole Board Suite Hall at Breakroom	Category with RACM Potential	Chrysotile	2	2

#### National Emission Standards for Hazardous Air Pollutants (NESHAP) Material Categories

include:

- A. Regulated Asbestos-Containing Materials (RACM)
  - 1. Friable ACM
  - 2. Non-friable ACM that is or can/will become friable during renovation/demolition activity.
- B. Category 1 Non-friable ACM (Roofing, flooring, mastics, gaskets etc.)
- C. Category 2 Non-friable ACM (Asbestos cement products)

OSHA Removal Classes include:

- A. Class 1
  - 1. Removal of surfacing material, thermal system insulation (TSI), PACM
  - 2. Four (4)-day worker, five (5)-day supervisor training and state certification

B. Class 2

1. Activities involving the removal of ACM which is not thermal system insulation (TSI) or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.
2. Four (4)-day worker, five (5)-day supervisor training and state certification

C. Class 3

1. Repair and maintenance operations, where "ACM", including TSI and surfacing ACM and PACM, is likely to be disturbed.
2. Sixteen (16)-hour worker training

D. Class 4

1. Maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, and III activities.

All analytical reports are presented in the Appendices.

### 3.3 Non-Asbestos-Containing Materials

The following table contains the laboratory results for suspect ACM that was sampled and determined to be non-ACM by PLM during this investigation:

#### Non-Asbestos-Containing Materials

Sample #	Material	Location (Sample Point)	Asbestos Present
AR-660-0001	Wood Grain Patterned Flooring	Suite 100C Hall	NAD
AR-660-0002	Wood Grain Patterned Flooring	Suite 100C Hall	NAD
AR-660-0003	Base Cove and Mastic	Suite 100C Breakroom	NAD
AR-660-0004	12" Tan Floor Tile	Suite 100C Breakroom	NAD
AR-660-0005	12" Tan Floor Tile	Suite 100C Men's Restroom	NAD
AR-660-0006	12" Brown Floor Tile	Suite 100C Men's Restroom	NAD

<b>Sample #</b>	<b>Material</b>	<b>Location (Sample Point)</b>	<b>Asbestos Present</b>
AR-660-0007	Drywall Mud	Suite 100C Breakroom	NAD
AR-660-0009	Perimeter Wall Texture Finish	Suite 100C Hall	NAD
AR-660-0010	Perimeter Wall Texture Finish	Suite 100C Conference Room #1	NAD
AR-660-0012	2'x2' Ceiling Panel	Suite 100C Hall	NAD
AR-660-0013	HVAC Duct Mastic	Suite 100C Hall	NAD
AR-660-0014	HVAC Duct Mastic	Suite 100C Hall	NAD
AR-660-0015	12" Sand Patterned Floor Tile	Suite 100B Multi-use Restroom	NAD
AR-660-0016	12" Sand Patterned Floor Tile	Suite 100B Multi-use Restroom	NAD



<b>Sample #</b>	<b>Material</b>	<b>Location (Sample Point)</b>	<b>Asbestos Present</b>
AR-660-0017	Base Cove and Mastic	Suite 100B Multi-use Restroom	NAD
AR-660-0018	2'x2' Ceiling Panel	Suite 100B Throughout	NAD
AR-660-0019	Drywall Mud	Suite 104 Reception Desk	NAD
AR-660-0020	12" Tan Floor Tile	Suite 104 Breakroom	NAD
AR-660-0021	12" Tan Floor Tile	Suite 104 Ladies Restroom	NAD
AR-660-0022	12" Off-White Floor Tile	Suite 104 Men's Restroom	NAD
AR-660-0023	12" Off-White Floor Tile	Suite 104 Men's Restroom	NAD
AR-660-0024	Pipe Joint TSI (old)	Suite 104 Hall	NAD

<b>Sample #</b>	<b>Material</b>	<b>Location (Sample Point)</b>	<b>Asbestos Present</b>
AR-660-0025	Pipe Insulation with joint compound	Suite 104 Hall	NAD
AR-660-0026	2'x2' Ceiling Panel	Suite 104 Hall	NAD
AR-660-0027	12" Sand Patterned Floor Tile	State Parole Board Suite Men's Restroom	NAD
AR-660-0028	12" Sand Patterned Floor Tile	State Parole Board Suite Men's Restroom	NAD
AR-660-0029	12" Gray Floor Tile	State Parole Board Suite Breakroom	NAD
AR-660-0030	12" Gray Floor Tile	State Parole Board Suite Flower's Office	NAD
AR-660-0031	Pipe Joint TSI (old)	State Parole Board Suite Hall at Breakroom	NAD
AR-660-0032	Pipe Joint TSI (old)	State Parole Board Suite Hall at Breakroom	NAD

<b>Sample #</b>	<b>Material</b>	<b>Location (Sample Point)</b>	<b>Asbestos Present</b>
AR-660-0034	2'x2' Ceiling Panel	State Parole Board Suite Hall at Breakroom	NAD
AR-660-0035	Perimeter Wall Texture Finish	Suite 102C Bench Test Room	NAD
AR-660-0036	Drywall Mud	Suite 102C Hall	NAD
AR-660-0037	12" Brown Floor Tile	Suite 300 Breakroom	NAD
AR-660-0038	12" Sand Patterned Floor Tile	Suite 300 Breakroom	NAD
AR-660-0039	Drywall Mud	Suite 300 Storage	NAD
AR-660-0040	Base Cove and Mastic	Suite 300 Storage	NAD
AR-660-0041	2'x2' Ceiling Panel	Suite 400 Hall	NAD

Sample #	Material	Location (Sample Point)	Asbestos Present
AR-660-0042	Drywall Mud	Suite 400 Hall	NAD
AR-660-0043	Drywall Mud	Suite 400 Hall	NAD
AR-660-0044	12" Sand Patterned Floor Tile	VA Suite Breakroom	NAD
AR-660-0045	Drywall Mud	VA Suite Storage	NAD
AR-660-0046	Base Cove and Mastic	VA Suite Storage	NAD

NAD = No Asbestos Detected

There was no floor tile found under the carpets on the second floor.

All analytical reports are presented in the Appendices. All materials were analyzed by PLM. According to the Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) regulations, any material containing greater than one percent (>1%) asbestos is considered ACM.

#### 4.0 SUMMARY OF RECOMMENDATIONS

The following recommendation is made concerning the building materials located in the interior of 660 North Street, Jackson, Mississippi.

1. A ten (10) day "Demolition/Renovation Notification Form" as referenced in 40 CFR Part 61, Subpart M, is not required to be submitted to Mississippi Department of Environmental Quality (MDEQ) due to no detection of asbestos in the samples that were collected and no-load bearing structure will be demolished.

## 5.0 QUALIFYING STATEMENT

**SEMS** has prepared this report for the exclusive use of the client. The report and its analytical results, findings, conclusions, and recommendations either in part or in its entirety are not to be used or relied on by any other party without prior consent by **SEMS, the Client or assigns**. The report format is proprietary to **SEMS**, having been designed, developed, and prepared by **SEMS** at great expense and the information is secret, confidential, unique, and constitutes the exclusive property of **SEMS** and shall not be used by any third party without the prior written consent of **SEMS**. Any use thereof, other than the sole benefit of **SEMS** or the client, shall be deemed wrongful and will cause irreparable injury to **SEMS**.

**SEMS** presents the findings, conclusions and recommendations, therein, which are based solely on the conditions observed during the inspection and analytical results. The client should be aware that methodologies, results, conclusions, recommendations, and any remediation protocol to be written are based partially upon decisions made by the client concerning the extent of project work to be conducted, and are the results of a limited sampling program conducted on a specific date(s). A different sampling program or samples taken at another time may have resulted in different conclusions, recommendations, and protocols. Additionally, **SEMS** does not make any representation or projection as to past conditions or future exposures and does not extend its findings to areas outside of the statistical representation of the completed investigation.

**APPENDIX A**  
**PROFESSIONAL CREDENTIALS**

## PROFESSIONAL RESUME

**NAME:** Joseph M. Drapala, CIH, CHMM, CIEC

**TITLE:** Industrial Hygiene Manager

**EDUCATION:** B.S. – Mechanical Engineering  
Mississippi State University

**SPECIALIZED TRAINING:** OSHA 40-Hour Health and Safety  
OSHA 40-Hour Hazardous Waste Operations and Emergency Response  
EPA/AHERA Asbestos Inspector (Mississippi)  
EPA/AHERA Asbestos Management Planning (Mississippi)  
EPA/AHERA Asbestos Project Design (Mississippi)  
Fundamentals of Dispersion Modeling  
Indoor Air Quality / Bio-Aerosols  
OSHA 10 and 30-Hour General Industry Outreach Program  
Radiation Safety  
Comprehensive Industrial Hygiene Review  
Quantitative Industrial Hygiene  
Basic Hazardous Material Transportation Training  
AHIA Management Certification Program  
Infectious Diseases and the Role of the Industrial Hygienist in  
Preventing and Managing the Coming Epidemic  
Roles of OEHS Professionals in Pandemic and Avian Influenza  
AIHce 2009 Media Training Workshop

**CERTIFICATIONS:** American Board of Industrial Hygiene, Certified Industrial Hygienist (No. 9068CP)  
Certified Hazardous Material Manager (No. 5181)  
Council-Certified Indoor Environmental Consultant (No. 0512009)  
Council-Certified Microbial Consultant (No. 0708038)  
Mississippi Certified Asbestos Inspector  
Mississippi Certified Project Designer  
Mississippi Certified Management Planner  
Mississippi Certified Lead Inspector

**AFFILIATIONS:** American Industrial Hygiene Association (Full Member)  
Academy of Industrial Hygiene (Diplomat)  
American Council for Accreditation Certification (Certification Board)  
Institute of Certified Hazardous Materials Managers



## PROFESSIONAL RESUME (Continued)

**Joseph M. Drapala, CIH, CHMM, CIEC, CMC**, is a Certified Industrial Hygienist (CIH), Certified Hazardous Materials Manager (CHMM), Certified Indoor Environmental Consultant (CIEC) and a Certified Microbial Consultant (CMC). Mr. Drapala has over 26 years of experience in environmental health and safety consulting. This includes compliance and permitting for federal and state environmental regulations, conducting employee exposure assessments regarding OSHA employee safety regulations, emergency response and indoor air quality investigations, remediation and renovation designs concerning asbestos, lead paint, hazardous materials and biological contamination. He has conducted investigations for federal, state, and local governmental agencies, institutions of higher learning, and private concerns, as well as AHERA Inspections and planning management for various school districts throughout the Southeast. Mr. Drapala has developed training materials and presented Industrial Hygiene and Indoor Air Quality seminars for various professional industries, such as insurance adjusters, real estate brokers and appraisers, and professional engineers. Additionally, Mr. Drapala provides expert witness and assistance for trial preparation to attorneys involving indoor air quality (IAQ) and industrial hygiene (IH) litigation. He has written articles and materials for IAQ education seminars with emphasis on molds and bioaerosol exposures.

Mr. Drapala currently serves as a Certification Board Member for the American Council for Accreditation Certification (formerly the American Indoor Air Quality Council).

### **SELECTED PROJECT EXPERIENCE:**

**PROJECT MANAGER:** Development and Implementation of an Asbestos Abatement of Residential Quarters, Veterans Administration Medical Center, Mississippi. Designed specifications and provided project management to abate asbestos materials for the interior and exterior of seven (7) residential quarters. Abatement included contaminated soil, thermal system insulation, and surfacing materials.

**PROJECT DESIGNER:** Asbestos Abatement Specifications for Asbestos-Containing Materials, Various Federal, State, and Local Clients, Mississippi. Responsibilities involved developing project specifications and drawings for the abatement of asbestos-containing materials (ACM) from each site. Duties also included pre-qualifications review of contractors, supervision of abatement projects, industrial hygiene monitoring of air quality before, during, and after abatement work.

**PROJECT MANAGER:** Asbestos Surveys, Abatement Design and Construction Supervision, United States Postal Service, Mississippi, Louisiana, Arkansas, and Texas. Abatement design included specifications of replacement material in abatement area. Conducted quality control air monitoring. Work was conducted in occupied facilities while maintaining full Postal Service operations.



# *State of Mississippi*

*Department of Environmental Quality  
Office of Pollution Control*

## *Certificate of Licensure*

In accordance with the Asbestos Abatement Accreditation and Certification Act,  
Enacted as 1989 Mississippi Law, Chapter 505

Be it known that

***Joseph Drapala***

Having submitted acceptable evidence of qualifications and  
training and other appropriate information, is hereby granted this

***Asbestos Inspector***

***Certification***

*Certificate No.: ABI-00003042  
Expiration Date: July 22nd, 2020  
Training Expires on July 22nd, 2020*

*Margaret Harkin*  
for **Chief, Air Division**



**APPENDIX B**

**LABORATORY ANALYTICAL RESULTS, BULK ASBESTOS REPORTS**



# EMSL Analytical, Inc.

18369 Petroleum Drive Baton Rouge, LA 70809  
Tel/Fax: (225) 755-1920 / (225) 755-1989  
<http://www.EMSL.com> / [batonrougelab@emsl.com](mailto:batonrougelab@emsl.com)

**EMSL Order:** 252003269  
**Customer ID:** SEMS50  
**Customer PO:** 1326-0001  
**Project ID:**

**Attention:** Joseph Drapala  
SEMS, Inc.  
11628 S. Choctaw Drive  
Baton Rouge, LA 70815

**Phone:** (225) 337-0402  
**Fax:**  
**Received Date:** 07/14/2020 9:55 AM  
**Analysis Date:** 07/17/2020 - 07/18/2020  
**Collected Date:** 07/09/2020

**Project:** 1326-0001

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
AR-660-0001-Flooring <small>252003269-0001</small>	Wood Grain Patterned Flooring	Brown/Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0001-Mastic <small>252003269-0001A</small>	Wood Grain Patterned Flooring	Clear Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0001-Leveler <small>252003269-0001B</small>	Wood Grain Patterned Flooring	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0001-Mastic 2 <small>252003269-0001C</small>	Wood Grain Patterned Flooring	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0002-Flooring <small>252003269-0002</small>	Wood Grain Patterned Flooring	Brown/Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0002-Mastic <small>252003269-0002A</small>	Wood Grain Patterned Flooring	Clear Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0002-Leveler <small>252003269-0002B</small>	Wood Grain Patterned Flooring	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0002-Mastic 2 <small>252003269-0002C</small>	Wood Grain Patterned Flooring	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0003-Base Cove <small>252003269-0003</small>	Base Cove & Mastic	Black Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0003-Mastic <small>252003269-0003A</small>	Base Cove & Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0004-Floor Tile <small>252003269-0004</small>	12" Tan Floor Tile	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0004-Mastic <small>252003269-0004A</small>	12" Tan Floor Tile	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0005-Floor Tile <small>252003269-0005</small>	12" Tan Floor Tile	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0005-Mastic <small>252003269-0005A</small>	12" Tan Floor Tile	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0006-Floor Tile <small>252003269-0006</small>	12" Brown Floor Tile	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0006-Mastic <small>252003269-0006A</small>	12" Brown Floor Tile	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

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<http://www.EMSL.com> / [batonrougelab@emsl.com](mailto:batonrougelab@emsl.com)

**EMSL Order:** 252003269  
**Customer ID:** SEMS50  
**Customer PO:** 1326-0001  
**Project ID:**

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
AR-660-0007 <small>252003269-0007</small>	Drywall Mud	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0008 <small>252003269-0008</small>	Drywall Mud	White Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
AR-660-0009-Texture <small>252003269-0009</small>	Perimeter Wall Texture Finish	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0009-Base Coat <small>252003269-0009A</small>	Perimeter Wall Texture Finish	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0010-Texture <small>252003269-0010</small>	Perimeter Wall Texture Finish	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0010-Base Coat <small>252003269-0010A</small>	Perimeter Wall Texture Finish	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0011 <small>252003269-0011</small>	Drywall Mud	White Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
AR-660-0012 <small>252003269-0012</small>	2'x2' Ceiling Panel	Gray/White Fibrous Homogeneous	80% Cellulose 10% Min. Wool	10% Non-fibrous (Other)	None Detected
AR-660-0013 <small>252003269-0013</small>	HVAC Duct Mastic	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0014 <small>252003269-0014</small>	HVAC Duct Mastic	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0015-Floor Tile <small>252003269-0015</small>	12" Sand Patterned Floor Tile	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0015-Mastic <small>252003269-0015A</small>	12" Sand Patterned Floor Tile	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0016-Floor Tile <small>252003269-0016</small>	12" Sand Patterned Floor Tile	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0016-Mastic <small>252003269-0016A</small>	12" Sand Patterned Floor Tile	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0017-Base Cove <small>252003269-0017</small>	Base Cove & Mastic	Brown Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0017-Mastic <small>252003269-0017A</small>	Base Cove & Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0018 <small>252003269-0018</small>	2'x2' Ceiling Panel	Gray/White Fibrous Homogeneous	80% Cellulose 5% Min. Wool	15% Non-fibrous (Other)	None Detected
AR-660-0019 <small>252003269-0019</small>	Drywall Mud	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

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**EMSL Order:** 252003269  
**Customer ID:** SEMS50  
**Customer PO:** 1326-0001  
**Project ID:**

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
AR-660-0020-Floor Tile <i>252003269-0020</i>	12" Tan Floor Tile	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0020-Mastic <i>252003269-0020A</i>	12" Tan Floor Tile	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0020-Leveler <i>252003269-0020B</i>	12" Tan Floor Tile	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0021-Floor Tile <i>252003269-0021</i>	12" Tan Floor Tile	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0021-Mastic <i>252003269-0021A</i>	12" Tan Floor Tile	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0022-Floor Tile <i>252003269-0022</i>	12" Off-White Floor Tile	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0022-Mastic <i>252003269-0022A</i>	12" Off-White Floor Tile	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0023-Floor Tile <i>252003269-0023</i>	12" Off-White Floor Tile	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0023-Mastic <i>252003269-0023A</i>	12" Off-White Floor Tile	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0024 <i>252003269-0024</i>	Pipe Joint TSI (Old)	Gray/White Fibrous Homogeneous	30% Min. Wool	70% Non-fibrous (Other)	None Detected
AR-660-0025-Insulation <i>252003269-0025</i> <i>No joint compound present.</i>	Pipe Insulation w/Joint Compound	Yellow Fibrous Homogeneous	99% Glass	1% Non-fibrous (Other)	None Detected
AR-660-0025-Insulation 2 <i>252003269-0025A</i>	Pipe Insulation w/Joint Compound	Gray/White Fibrous Homogeneous	40% Min. Wool	60% Non-fibrous (Other)	None Detected
AR-660-0026 <i>252003269-0026</i>	2'x2' Ceiling Panel	Gray/White Fibrous Homogeneous	60% Cellulose 20% Min. Wool	20% Non-fibrous (Other)	None Detected
AR-660-0027-Floor Tile <i>252003269-0027</i>	12" Sand Patterned Floor Tile	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0027-Mastic <i>252003269-0027A</i>	12" Sand Patterned Floor Tile	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0028 <i>252003269-0028</i> <i>Mastic not present.</i>	12" Sand Patterned Floor Tile	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0029 <i>252003269-0029</i>	12" Gray Floor Tile	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0030 <i>252003269-0030</i>	12" Gray Floor Tile	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

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**EMSL Order:** 252003269  
**Customer ID:** SEMS50  
**Customer PO:** 1326-0001  
**Project ID:**

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
AR-660-0031 <i>252003269-0031</i>	Pipe Joint TSI (Old)	Gray/White Fibrous Homogeneous	10% Glass	90% Non-fibrous (Other)	None Detected
AR-660-0032 <i>252003269-0032</i>	Pipe Joint TSI (Old)	Gray Non-Fibrous Homogeneous	10% Glass	90% Non-fibrous (Other)	None Detected
AR-660-0033 <i>252003269-0033</i>	Drywall Mud	White Non-Fibrous Homogeneous		98% Non-fibrous (Other)	2% Chrysotile
AR-660-0034 <i>252003269-0034</i>	2'x2' Ceiling Panel	Gray/White Fibrous Homogeneous	70% Cellulose 20% Min. Wool	10% Non-fibrous (Other)	None Detected
AR-660-0035-Texture <i>252003269-0035</i>	Perimeter Wall Texture Finish	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0035-Base Coat <i>252003269-0035A</i>	Perimeter Wall Texture Finish	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0036 <i>252003269-0036</i>	Drywall Mud	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0037 <i>252003269-0037</i>	12" Brown Floor Tile	Brown/Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0038 <i>252003269-0038</i>	12" Sand Patterned Floor Tile	Gray/Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0039 <i>252003269-0039</i>	Drywall Mud	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0040 <i>252003269-0040</i> <i>No base cove present.</i>	Base Cove & Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0041 <i>252003269-0041</i>	2'x2' Ceiling Panel	Gray/White Fibrous Homogeneous	60% Cellulose 30% Min. Wool	10% Non-fibrous (Other)	None Detected
AR-660-0042 <i>252003269-0042</i>	Drywall Mud	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0043 <i>252003269-0043</i>	Drywall Mud	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0044-Floor Tile <i>252003269-0044</i>	12" Sand Patterned Floor Tile	Tan Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0044-Mastic <i>252003269-0044A</i>	12" Sand Patterned Floor Tile	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0045-Mud <i>252003269-0045</i>	Drywall Mud	White Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
AR-660-0045-Mastic <i>252003269-0045A</i>	Drywall Mud	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected

Initial report from: 07/19/2020 13:32:42



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Tel/Fax: (225) 755-1920 / (225) 755-1989  
<http://www.EMSL.com / batonrougelab@emsl.com>

**EMSL Order:** 252003269  
**Customer ID:** SEMS50  
**Customer PO:** 1326-0001  
**Project ID:**

## Test Report: Asbestos Analysis of Bulk Materials via EPA 600/R-93/116 Method using Polarized Light Microscopy

Sample	Description	Appearance	Non-Asbestos		Asbestos
			% Fibrous	% Non-Fibrous	% Type
AR-660-0046-Cove Base	Base Cove & Mastic	Gray Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
<i>252003269-0046</i>					
AR-660-0046-Mastic	Base Cove & Mastic	Yellow Non-Fibrous Homogeneous		100% Non-fibrous (Other)	None Detected
<i>252003269-0046A</i>					

Analyst(s) \_\_\_\_\_

- Adam Gart (53)
- Nicholas Montoya-Orozco (16)
- Quynh Vu (3)

Jamie Laginess, Laboratory Operations Manager  
or Other Approved Signatory

EMSL maintains liability limited to cost of analysis. The above analyses were performed in general compliance with Appendix E to Subpart E of 40 CFR (previously EPA 600/M4-82-020 "Interim Method"), but augmented with procedures outlined in the 1993 ("final") version of the method. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. All samples received in acceptable condition unless otherwise noted. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the federal government. EMSL recommends gravimetric reduction for all non-friable organically bound materials prior to analysis. Estimation of uncertainty is available on request.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NVLAP Lab Code 101048-0, AIHA-LAP, LLC-IHLAP Lab 100194, NYS ELAP 10872, NJ DEP 03036, PA ID# 68-00367, LA #04127

Initial report from: 07/19/2020 13:32:42



# Asbestos Bulk Building Material Chain of Custody

EMSL Order Number (lab use only):

3269

Baton Rouge, LA 70809  
Phone (225) 755-1920  
Fax (225) 755-1989

EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

Company Name: SEMS Inc.		EMSL Customer ID: SEMS50	
Street: 160 Upton Drive		City: Jackson	State or Province: MS
Zip/Postal Code: 39209	Country: US	Telephone #: 601220766	Fax #: 6019227927
Report To (Name): Joseph Drapala		Please Provide Results via: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
email Address: jdrapala@semsinc.net		Purchase Order Number: 1326-0001	
Client Project ID: 1326-0001		EMSL Project ID (internal use only):	
State or Province Collected: MS		CT only <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	
EMSL-Bill to: <input type="checkbox"/> Same <input checked="" type="checkbox"/> Different - if bill to is different note instructions in comment. Third party billing requires written authorization from third party			
<b>Turnaround Time (TAT) Options Please Check</b>			
<input type="checkbox"/> 3 Hour	<input type="checkbox"/> 6 Hour	<input type="checkbox"/> 24 Hour	<input type="checkbox"/> 32 Hour* <input type="checkbox"/> 48 Hour <input checked="" type="checkbox"/> 72 Hour <input type="checkbox"/> 96 Hour <input type="checkbox"/> 1 Week <input type="checkbox"/> 2 Week
<small>*32 Hour TAT available for select tests only; samples must be submitted by 11:30am. Please call ahead for large projects and/or turnaround times 6 hours or less.</small>			
<b>PLM - Bulk (reporting limit)</b>		<b>TEM - Bulk</b>	
<input checked="" type="checkbox"/> PLM EPA 600/R-93/116 (<1%)		<input type="checkbox"/> TEM EPA NOB - EPA 600/R-93/116 Section 2.5.5.1	
<input type="checkbox"/> PLM EPA NOB (<1%)		<input type="checkbox"/> NY ELAP Method 198.4 non-friable - NY	
Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%)		<input type="checkbox"/> Chatfield Protocol (semi-quantitative)	
Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%)		<input type="checkbox"/> TEM % by Mass - EPA 600/R-93/116 Section 2.5.5.2	
<input type="checkbox"/> NIOSH 9002 (<1%)		<input type="checkbox"/> TEM Qualitative via Filtration Prep Technique	
<input type="checkbox"/> NY ELAP Method 198.1- friable - NY		<input type="checkbox"/> TEM Qualitative via Drop Mount Prep Technique	
<input type="checkbox"/> NY ELAP Method 198.6 NOB- non-friable - NY		<b>Other tests (please specify)</b>	
<input type="checkbox"/> NY ELAP Method 198.8- Vermiculite Surfacing Material			
<input type="checkbox"/> OSHA ID-191 Modified			
<input type="checkbox"/> EMSL Standard Addition Method			
<input type="checkbox"/> Positive Stop - Clearly Identify Homogenous Areas (HA)		Date Sampled: 7-9-20	
Sampler's Name: Joseph Drapala		Sampler's Signature:	
Sample #	HA #	Sample Location	Material Description
		see Attached for sample list	
Client Sample # (s):		Total # of Samples: 46	
Relinquished by (Client):		Date: 7-13-20	Time: 12:00 PM
Received by (Lab):		Date: 7/14/2020	Time: 9:55 AM
<b>Comments/Special Instructions:</b> Bill To: SEMS INC, 11625 South Choctaw Drive, Baton Rouge, LA, 70815, US Attention: Kari Guitreau Phone: 225-924-2002 Email: kguitreau@seminc.net Purchase Order: 1326-0001			

(R) 7709 4087 6787  
1 of 1

3269



## Chain of Custody Asbestos Lab Services

EMSL Analytical Inc.

18369 Petroleum Drive  
Baton Rouge, LA  
70809  
Phone (225) 755-1920  
Fax (225) 755-1989  
[http:// www.emsl.com](http://www.emsl.com)

Client sample # (s): AR-660-0001 to 0046

Total samples #: 46

Relinquished: Joseph Drapala

Date: 7/13/2020 Time: 1700 FedEx

Received: [Signature]

Date: 7/14/2020 Time: 9:55am


Relinquished: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Received: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Sample Number	Sample Description/Location	Volume (if applicable)
AR-660-0001	Wood Grain Patterned Flooring	
AR-660-0002	Wood Grain Patterned Flooring	
AR-660-0003	Base Cove and Mastic	
AR-660-0004	12" Tan Floor Tile	
AR-660-0005	12" Tan Floor Tile	
AR-660-0006	12" Brown Floor Tile	
AR-660-0007	Drywall Mud	
AR-660-0008	Drywall Mud	
AR-660-0009	Perimeter Wall Texture Finish	
AR-660-0010	Perimeter Wall Texture Finish	
AR-660-0011	Drywall Mud	
AR-660-0012	2'x2' Ceiling Panel	
AR-660-0013	HVAC Duct Mastic	
AR-660-0014	HVAC Duct Mastic	
AR-660-0015	12" Sand Patterned Floor Tile	
AR-660-0016	12" Sand Patterned Floor Tile	
AR-660-0017	Base Cove and Mastic	
AR-660-0018	2'x2' Ceiling Panel	
AR-660-0019	Drywall Mud	
AR-660-0020	12" Tan Floor Tile	
AR-660-0021	12" Tan Floor Tile	
AR-660-0022	12" Off-White Floor Tile	
AR-660-0023	12" Off-White Floor Tile	
AR-660-0024	Pipe Joint TSI (old)	
AR-660-0025	Pipe Insulation with joint compound	
AR-660-0026	2'x2' Ceiling Panel	
AR-660-0027	12" Sand Patterned Floor Tile	
AR-660-0028	12" Sand Patterned Floor Tile	
AR-660-0029	12" Gray Floor Tile	
AR-660-0030	12" Gray Floor Tile	

Sample Number	Sample Description/Location	Volume (if applicable)
AR-660-0031	Pipe Joint TSI (old)	
AR-660-0032	Pipe Joint TSI (old)	
AR-660-0033	Drywall Mud	
AR-660-0034	2'x2' Ceiling Panel	
AR-660-0035	Perimeter Wall Texture Finish	
AR-660-0036	Drywall Mud	
AR-660-0037	12" Brown Floor Tile	
AR-660-0038	12" Sand Patterned Floor Tile	
AR-660-0039	Drywall Mud	
AR-660-0040	Base Cove and Mastic	
AR-660-0041	2'x2' Ceiling Panel	
AR-660-0042	Drywall Mud	
AR-660-0043	Drywall Mud	
AR-660-0044	12" Sand Patterned Floor Tile	
AR-660-0045	Drywall Mud	
AR-660-0046	Base Cove and Mastic	
Relinquished:  Joseph Drapala Date: 7/13/2020 Time: 1700 FedEx		

Page 3



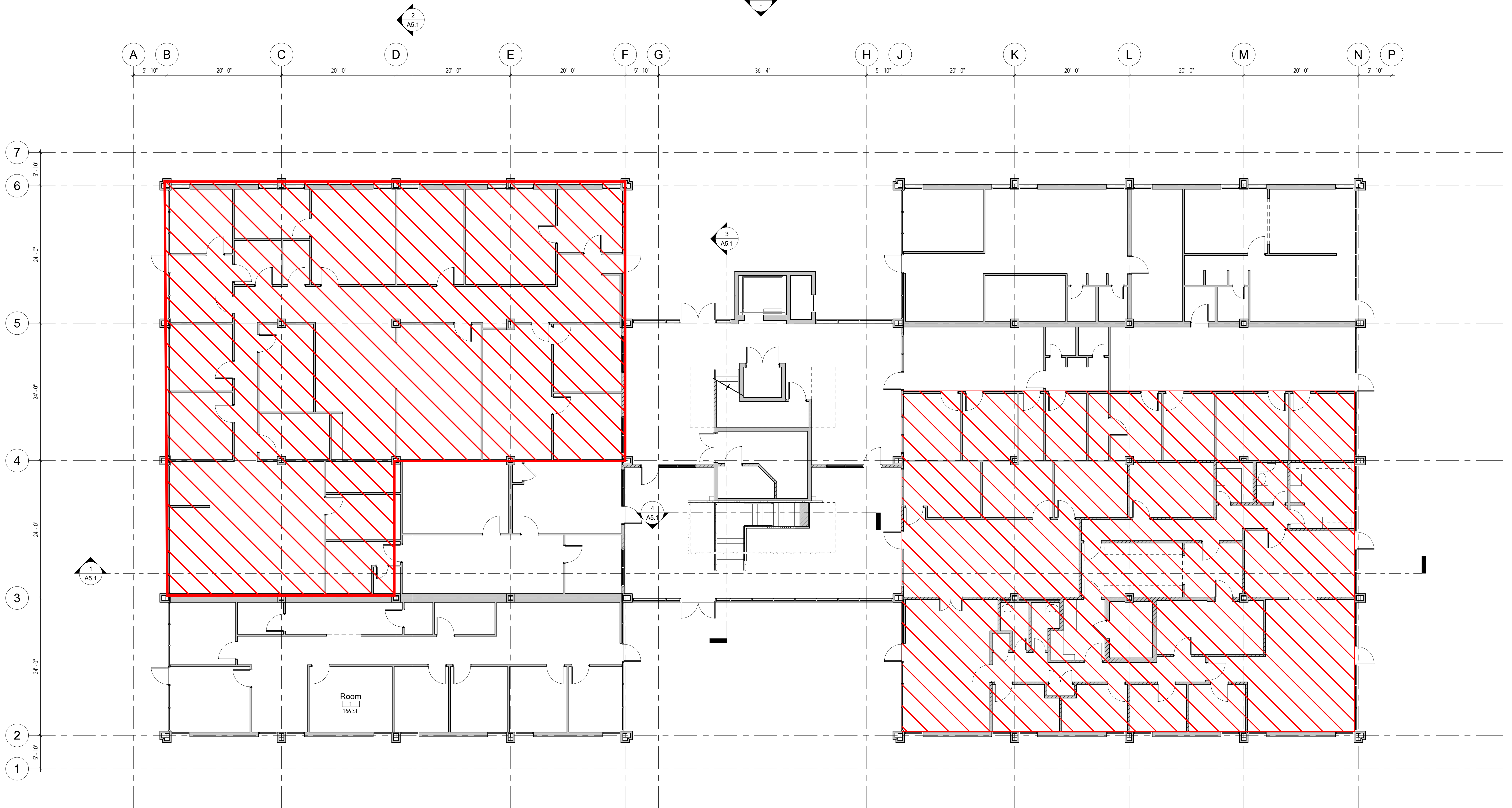
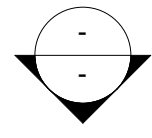
**APPENDIX C**

**SCHEMATIC FLOOR PLAN: ACM LOCATION**



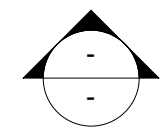


EAST ELEVATION (EXISTING)



Drywall mud on interior surfaces in the hatched areas were determined to be Asbestos Containing Materials

WEST ELEVATION (EXISTING)







**A REPORT FOR A MATERIALS SURVEY  
FOR  
LEAD-BASED PAINT AND LEAD-CONTAINING MATERIALS  
OF THE  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET  
JACKSON, MISSISSIPPI**

Requested by:

**ALBERT AND ROBINSON ARCHITECTS PLLC  
514 MAIN STREET  
HATTIESBURG, MS 39401**

For

**MS DEPARTMENT OF FINANCE AND ADMINISTRATION  
501 NORTH WEST STREET, #1201a  
Jackson, Mississippi**

Prepared on:

August 4, 2020

**SEMS Project #1326-0001.2**

Prepared by:  
Joseph M. Drapala, CIH, CIHH, CIEC  
Industrial Hygiene Manager

	160 Upton Drive Jackson, MS 39209		601.922.0766		info@semsinc.net www.semsinc.net
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**A REPORT FOR  
A MATERIALS SURVEY  
FOR  
LEAD-BASED PAINT AND LEAD-CONTAINING MATERIALS  
OF THE**

**STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET  
JACKSON, MISSISSIPPI**

Requested by:

**ALBERT AND ROBINSON ARCHITECTS PLLC  
514 MAIN STREET  
HATTIESBURG, MS 39401**

For

**MISSISSIPPI DEPARTMENT OF FINANCE AND ADMINISTRATION  
501 NORTH WEST STREET, #1201a  
Jackson, Mississippi**

Prepared by:



**Southern Environmental Management & Specialties, Inc.**  
160 Upton Drive  
Jackson, Mississippi 39236-6485  
(601) 922-0766

**SEMS, Inc.** Report No. 1326-0001.2  
August 2020

## TABLE OF CONTENTS

	<u>Page</u>
<b>EXECUTIVE SUMMARY .....</b>	<b>ii</b>
<b>1.0 PURPOSE AND SCOPE OF SERVICES.....</b>	<b>1</b>
<b>2.0 SITE DESCRIPTION .....</b>	<b>2</b>
2.1 General.....	2
<b>3.0 DISCUSSION OF SAMPLING RESULTS.....</b>	<b>3</b>
3.1 Lead-Based Paint and Lead-Containing Materials.....	3
<b>4.0 SUMMARY OF RECOMMENDATIONS.....</b>	<b>4</b>
<b>5.0 QUALIFYING STATEMENT.....</b>	<b>5</b>

### APPENDICES:

Appendix A:	Professional Credentials
Appendix B:	XRF Lead-Based Paint Readings
Appendix C:	Schematic Floor Plan: Lead-Containing Materials Location

## EXECUTIVE SUMMARY

**Southern Environmental Management and Specialties, Inc. (SEMS)** was retained by Albert and Robinson Architects PLLC, Hattiesburg, Mississippi, on behalf of Mississippi Department of Finance and Administration, Jackson, Mississippi, to conduct a facility survey to identify and sample suspected Lead-Based Paint and Lead-Containing Materials (LCM) in the interior of 660 North Street, Jackson, Mississippi.

An Innov-X Systems X-Ray Fluorescence (XRF) multi-spectrum analyzer was utilized to test painted surfaces and Lead-Containing Materials (LCM) within the designed project area. The assessment was conducted on July 10, 2020 by Joseph M. Drapala, CIH, Mississippi Certified Lead Inspector (License No. PBI-00004078). Please refer to Appendix B, XRF Lead-Based Paint Readings, for multiple point readings.

### **Summary of Findings**

The following summary of findings is based on the results from the XRF and field investigation:

<b>Location</b>	<b>Component</b>	<b>Substrate</b>	<b>Color</b>	<b>LPB Concentration</b>	<b>Comment</b>
Suite 100C Parole Board West Hall	Wall Panel	Wood	Stain	0.03	Lead Containing Material (LCM)
Suite 100C Parole Board West Hall	Wall Panel	Wood	Stain	0.07	LCM

**EXECUTIVE SUMMARY  
(Continued)**

<b>Location</b>	<b>Component</b>	<b>Substrate</b>	<b>Color</b>	<b>LPB Concentration</b>	<b>Comment</b>
Suite 100C Parole Board West Hall	Wall Panel	Wood	Stain	0.03	LCM
Suite 100C Parole Board West Hall	Wall Panel	Wood	Stain	0.14	LCM
Suite 100C Parole Board West Hall	Wall Panel	Wood	Stain	0.16	LCM
Suite 100C Parole Board West Hall	Wall Panel	Wood	Stain	0.11	LCM
Suite 100C Parole Board West Hall	Wall Panel	Wood	Stain	0.11	LCM
Suite 100C Parole Board West Hall	Door Casing	Wood	Brown	0.02	LCM
Suite 100C Parole Board West Hall	Door Casing	Wood	Brown	0.02	LCM
Suite 100C Parole Board West Hall	Door Casing	Wood	Brown	0.03	LCM
Suite 100C Parole Board West Hall	Door Casing	Wood	Brown	0.01	LCM
Suite 100C Parole Board West Hall	Door Casing	Wood	Brown	0.03	LCM
Suite 100C Parole Board West Hall	Door Casing	Wood	Brown	0.02	LCM
Suite 100C Parole Board West Hall	Door Casing	Wood	Brown	0.02	LCM
Suite 100C Parole Board West Hall	Door Casing	Wood	Brown	0.03	LCM
Suite 100C Parole Board West Hall	Door Casing	Wood	Brown	0.16	LCM

**EXECUTIVE SUMMARY  
(Continued)**

<b>Location</b>	<b>Component</b>	<b>Substrate</b>	<b>Color</b>	<b>LPB Concentration</b>	<b>Comment</b>
Suite 100C Parole Board West Hall	Door Casing	Wood	Brown	0.19	LCM
Suite 100C Parole Board West Hall	Door Casing	Wood	Brown	0.28	LCM
Suite 100C Parole Board West Hall	Door Casing	Wood	Brown	0.01	LCM

Lead-Containing Materials (LCM) are materials where lead was detected below the Lead-Based Paint definition of 1.0 mg/cm<sup>2</sup>.

**Inspection Report Limitations**

**This inspection report shall not be used as a substitute for lead abatement specifications and are not to be used in formal bid documents as a specification. A specific Division for Lead Abatement should accompany this inspection report in formal bid documentation.**

**Lead-Based Paint**

The results of the XRF readings did indicate the presence of Lead-Based Paint (LBP) with concentrations above the Housing and Urban Development (HUD) standard of 1.0 mg/cm<sup>2</sup>. Trace amounts of lead were present in the several locations that were less than 1.0 mg/cm<sup>2</sup>. It should be noted that OSHA General Industry Standard 29 CFR 1910.1025 and Construction Industry Standard 29 CFR 1926.62, for Lead, may affect construction



## **EXECUTIVE SUMMARY (Continued)**

workers who disturb lead-containing materials during demolition or renovation activities. OSHA requires contractors to implement means of controlling release of construction dust and debris that may contain lead during renovation or demolition activities. Please refer to Appendix B, XRF Lead-Based Paint Readings, for multiple point readings.

### **Summary of Recommendations:**

The following recommendations are made concerning the building materials located at the State of Mississippi Office Building, 660 North Street, Jackson, Mississippi.

1. **SEMS** recommends that all personnel performing work in Suite 100C, Mississippi Parole Board Offices, on the lead-containing materials be made aware of the presence of lead and to implement the Occupational Safety and Health Administration (OSHA) safety measures. OSHA regulation 29 CFR 1910.1025 and 29 CFR 1926.62 establishes protection guidelines for workers who may be exposed to airborne lead, including a permissible exposure limit (PEL) for airborne lead particles averaged over an eight (8)-hour time-weighted average (TWA) period. OSHA has identified manual demolition of structures with lead content as a potential health hazard in the Construction Safety and Health Outreach Program.
2. **SEMS** recommends that once a waste stream for LCM is established that the generated waste be analyzed by Toxicity Characterization Leaching Procedure (TCLP) to establish if the waste is non-hazardous or hazardous and requirements for proper disposal as established by 40 CFR 260 through 264.
3. **SEMS** makes no further recommendations at this time regarding the study site; however, **SEMS** reserves the right to modify our opinion should additional information, not available during the time of this investigation, be presented to **SEMS**.

## 1.0 PURPOSE AND SCOPE OF SERVICES

**Southern Environmental Management and Specialties, Inc. (SEMS)** was retained by Albert and Robinson Architects PLLC, Hattiesburg, Mississippi, on behalf of Mississippi Department of Finance and Administration, Jackson, Mississippi, to conduct a facility survey to identify and sample suspected Asbestos-Containing Materials (ACM) at 660 North Street, Jackson, Mississippi.

Specifically, the scope of services rendered included the following:

### Scope of Work:

1. Survey for lead-based paint and lead-containing materials in the designated spaces of the project area utilizing the multi-spectrum analyzer.
2. Identify and document location of all homogeneous areas and location of all sampling points to confirm lead-containing coating materials and lead-containing materials
3. Prepare a final report with observations and recommendations relating to the facility conditions identified.

## 2.0 SITE DESCRIPTION

### 2.1 General

**SEMS** conducted a Lead-Based Paint (LBP) Assessment for Albert and Robinson Architects PLLC, Hattiesburg, Mississippi, on behalf of Mississippi Department of Finance and Administration, Jackson, Mississippi, to conduct a facility survey to identify and sample suspected Lead-Containing Materials (LCM) at 660 North Street, Jackson, Mississippi. The LBP Assessment was conducted by Joseph M. Drapala, CIH, Mississippi Certified Lead Inspector (License No. PBI-00004078).

An Innov-X Systems X-Ray Fluorescence (XRF) multi-spectrum analyzer was utilized to test painted surfaces and Lead-Containing Materials within the designed project area. Please refer to Appendix B, XRF Lead-Based Paint Readings, for multiple point readings.

### 3.0 DISCUSSION OF SAMPLING RESULTS

#### 3.1 Lead-Based Paint and Lead-Containing Materials

The results of the XRF readings did indicate the presence of Lead-Based Paint with concentrations above the Housing and Urban Development (HUD) standard of 1.0 mg/cm<sup>2</sup>. However, Lead-Containing Materials (LCM) below the HUD definition were identified on materials in Suite 100 C. Please refer to Appendix B, XRF Lead-Based Paint Readings, for multiple point readings.

#### 4.0 SUMMARY OF RECOMMENDATIONS

The following recommendations are made regarding the findings presented in this report:

1. **SEMS** recommends that all personnel performing work in Suite 100C, Mississippi Parole Board Offices, on the lead-containing materials be made aware of the presence of lead and to implement the Occupational Safety and Health Administration (OSHA) safety measures. OSHA regulation 29 CFR 1910.1025 and 29 CFR 1926.62 establishes protection guidelines for workers who may be exposed to airborne lead, including a permissible exposure limit (PEL) for airborne lead particles averaged over an eight (8)-hour time-weighted average (TWA) period. OSHA has identified manual demolition of structures with lead content as a potential health hazard in the Construction Safety and Health Outreach Program.
2. **SEMS** recommends that once a waste stream for LBP is established that the generated waste be analyzed by Toxicity Characterization Leaching Procedure (TCLP) to establish if the waste is non-hazardous or hazardous and requirements for proper disposal as established by 40 CFR 260 through 264
3. **SEMS** makes no further recommendations at this time regarding the study site; however, **SEMS** reserves the right to modify our opinion should additional information, not available during the time of this investigation, be presented to **SEMS**.

## 5.0 QUALIFYING STATEMENT

**SEMS** has prepared this report for the exclusive use of the client. The report and its analytical results, findings, conclusions, and recommendations either in part or in its entirety are not to be used or relied on by any other party without prior consent by **SEMS, the Client or assigns**. The report format is proprietary to **SEMS**, having been designed, developed, and prepared by **SEMS** at great expense and the information is secret, confidential, unique, and constitutes the exclusive property of **SEMS** and shall not be used by any third party without the prior written consent of **SEMS**. Any use thereof, other than the sole benefit of **SEMS** or the client, shall be deemed wrongful and will cause irreparable injury to **SEMS**.

**SEMS** presents the findings, conclusions, and recommendations, therein, which are based solely on the conditions observed during the inspection and analytical results. The client should be aware that methodologies, results, conclusions, recommendations, and any remediation protocol to be written are based partially upon decisions made by the client concerning the extent of project work to be conducted, and are the results of a limited sampling program conducted on a specific date(s). A different sampling program or samples taken at another time may have resulted in different conclusions, recommendations, and protocols. Additionally, **SEMS** does not make any representation or projection as to past conditions or future exposures and does not extend its findings to areas outside of the statistical representation of the completed investigation.

**APPENDIX A**  
**PROFESSIONAL CREDENTIALS**

## PROFESSIONAL RESUME

**NAME:** Joseph M. Drapala, CIH, CHMM, CIEC

**TITLE:** Industrial Hygiene Manager

**EDUCATION:** B.S. – Mechanical Engineering  
Mississippi State University

**SPECIALIZED TRAINING:** OSHA 40-Hour Health and Safety  
OSHA 40-Hour Hazardous Waste Operations and Emergency Response  
EPA/AHERA Asbestos Inspector (Mississippi)  
EPA/AHERA Asbestos Management Planning (Mississippi)  
EPA/AHERA Asbestos Project Design (Mississippi)  
Fundamentals of Dispersion Modeling  
Indoor Air Quality / Bio-Aerosols  
OSHA 10 and 30-Hour General Industry Outreach Program  
Radiation Safety  
Comprehensive Industrial Hygiene Review  
Quantitative Industrial Hygiene  
Basic Hazardous Material Transportation Training  
AHIA Management Certification Program  
Infectious Diseases and the Role of the Industrial Hygienist in  
Preventing and Managing the Coming Epidemic  
Roles of OEHS Professionals in Pandemic and Avian Influenza  
AIHce 2009 Media Training Workshop

**CERTIFICATIONS:** American Board of Industrial Hygiene, Certified Industrial Hygienist (No. 9068CP)  
Certified Hazardous Material Manager (No. 5181)  
Council-Certified Indoor Environmental Consultant (No. 0512009)  
Council-Certified Microbial Consultant (No. 0708038)  
Mississippi Certified Asbestos Inspector  
Mississippi Certified Project Designer  
Mississippi Certified Management Planner  
Mississippi Certified Lead Inspector

**AFFILIATIONS:** American Industrial Hygiene Association (Full Member)  
Academy of Industrial Hygiene (Diplomat)  
American Council for Accreditation Certification (Certification Board)  
Institute of Certified Hazardous Materials Managers



## PROFESSIONAL RESUME (Continued)

**Joseph M. Drapala, CIH, CHMM, CIEC, CMC**, is a Certified Industrial Hygienist (CIH), Certified Hazardous Materials Manager (CHMM), Certified Indoor Environmental Consultant (CIEC) and a Certified Microbial Consultant (CMC). Mr. Drapala has over 26 years of experience in environmental health and safety consulting. This includes compliance and permitting for federal and state environmental regulations, conducting employee exposure assessments regarding OSHA employee safety regulations, emergency response and indoor air quality investigations, remediation and renovation designs concerning asbestos, lead paint, hazardous materials, and biological contamination. He has conducted investigations for federal, state, and local governmental agencies, institutions of higher learning, and private concerns, as well as AHERA Inspections and planning management for various school districts throughout the Southeast. Mr. Drapala has developed training materials and presented Industrial Hygiene and Indoor Air Quality seminars for various professional industries, such as insurance adjusters, real estate brokers and appraisers, and professional engineers. Additionally, Mr. Drapala provides expert witness and assistance for trial preparation to attorneys involving indoor air quality (IAQ) and industrial hygiene (IH) litigation. He has written articles and materials for IAQ education seminars with emphasis on molds and bioaerosol exposures.

Mr. Drapala currently serves as a Certification Board Member for the American Council for Accreditation Certification (formerly the American Indoor Air Quality Council).

### **SELECTED PROJECT EXPERIENCE:**

**PROJECT MANAGER:** Development and Implementation of an Asbestos Abatement of Residential Quarters, Veterans Administration Medical Center, Mississippi. Designed specifications and provided project management to abate asbestos materials for the interior and exterior of seven (7) residential quarters. Abatement included contaminated soil, thermal system insulation, and surfacing materials.

**PROJECT DESIGNER:** Asbestos Abatement Specifications for Asbestos-Containing Materials, Various Federal, State, and Local Clients, Mississippi. Responsibilities involved developing project specifications and drawings for the abatement of asbestos-containing materials (ACM) from each site. Duties also included pre-qualifications review of contractors, supervision of abatement projects, industrial hygiene monitoring of air quality before, during, and after abatement work.

**PROJECT MANAGER:** Asbestos Surveys, Abatement Design and Construction Supervision, United States Postal Service, Mississippi, Louisiana, Arkansas, and Texas. Abatement design included specifications of replacement material in abatement area. Conducted quality control air monitoring. Work was conducted in occupied facilities while maintaining full Postal Service operations.



**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS**



**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Cal Check							%		
7/10/2020	Lead Paint	660 North Street		Calibration	--	---	1.11	mg/cm2	NIST Check - Interim Result	
7/10/2020	Lead Paint	660 North Street		Calibration	--	---	1.13	mg/cm2	NIST Check - Interim Result	
7/10/2020	Lead Paint	660 North Street		Calibration	--	---	1.13	mg/cm2	NIST Check - Interim Result	
7/10/2020	Lead Paint						1.12	mg/cm2	NIST Check - Passed	
7/10/2020	Lead Paint	660 North Street	100c	Wall	Concrete	Gray	0	mg/cm2	Negative	texture
7/10/2020	Lead Paint	660 North Street	100c	Wall	Concrete	White	0	mg/cm2	Negative	texture
7/10/2020	Lead Paint	660 North Street	100c	Wall	Concrete	White	0	mg/cm2	Negative	texture
7/10/2020	Lead Paint	660 North Street	100c	Wall	Concrete	White	0	mg/cm2	Negative	texture
7/10/2020	Lead Paint	660 North Street	100c	Wall	Concrete	White	0	mg/cm2	Negative	texture
7/10/2020	Lead Paint	660 North Street	100c	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Crown Molding	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Crown Molding	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c hall	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c hall	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c hall	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c hall	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c hall	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c hall	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c c113	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c c113	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c rr	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c rr	Wall	Drywall	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c rr	--	Metal	Tan	0	mg/cm2	Negative	

**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Lead Paint	660 North Street	100c rr	--	Metal	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door System	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Door System	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Window Casing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Window Casing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Window Casing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c	Window Casing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c break	Cabinet	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c break	Cabinet	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c break	Cabinet	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c break	Cabinet	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100c break	Cabinet	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Painted wallpaper	Tan	0	mg/cm2	Negative	

**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Lead Paint	660 North Street	104	Wall	Painted wallpaper	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104 conf	Wall	Drywall	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104 conf	Wall	Drywall	Lt Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104 conf	Cabinet	Wood	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104 conf	Cabinet	Wood	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104 conf	Cabinet	Wood	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	--	Metal	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Painted wallpaper	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Painted wallpaper	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Painted wallpaper	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Painted wallpaper	Tan	0.01	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Painted wallpaper	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Painted wallpaper	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Concrete	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	White	0	mg/cm2	Negative	fresh paint
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	White	0	mg/cm2	Negative	fresh paint
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	White	0	mg/cm2	Negative	fresh paint
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	White	0	mg/cm2	Negative	fresh paint
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	White	0	mg/cm2	Negative	fresh paint
7/10/2020	Lead Paint	660 North Street	104	Wall	Drywall	White	0	mg/cm2	Negative	fresh paint
7/10/2020	Lead Paint	660 North Street	104	Door Casing	Wood	Off-white	0	mg/cm2	Negative	fresh paint
7/10/2020	Lead Paint	660 North Street	104	Door Casing	Wood	Off-white	0	mg/cm2	Negative	fresh paint
7/10/2020	Lead Paint	660 North Street	104	Door Casing	Wood	Off-white	0	mg/cm2	Negative	fresh paint

**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Lead Paint	660 North Street	104	Door Casing	Wood	Off-white	0	mg/cm2	Negative	fresh paint
7/10/2020	Lead Paint	660 North Street	104	Door Casing	Wood	Off-white	0	mg/cm2	Negative	fresh paint
7/10/2020	Lead Paint	660 North Street	104	Door	Wood	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Door	Wood	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Door	Wood	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Window Casing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Window Casing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Window Casing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Door System	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Door System	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Door System	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Door System	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Door System	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	104	Door System	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b hall	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b hall	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b hall	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b hall	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b hall	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b hall	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b hall	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b offices	Crown Molding	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b offices	Crown Molding	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100b offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	





**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Wood	Stain	0.03	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Wood	Stain	0.14	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Wood	Stain	0.16	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Wood	Stain	0.11	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Wood	Stain	0.11	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0.02	mg/cm2	Negative	West Side Only

**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0.02	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0.03	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0.01	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0.03	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0.02	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0.02	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0.03	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0.16	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0.19	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0.28	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0.01	mg/cm2	Negative	West Side Only
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	White	0	mg/cm2	Negative	

**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door Casing	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door System	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door System	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door System	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Cabinet	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Cabinet	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Cabinet	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Cabinet	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Cabinet	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Door	Wood	Stain	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Crown Molding	Wood	Brown	0.02	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Crown Molding	Wood	Brown	0.01	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Crown Molding	Wood	Brown	0.01	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Concrete	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	100a parole	Wall	Concrete	White	0	mg/cm2	Negative	
7/10/2020	Cal Check							%		
7/10/2020	Cal Check							%		
7/10/2020	Lead Paint	660 North Street	100a parole	Calibration	--	---	1.12	mg/cm2	NIST Check - Interim Result	
7/10/2020	Lead Paint	660 North Street	100a parole	Calibration	--	---	1.15	mg/cm2	NIST Check - Interim Result	
7/10/2020	Lead Paint	660 North Street	100a parole	Calibration	--	---	1.16	mg/cm2	NIST Check - Interim Result	
7/10/2020	Lead Paint						1.14	mg/cm2	NIST Check - Passed	

**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Lead Paint	660 North Street	300	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 rr	Wall	Tile	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 rr	Wall	Tile	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 rr	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 rr	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 rr	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Wall	Drywall	Tan	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	

**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Lead Paint	660 North Street	300 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	300 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door System	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door System	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door System	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door System	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door System	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door System	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door System	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door System	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door System	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400 office	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400 office	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400 office	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400 office	Wall	Drywall	Off-white	0	mg/cm2	Negative	

**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Lead Paint	660 North Street	PE board 400 office	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400 office	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400 office	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400 office	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400 office	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	PE board 400 rr	Wall	Tile	Tan	0	mg/cm2	Negative	
7/10/2020	Cal Check							%		
7/10/2020	Cal Check							%		
7/10/2020	Lead Paint	660 North Street		Calibration	--	---	1.1	mg/cm2	T Check - Interim Result	
7/10/2020	Lead Paint	660 North Street		Calibration	--	---	1.1	mg/cm2	T Check - Interim Result	
7/10/2020	Lead Paint	660 North Street		Calibration	--	---	1.12	mg/cm2	T Check - Interim Result	
7/10/2020	Lead Paint						1.11	mg/cm2	NIST Check - Passed	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	

**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	



**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door Casing	Wood	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 offices	Door	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 hall	Cabinet	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 hall	Cabinet	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 hall	Cabinet	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 hall	Cabinet	Wood	White	0	mg/cm2	Negative	

**APPENDIX B**

**XRF LEAD-BASED PAINT READINGS  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET, JACKSON, MISSISSIPPI**

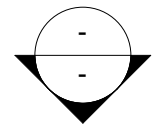
Date	Mode	Project/Site	Location	Component	Substrate	Color	LPB Concentration	Unit	LBP Result	Notes
7/10/2020	Lead Paint	660 North Street	VA 200 hall	Cabinet	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 hall	Cabinet	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 hall	Cabinet	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 break	Cabinet	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 break	Cabinet	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 break	Cabinet	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	VA 200 break	Cabinet	Wood	White	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Stairway Railing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Stairway Railing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Stairway Railing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Stairway Railing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Wall	Drywall	Off-white	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Window Casing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Window Casing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Window Casing	Metal	Brown	0	mg/cm2	Negative	
7/10/2020	Lead Paint	660 North Street	Main lobby	Wall	Concrete	White	0	mg/cm2	Negative	Texture
7/10/2020	Lead Paint	660 North Street	Main lobby	Wall	Concrete	White	0	mg/cm2	Negative	Texture
7/10/2020	Lead Paint	660 North Street	Main lobby	Wall	Concrete	White	0	mg/cm2	Negative	Texture
7/10/2020	Lead Paint	660 North Street		Calibration	--	---	1.13	mg/cm2	NIST Check - Interim Result	
7/10/2020	Lead Paint	660 North Street		Calibration	--	---	1.12	mg/cm2	NIST Check - Interim Result	
7/10/2020	Lead Paint	660 North Street		Calibration	--	---	1.13	mg/cm2	NIST Check - Interim Result	
7/10/2020	Lead Paint						1.13	mg/cm2	NIST Check - Passed	
7/10/2020	Cal Check							%		

**APPENDIX C**

**SCHEMATIC FLOOR PLAN: LEAD-CONTAINING MATERIALS LOCATION**

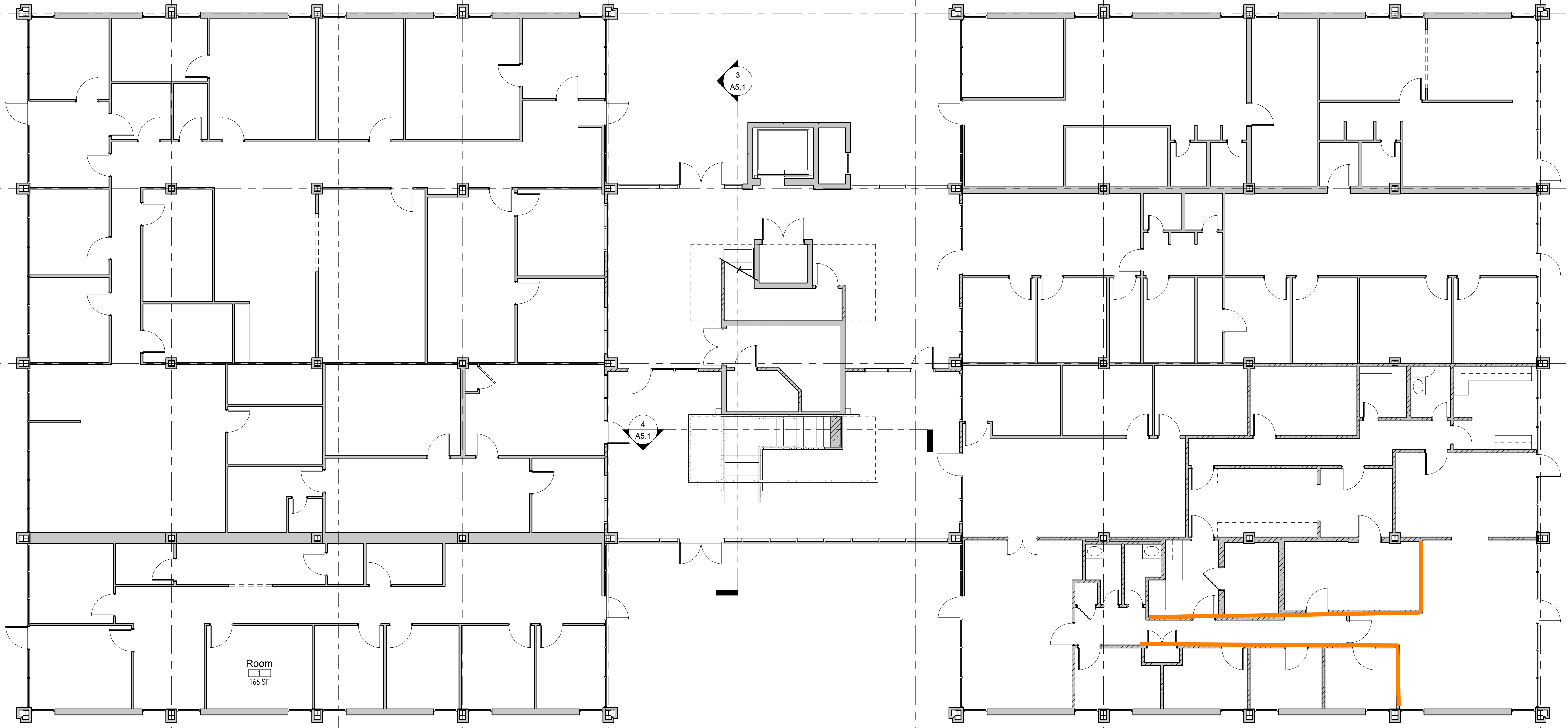


EAST ELEVATION (EXISTING)



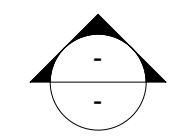
A B C D E F G H J K L M N P  
5'-10" 20'-0" 20'-0" 20'-0" 20'-0" 5'-10" 36'-4" 5'-10" 20'-0" 20'-0" 20'-0" 20'-0" 5'-10"

7  
6  
5  
4  
3  
2  
1  
5'-10" 24'-0" 24'-0" 24'-0" 24'-0" 24'-0" 5'-10"



Wood Panel on walls marked above are Lead Containing Material below 1.0 mg/cm<sup>2</sup>

WEST ELEVATION (EXISTING)







**A REPORT FOR A QUALITATIVE ASSESSMENT  
FOR  
HAZARDOUS MATERIALS AND UNIVERSAL WASTE  
AND ENVIRONMENTAL CONDITIONS  
OF THE  
STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET  
JACKSON, MISSISSIPPI**

Requested by:

**ALBERT AND ROBINSON ARCHITECTS PLLC  
514 MAIN STREET  
HATTIESBURG, MS 39401**

For

**MS DEPARTMENT OF FINANCE AND ADMINISTRATION  
501 NORTH WEST STREET, #1201a  
Jackson, Mississippi**

Prepared on:  
August 4, 2020

**SEMS Project #1326-0001.3**

Prepared by:  
Joseph M. Drapala, CIH, CIHH, CIEC  
Industrial Hygiene Manager

	160 Upton Drive Jackson, MS 39209		601.922.0766		info@semsinc.net www.semsinc.net
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**A REPORT  
FOR  
A QUALITATIVE ASSESSMENT**

**FOR**

**HAZARDOUS MATERIALS AND UNIVERSAL WASTE  
AND ENVIRONMENTAL CONDITIONS**

**OF THE**

**STATE OF MISSISSIPPI OFFICE BUILDING  
660 NORTH STREET  
JACKSON, MISSISSIPPI**

Requested by:

**ALBERT AND ROBINSON ARCHITECTS PLLC  
514 MAIN STREET  
HATTIESBURG, MS 39401**

For

**MISSISSIPPI DEPARTMENT OF FINANCE AND ADMINISTRATION  
501 NORTH WEST STREET, #1201a  
Jackson, Mississippi**

Prepared by:



**Southern Environmental Management & Specialties, Inc.**

160 Upton Drive  
Jackson, Mississippi 39236-6485  
(601) 922-0766

**SEMS, Inc.** Report No. 1326-0001.3  
August 2020



## TABLE OF CONTENTS

	<u>Page</u>
<b>EXECUTIVE SUMMARY .....</b>	<b>ii</b>
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
1.1 Hazardous Materials.....	1
1.2 Universal Waste .....	2
<b>2.0 PURPOSE AND SCOPE OF SERVICES.....</b>	<b>6</b>
<b>3.0 SITE DESCRIPTION .....</b>	<b>7</b>
3.1 General.....	7
<b>4.0 DISCUSSION OF FINDINGS .....</b>	<b>8</b>
4.1 Hazardous Materials.....	8
4.2 Universal Waste .....	8
<b>5.0 SUMMARY OF RECOMMENDATIONS.....</b>	<b>9</b>
<b>6.0 QUALIFYING STATEMENT.....</b>	<b>10</b>

### APPENDICES:

Appendix A: Professional Credentials

## EXECUTIVE SUMMARY

**Southern Environmental Management and Specialties, Inc. (SEMS)** was retained by Albert and Robinson Architects PLLC, Hattiesburg, Mississippi, on behalf of Mississippi Department of Finance and Administration, Jackson, Mississippi, to conduct a Qualitative Assessment for potentially hazardous waste and universal waste and environmental conditions identified at the State of Mississippi Office Building, 660 North Street, Jackson, Mississippi.

**SEMS** conducted the Qualitative Assessment on July 9, 2020 to identify potential hazardous materials and/or universal waste and environmental conditions that may impact planned renovation/demolition activities at the facility. The Qualitative Assessment was conducted by Joseph M. Drapala, CIH, CHMM, CIEC.

**This report presents the Findings and Recommendations of the Qualitative Assessment for Hazardous Materials and Universal Waste and Environmental Conditions.**

### **Summary of Findings:**

The following summary of findings is based upon the results from the facility visual survey:

### **Hazardous Waste and Universal Waste and Environmental Conditions**

1. **SEMS** did not observe areas of chemical/hazardous materials storage in the form of bulk containers in the projected demolition areas.

2. **SEMS** did not observe any batteries that would be subject to universal waste regulations as defined in Title 40 CFR 273.9.
3. **SEMS** observed lamps as defined as a universal waste. The common universal waste lamps were noted throughout the facility included standard fluorescent lighting units. These units potentially contain mercury and appear to be in good condition.
4. **SEMS** did not observe any pesticides that would be subject to universal waste regulations as defined in Title 40 CFR 273.9.
5. **SEMS** did not observe zone control thermostats that would be subject to universal waste regulations as defined in Title 40 CFR 273.9.

#### **Summary of Recommendations:**

The following recommendations are made concerning universal waste and environmental conditions identified at the State of Mississippi Office Building, 660 North Street, Jackson, Mississippi.

1. **SEMS** recommends that any fluorescent lights and ballasts be removed from the area and disposed in accordance with universal waste management and disposal policies.
2. **SEMS** makes no further recommendations at this time regarding the study site; however, **SEMS** reserves the right to modify our opinion should additional information, not available during the time of this investigation, be presented to **SEMS**.

## 1.0 INTRODUCTION

**Southern Environmental Management and Specialties, Inc. (SEMS)** was retained by Albert and Robinson Architects PLLC, Hattiesburg, Mississippi, on behalf of the Mississippi Department of Finance and Administration, Jackson, Mississippi, to conduct a Qualitative Assessment for potentially hazardous waste and universal waste and environmental conditions identified for the interior of the State of Mississippi Office Building at 660 North Street, Jackson, Mississippi.

### **Background:**

As background information and an introduction into the qualitative survey proposed for the subject facility, the following sections describe **Hazardous Materials and the Universal Waste Rule (UWR) and the relationship with hazardous waste typically handled by the Resource Conservation and Recovery Act (RCRA).**

#### 1.1 Hazardous Materials

Hazardous materials pose hazards and risks to humans, animals, and the environment and can be any substance or material that could adversely affect the safety of the public, handlers or carriers. Hazardous material professionals are responsible for and properly qualified to manage such materials at any point in their life-cycle, from process planning and development of new products; through manufacture, distribution, and use; and cleanup, remediation, and disposal. Hazardous materials are defined and regulated in

the United States primarily by laws and regulations administered by the U.S. Environmental Protection Agency (EPA), the U.S. Occupational Safety and Health Administration (OSHA), the U.S. Department of Transportation (DOT), and the U.S. Nuclear Regulatory Commission (NRC). Each has its own definition of a "hazardous material."

OSHA's definition includes any substance or chemical which is a "health hazard" or "physical hazard," including: chemicals which are carcinogens, toxic agents, irritants, corrosives, sensitizers; agents which act on the hematopoietic system; agents which damage the lungs, skin, eyes, or mucous membranes; chemicals which are combustible, explosive, flammable, oxidizers, pyrophorics, unstable-reactive or water-reactive; and chemicals which in the course of normal handling, use, or storage may produce or release dusts, gases, fumes, vapors, mists or smoke which may have any of the previously mentioned characteristics. (Full definitions can be found at 29 Code of Federal Regulations (CFR) 1910.1200.)

## 1.2 Universal Waste

The Universal Waste Rule (UWR) codified in Title 40 Code of Federal Regulations (CFR) Part 273, "Standards for Universal Waste Management," was promulgated by the Environmental Protection Agency (EPA) on 11 May 1995. The EPA developed the UWR to improve waste management practices of widely generated, low risk Resource

Conservation and Recovery Act (RCRA) hazardous waste. Through streamlined RCRA waste management practices, the EPA intended to develop a system to separate "universal" hazardous waste from the municipal waste stream and ensure proper waste management.

The streamlined management established by the UWR provides relief from the full regulatory aspects of RCRA by simplifying collection and management requirements for universal waste. **In 1995, the EPA designated three types of hazardous waste as universal: batteries, pesticides, and thermostats. In 1999, the EPA added lamps to the list of universal waste and in 2005 EPA added Mercury-containing equipment which means a device or part of a device (including thermostats but excluding batteries and lamps) that contains elemental mercury integral to its function.**

Although the UWR is less stringent than RCRA, EPA believes the rule encourages resource conservation and improves the implementation of RCRA. EPA developed the rule to facilitate and expand collection of universal waste and hopes the rule will encourage unregulated entities to participate, further diverting these wastes from the municipal solid waste stream.

The following is the current list and definition of Universal Waste:

**a. Batteries**

A battery is defined in Title 40 CFR 273.9, "Definitions," as a device designed to receive, store, and deliver electric energy that consists of one or more electrically connected electrochemical cells. The term also includes an intact, unbroken battery from which the electrolyte has been removed. In short, many kinds/types of batteries are covered under the universal waste regulations as long as they are hazardous waste. Spent lead-acid batteries, which are managed under Title 40 CFR Part 266, Subpart G, "Spent Lead-Acid Batteries Being Reclaimed," are exempt from universal waste regulations. However, if spent lead-acid batteries are not managed under Title 40 CFR Part 266, Subpart G, then they are subject to management under universal waste regulations.

**b. Lamps**

A lamp is defined as "the bulb or tube portion of an electric lighting device." Examples of common universal waste lamps include spent fluorescent, high intensity discharge, neon, mercury vapor, high pressure sodium, and metal halide lamps. As of 6 January 2000, any spent or waste lamp that is hazardous or exhibits one of the hazardous waste characteristics identified in Title 40 CFR Part 261, "Identification and Listing of Hazardous Wastes," is subject to regulation as a universal waste.

**c. Pesticides**

A pesticide means "any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest, or intended for use as a plant regulator, defoliant, or desiccant, other than animal drugs and feeds. Therefore, any unused pesticide products that are collected and managed as part of a waste pesticide collection/recall program mandated by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), or a voluntary recall program, are subject to management under universal waste regulations. [Note: Recalled pesticides managed by farmers in compliance with Title 40 CFR Part 262, "Standards Applicable to Generators of Hazardous Wastes," Subpart G, "Farmers," are not subject to regulation as a universal waste.]

**d. Mercury-Containing Equipment**

Mercury-containing equipment means a device or part of a device (including thermostats but excluding batteries and lamps) that contains elemental mercury integral to its function. A thermostat means "a temperature control device that contains metallic mercury in an

ampule attached to a bimetal sensing element, and mercury-containing ampules that have been removed from these temperature control devices." A thermostat becomes a solid waste on the date it is discarded, at which time the generator must determine if the thermostat exhibits any hazardous waste characteristic: ignitability, corrosivity, reactivity, or toxicity. If thermostats are not waste, or are not determined to be hazardous wastes, they are not subject to universal waste regulations.



## 2.0 PURPOSE AND SCOPE OF SERVICES

**SEMS** proposed to conduct a Qualitative Assessment to identify potentially hazardous waste, universal waste and environmental conditions located of the interior of the State of Mississippi Office Building, 660 North Street, Jackson, Mississippi.

**Specifically, the scope of services rendered for this project included the following:**

Scope of Work:

1. Conduct a Qualitative Assessment to identify potentially hazardous waste and universal waste and environmental conditions that may impact planned renovation and/or demolition activities.
2. Review all field, survey, and analytical data (if available) to provide a comprehensive facility assessment.
3. Prepare a final report with observations and recommendations relating to the qualitative assessment.

### 3.0 SITE DESCRIPTION

#### 3.1 General

**SEMS** conducted a Hazardous Material and Universal Waste and Environmental Conditions Qualitative Assessment of the interior of 660 North Street, Jackson, Mississippi on July 9, 2020. The Qualitative Assessment was conducted by Joseph M. Drapala, CIH, CHMM, CIEC.

## 4.0 DISCUSSION OF FINDINGS

**SEMS** conducted a facility-wide Qualitative Assessment to identify potential **Hazardous Materials, Universal Waste and Environmental Conditions** that may have an impact on planned renovation and/or demolition activities. The Findings are discussed below:

### 4.1 Hazardous Materials

**SEMS** conducted a limited survey to identify hazardous materials or areas with environmental concerns. The following materials and concerns were identified:

1. **SEMS** did not observe areas of chemical/hazardous materials storage in the form of bulk containers in the projected renovation areas.

### 4.2 Universal Waste

1. **SEMS** did not observe any batteries that would be subject to universal waste regulations as defined in Title 40 CFR 273.9.
2. **SEMS** observed lamps as defined as a universal waste. The common universal waste lamps were noted throughout the facility included standard fluorescent lighting units. These units potentially contain mercury and appear to be in good condition.
3. **SEMS** did not observe any pesticides that would be subject to universal waste regulations as defined in Title 40 CFR 273.9.
4. **SEMS** did not observe zone control thermostats that would be subject to universal waste regulations as defined in Title 40 CFR 273.9

## 5.0 SUMMARY OF RECOMMENDATIONS

### Summary of Recommendations:

The following recommendations are made concerning universal waste and environmental conditions identified for the interior of 660 North Street, Jackson, Mississippi

1. **SEMS** recommends any fluorescent lights and ballasts removed from the area and disposed in accordance with universal waste management and disposal policies.
2. **SEMS** makes no further recommendations at this time regarding the study site; however, **SEMS** reserves the right to modify our opinion should additional information, not available during the time of this investigation, be presented to **SEMS**.

## 6.0 QUALIFYING STATEMENT

**SEMS** has prepared this report for the exclusive use of the client. The report and its analytical results, findings, conclusions, and recommendations either in part or in its entirety are not to be used or relied on by any other party without prior consent by **SEMS, the Client or assigns**. The report format is proprietary to **SEMS**, having been designed, developed, and prepared by **SEMS** at great expense and the information is secret, confidential, unique, and constitutes the exclusive property of **SEMS** and shall not be used by any third party without the prior written consent of **SEMS**. Any use thereof, other than the sole benefit of **SEMS** or the client, shall be deemed wrongful and will cause irreparable injury to **SEMS**.

**SEMS** presents the findings, conclusions and recommendations, therein, which are based solely on the conditions observed during the inspection and analytical results. The client should be aware that methodologies, results, conclusions, recommendations, and any remediation protocol to be written are based partially upon decisions made by the client concerning the extent of project work to be conducted and are the results of a limited sampling program conducted on a specific date(s). A different sampling program or samples taken at another time may have resulted in different conclusions, recommendations, and protocols. Additionally, **SEMS** does not make any representation or projection as to past conditions or future exposures and does not extend its findings to areas outside of the statistical representation of the completed investigation.



**APPENDIX A**  
**PROFESSIONAL CREDENTIALS**

## PROFESSIONAL RESUME

**NAME:** Joseph M. Drapala, CIH, CHMM, CIEC

**TITLE:** Industrial Hygiene Manager

**EDUCATION:** B.S. – Mechanical Engineering  
Mississippi State University

**SPECIALIZED TRAINING:** OSHA 40-Hour Health and Safety  
OSHA 40-Hour Hazardous Waste Operations and Emergency Response  
EPA/AHERA Asbestos Inspector (Mississippi)  
EPA/AHERA Asbestos Management Planning (Mississippi)  
EPA/AHERA Asbestos Project Design (Mississippi)  
Fundamentals of Dispersion Modeling  
Indoor Air Quality / Bio-Aerosols  
OSHA 10 and 30-Hour General Industry Outreach Program  
Radiation Safety  
Comprehensive Industrial Hygiene Review  
Quantitative Industrial Hygiene  
Basic Hazardous Material Transportation Training  
AHIA Management Certification Program  
Infectious Diseases and the Role of the Industrial Hygienist in  
Preventing and Managing the Coming Epidemic  
Roles of OEHS Professionals in Pandemic and Avian Influenza  
AIHce 2009 Media Training Workshop

**CERTIFICATIONS:** American Board of Industrial Hygiene, Certified Industrial Hygienist (No. 9068CP)  
Certified Hazardous Material Manager (No. 5181)  
Council-Certified Indoor Environmental Consultant (No. 0512009)  
Council-Certified Microbial Consultant (No. 0708038)  
Mississippi Certified Asbestos Inspector  
Mississippi Certified Project Designer  
Mississippi Certified Management Planner  
Mississippi Certified Lead Inspector

**AFFILIATIONS:** American Industrial Hygiene Association (Full Member)  
Academy of Industrial Hygiene (Diplomat)  
American Council for Accreditation Certification (Certification Board)  
Institute of Certified Hazardous Materials Managers



**PROFESSIONAL RESUME: Joseph M. Drapala, CIH, CHMM, CIEC (Continued)**

**Joseph M. Drapala, CIH, CHMM, CIEC, CMC**, is a Certified Industrial Hygienist (CIH), Certified Hazardous Materials Manager (CHMM), Certified Indoor Environmental Consultant (CIEC) and a Certified Microbial Consultant (CMC). Mr. Drapala has over 26 years of experience in environmental health and safety consulting. This includes compliance and permitting for federal and state environmental regulations, conducting employee exposure assessments regarding OSHA employee safety regulations, emergency response and indoor air quality investigations, remediation and renovation designs concerning asbestos, lead paint, hazardous materials and biological contamination. He has conducted investigations for federal, state, and local governmental agencies, institutions of higher learning, and private concerns, as well as AHERA Inspections and planning management for various school districts throughout the Southeast. Mr. Drapala has developed training materials and presented Industrial Hygiene and Indoor Air Quality seminars for various professional industries, such as insurance adjusters, real estate brokers and appraisers, and professional engineers. Additionally, Mr. Drapala provides expert witness and assistance for trial preparation to attorneys involving indoor air quality (IAQ) and industrial hygiene (IH) litigation. He has written articles and materials for IAQ education seminars with emphasis on molds and bioaerosol exposures.

Mr. Drapala currently serves as a Certification Board Member for the American Council for Accreditation Certification (formerly the American Indoor Air Quality Council).

**SELECTED PROJECT EXPERIENCE:**

**PROJECT MANAGER:** Development and Implementation of an Asbestos Abatement of Residential Quarters, Veterans Administration Medical Center, Mississippi. Designed specifications and provided project management to abate asbestos materials for the interior and exterior of seven (7) residential quarters. Abatement included contaminated soil, thermal system insulation, and surfacing materials.

**PROJECT DESIGNER:** Asbestos Abatement Specifications for Asbestos-Containing Materials, Various Federal, State, and Local Clients, Mississippi. Responsibilities involved developing project specifications and drawings for the abatement of asbestos-containing materials (ACM) from each site. Duties also included pre-qualifications review of contractors, supervision of abatement projects, industrial hygiene monitoring of air quality before, during, and after abatement work.

**PROJECT MANAGER:** Asbestos Surveys, Abatement Design and Construction Supervision, United States Postal Service, Mississippi, Louisiana, Arkansas, and Texas. Abatement design included specifications of replacement material in abatement area. Conducted quality control air monitoring. Work was conducted in occupied facilities while maintaining full Postal Service operations.

**SECTION 03 05 16  
UNDERSLAB VAPOR BARRIER**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Sheet vapor barrier under concrete slabs on grade.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 10 00 - Concrete Forming and Accessories: Forms and accessories for formwork.
- B. Section 03 20 00 - Concrete Reinforcing.
- C. Section 03 30 00 - Cast-in-Place Concrete: Preparation of subgrade, granular fill, placement of concrete.

**1.03 REFERENCE STANDARDS**

- A. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2011.
- B. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products.
- C. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Underslab Vapor Barrier:
  - 1. Water Vapor Permeance: Not more than 0.010 perms, maximum.
  - 2. Complying with ASTM E1745 Class A.
  - 3. Thickness: 15 mils.
- B. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that surface over which vapor barrier is to be installed is complete and ready before proceeding with installation of vapor barrier.

**3.02 INSTALLATION**

- A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.
- B. Install vapor barrier under interior slabs on grade; lap sheet over footings and seal to foundation walls.
- C. Lap joints minimum 6 inches.
- D. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
- E. No penetration of vapor barrier is allowed except for reinforcing steel and permanent utilities.
- F. Repair damaged vapor retarder before covering with other materials.

**END OF SECTION**

## **SECTION 031000: CONCRETE FORMING AND ACCESSORIES**

### **PART 1 GENERAL**

#### **1.1 RELATED SECTIONS**

- A. Division 01 Sections
- B. Section 032000 - Concrete Reinforcing.
- C. Section 033000 - Cast-in-Place Concrete.

#### **1.2 REFERENCES**

ACI 117 – Standard Specifications for Tolerances for Concrete Construction and Materials.

ACI 301 – Standard Specifications for Structural Concrete.

ACI 318 – Building Code Requirements for Structural Concrete.

ACI 347 – Guide to Formwork for Concrete.

ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials.

ASTM E154 – Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.

ASTM E1643 – Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

ASTM E1745 – Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

ASTM E1993 – Standard Specification for Bituminous Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

ASTM F1249 – Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

#### **1.3 DEFINITIONS**

- A. Architectural Concrete: All concrete members exposed to public view are classified as Architectural Concrete and shall comply with the Architectural Concrete provisions in this specification and ACI 301.

#### **1.4 SUBMITTALS**

- A. Submit manufacturer's data for:
  - 1. Vapor Retarder

#### **1.5 DESIGN OF FORMWORK**

- A. Design of formwork, shoring, and reshoring and its removal is the Contractor's responsibility.
- B. Design of formwork, shoring, and reshoring shall conform to ACI 117, ACI 301, ACI 318, and ACI 347.
- C. Design formwork in a manner such that existing or new construction is not overloaded.

#### **1.6 ARCHITECTURAL CONCRETE MOCK-UP**

- A. Provide a mock-up as shown in the Drawings using the products and practices specified for Architectural Concrete to be reviewed and approved by the Architect.
- B. Mock-up shall be protected for the duration of the construction and will be used as the basis of acceptance for constructed work.

### **PART 2 PRODUCTS**

#### **2.1 FORM MATERIALS**

- A. Form Material: Wood, plywood, metal, fiberglass or a combination of these, with sufficient strength to prevent distortion.
- B. Form Definitions
  - 1. Standard Forms: No form-facing material required. Standard forms are acceptable everywhere except for Architectural Concrete elements.
  - 2. Architectural Concrete Forms: Form-facing material shall be plywood, tempered concrete-form-grade hardboard, metal (unrusted) or plastic that will produce a smooth, uniform texture on the concrete. Do not use form-facing material with raised grain, torn edges, worn edges, patches, dents, or other defects that will impair the texture of the exposed concrete surfaces. Intent is that when the forms are removed, the exposed concrete surfaces will be free from all blemishes. Architectural concrete forms are required for all concrete elements indicated as Architectural Concrete.

#### **2.2 FORMWORK ACCESSORIES**

- A. Formwork Accessories: Commercially manufactured products, including ties and hangers. Do not use nonfabricated wire form ties.

#### **2.3 FORM RELEASE AGENT**

- A. Form release agent shall not bond with, stain, nor adversely affect concrete surfaces.

## **2.4 VAPOR RETARDER**

- A. Vapor Retarder
  - 1. Polyethylene sheet, not less than 10 mils thick, complying with ASTM E1745, Class A, B, and C.
  - 2. Maximum Permeance: ASTM E96: 0.04 perms (US).
  - 3. Seam Tape: High Density Polyethylene Tape with pressure sensitive adhesive; minimum width of 4 inches.
  - 4. Pipe Boots: Construct pipe boots from vapor barrier material and seam tape in accordance with manufacturer's instructions.

## **2.5 EXPANSION / ISOLATION JOINT FILLER**

- A. Expansion / Isolation Joint Filler: ASTM D1751, asphalt impregnated premolded fiberboard, 3/8-inch thick by full thickness of slab or joint, unless indicated otherwise in the Structural Drawings.

## **2.6 CONSTRUCTION JOINTS**

- A. Slabs On Ground: Steel plate dowel (1/4" thick) such as manufactured by PNA Construction Technologies, Inc., Greenstreak Group, Inc., or approved equal.
  - 1. Plate Thickness: 1/4-inch thick for slabs up to 6 inches in thickness; 3/8-inch for slabs over 6 inches and up to 8 inches in thickness; 3/4-inch thick for slabs over 8 inches in thickness and up to 12 inches in thickness.

## **PART 3 EXECUTION**

### **3.1 GENERAL**

- A. Erect formwork in accordance with ACI 301 and ACI 347.
- B. Finished work shall comply with tolerances of ACI 117.
- C. Provide 3/4-inch chamfer at all formed corners.

### **3.2 FOUNDATION ELEMENTS**

- A. Form foundation elements if soil or other conditions are such that earth trench forms are unsuitable.
- B. Sides of perimeter grade beams, foundation walls, and turned-down slabs shall be formed, and earth cuts as forms are not acceptable.
- C. Maintain minimum coverage of reinforcing steel as indicated in Structural Drawings.

### **3.3 VAPOR RETARDER**

- A. Where indicated on Structural Drawings, place vapor retarder over granular subbase and behind expansion / isolation joints at walls. Place electrical conduits and ducts in granular subbase.
- B. Install vapor retarder in accordance with manufacturer's instructions and ASTM E1643.

1. Lap vapor retarder six inches minimum at splices and seal with seam tape.
2. Lap vapor retarder over footings and seal to walls.
3. Seal all pipe penetrations with pipe boot.
4. No penetration of vapor retarder is permitted except for reinforcing steel and permanent utilities.
5. Do not puncture vapor retarder; repair damaged areas by cutting patches of vapor retarder, overlapping damaged area 6 inches and taping all four sides.

- C. Install waterproof and vaporproof membrane in accordance with manufacturer's recommendations.

### **3.4 FORM PREPARATION**

- A. Seal form joints to prevent leakage.
- B. Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed.
- C. Before reinforcement is placed, coat contact surfaces of form with form release agent in accordance with manufacturer's recommendations. Do not allow excess form release agent to accumulate in forms or come in contact with concrete surfaces against which fresh concrete will be placed.

### **3.5 INSERTS AND EMBEDMENT ITEMS**

- A. Install and secure in position required inserts, embeds, hangers, sleeves, anchors, and nailers.
- B. Locate anchor bolts/rods in position in accordance with approved setting drawings and secure to prevent displacement during concrete placement.

### **3.6 PROVISIONS FOR OTHER TRADES**

- A. Install openings in concrete formwork to accommodate work of other trades. Determine size and location of openings and recesses from trades requiring such items. Obtain approval from Structural Engineer for openings not shown in Structural Drawings.
- B. Accurately place and securely support items built into forms.

### **3.7 CONSTRUCTION JOINTS**

- A. Slabs On Ground: Install steel plate dowels in accordance with manufacturer's recommendations. Place plate dowels at mid-depth of slab (+/-1/4-inch), unless noted otherwise in the Structural Drawings.
- B. Framed Construction:
1. Install construction joints in accordance with ACI 318.
  2. Obtain Architect/Structural Engineer's prior approval for use and location of joints.
  3. Provide 1½-inch deep key-type construction joints at end of each placement for framed slabs, beams, walls, and footings. Bevel forms for easy removal.
  4. Remove loose particles and latency from surface prior to placing the next lift. Chip the surface to a depth sufficient to expose sound concrete.

### **3.8 FORMWORK REMOVAL**

- A. Remove formwork carefully in such manner and at such time as to ensure complete safety of structure. Do not remove formwork, shoring, or reshoring until members have acquired sufficient strength to support their weight and the load thereon safely.
- B. For conventionally reinforced framed slabs, formwork shall remain in place for a minimum of 5 days after concrete placement.
- C. For Architectural Concrete elements, remove forms as early as permissible and in such a manner as to not damage exposed surfaces.

### **3.9 FINISHES OF FORMED SURFACES**

- A. Standard Form Finish: Patch tie holes and defects. Chip or rub off fins exceeding ¼ inch in height. Leave surface with the texture imparted by the forms.
- B. Architectural Concrete Finish: Patch tie holes and defects. Remove all fins completely. Produce finish on newly hardened concrete no later than the day following formwork removal. Wet the surface and rub it with carborundum or other abrasive until uniform color and texture are produced. Use no cement grout other than cement paste drawn from the concrete itself by the rubbing process.

**END OF SECTION**





## SECTION 03 15 16

### EXPANSION AND CONSTRUCTION JOINTS

#### PART 1 - GENERAL

##### 1.01 SCOPE

- A. CONTRACTOR shall furnish all labor, materials, equipment, and incidentals required to provide concrete joints as shown and specified.
- B. The types of concrete joints required include the following:
  - 1. Construction joints
  - 2. Expansion joints and fillers
  - 3. Control joints

##### 1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03 30 00 - Cast-in-Place Concrete

##### 1.03 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:
  - 1. ACI 301, "Specifications for Structural Concrete for Buildings", Chapter 6, Joints and Embedded Items.
  - 2. ASTM D 8129, D 1751, D 1752, D 545, D 5249, C 666, and D 4329.
- B. All manufactured items shall be installed in accordance with manufacturer's instructions.

#### PART 2 - PRODUCTS

##### 2.01 MATERIALS

- A. For construction and contraction joints provide a semi-rigid, closed-cell polypropylene foam, preformed joint filler that meets the following physical property requirements and fully complies with ASTM D8139 and equal to NOMAFLEX® by Nomaco, Inc., 501 Innovative Way, Zebulon, NC 27597. Phone (877) 291-1157. Fax (919) 269-7936. Website: [www.nomaco.com/products/construction](http://www.nomaco.com/products/construction).

a.	Compression Strength	30-60 psi	per ASTM D 545 or AASHTO T 42
b.	Compression Recovery	> 80%	per ASTM D 545 or AASHTO T 42
c.	Extrusion	< 0.1 in.	per ASTM D 545 or AASHTO T 42
d.	Density	>3.5 lbs./cu.ft.	per ASTM D 545 or AASHTO T 42
e.	Water Absorption	< 1.0%	per ASTM D 545 or AASHTO T 42
f.	Heat Resistance °F	392°F± 5°F	per ASTM D 5249
g.	Freeze Thaw Resistance	No change	per ASTM C 666
h.	UV Weathering	No change	per ASTM D 4329

- B. Joint sealant shall be a self-leveling polyurethane sealant suitable for industrial Environments and equal to Sonomeric 1 as manufactured by BASF, The Chemical Company.

### **PART 3 - EXECUTION**

#### **3.01 APPLICATION**

- A. In slabs on grade provide control joints at a spacing of approximately 15 feet or as shown on the drawings. All joints shall be installed in accordance with ACI 301, Chapter 6.
- B. Install expansion / isolation joint filler in accordance with manufacturer's instructions.
- C. Position joint filler against forms, against adjacent concrete slabs, at interrupting objects or columns, against abutting structures, and all other locations shown on the drawings before concrete placement.
- D. Contingent on the application, NOMAFLEX® may be installed without fasteners or may be held in place with standard nails, pins or construction grade spray adhesive that is suitable for use with polypropylene materials.
- E. When used without concrete joint sealant, install joint filler at or slightly below the intended concrete surface, screed, and tool the edges to desired finish grade.
- F. Seal with concrete joint sealant. Protect concrete joint sealant from traffic until fully cured.
- G. Provide owner at completion of project with a spare case or five-gallon container of joint sealer used on project.

### **END OF SECTION 03 15 16**

## **SECTION 032000: CONCRETE REINFORCEMENT**

### **PART 1 GENERAL**

#### **1.1 RELATED SECTIONS**

- A. Division 1 Sections
- B. Section 031000 – Concrete Forming and Accessories.
- C. Section 033000 – Cast-in-Place Concrete.

#### **1.2 REFERENCES**

ACI 117 – Standard Specifications for Tolerances for Concrete Construction and Materials.

ACI 301 – Standard Specifications for Structural Concrete.

ACI 315 – Details and Detailing of Concrete Reinforcement.

ACI 318 – Building Code Requirements for Structural Concrete.

ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete Reinforcement.

ASTM A615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

ASTM A706 – Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

AWS D1.4 – Structural Weld Code - Reinforcing Steel.

AWS D12.1 – Recommended Practices for Welding Reinforcing Steel Metal Inserts, and Connections in Reinforced Concrete Construction.

CRSI – Manual of Standard Practice.

#### **1.3 SUBMITTALS**

- A. Refer to Structural Quality Assurance Plan in the Structural Drawings for additional submittal requirements.
- B. Shop Drawings:
  - 1. Notify Structural Engineer prior to detailing reinforcing steel shop drawings.
  - 2. Indicate size, spacing, location and quantities of reinforcing steel and wire fabric, bending and cutting schedules, splice lengths, stirrup spacing, supporting and spacing devices. Detail reinforcing steel in accordance with ACI 315 and CRSI Standards.
  - 3. Written description of reinforcement without adequate sections, elevations, and details is not acceptable.

4. Reproduction of Structural Drawings for shop drawings is not permitted. Electronic drawing files will not be provided to the Contractor.

C. Submit manufacturer's data for tension and compression splicers.

#### **1.4 QUALITY ASSURANCE**

A. Refer to the Structural Quality Assurance Plan in the Structural Drawings.

#### **1.5 STORAGE AND PROTECTING**

A. Store reinforcing steel above ground so that it remains clean. Maintain steel surfaces free from materials and coatings that might impair bond.

### **PART 2 PRODUCTS**

#### **2.1 MATERIALS**

A. Deformed Reinforcing Steel: ASTM A615, refer to Structural Drawings for grade (Grade 60 minimum).

B. Welded Steel Wire Reinforcement: ASTM A1064.

#### **2.2 ACCESSORY MATERIALS**

A. Annealed Steel Tie Wire: 16½ gage minimum.

B. Bar Supports: Plastic-tipped steel Class I bar supports conforming to CRSI Specifications. Concrete brick may be used to support reinforcement to obtain proper clearance from earth.

#### **2.3 SPLICERS**

A. Tension Splicers: Capable of developing 125% of the reinforcing steel ASTM specified minimum yield strength.

B. Compression Splicers: Mechanical type such that the compression stress is transmitted by end bearing held in concentric contact.

#### **2.4 DOWEL ADHESIVE**

A. Adhesive conforming to Simpson AT-XP (IAPMO-UES ER-263), Simpson SET-XP (ICC-ES ESR-2508), DeWalt/Powers Pure110+ (ICC-ES ESR-3298), DeWalt/Powers DeWalt AC200+ Adhesive (ICC-ES ESR-4027), Hilti HIT-HY 200 Safe Set Fast Cure Adhesive (ICC-ES ESR-3187), Hilti HIT-RE 500 V3 SAFE Set Adhesive (ICC-ES ESR-3814). Minimum Embedment = 12 times anchor diameter, UNO.

### **PART 3 EXECUTION**

#### **3.1 FABRICATION**

A. Fabricate reinforcing steel in accordance with ACI 318 and CRSI standards.

- B. Bend bars cold. Do not heat or flame cut bars. No field bending of bars partially embedded in concrete is permitted, unless specifically approved Structural Engineer and checked by Testing and Inspection Agency for cracks.
- C. Weld only as indicated. Perform welding in accordance with AWS D1.4 and AWS D12.1.
- D. Tag reinforcing steel for easy identification.

### **3.2 INSTALLATION**

- A. Before placing concrete, clean reinforcement of foreign particles and coatings.
- B. Place, support, and secure reinforcement against displacement in accordance with ACI 318 and CRSI standards. Do not deviate from alignment or measurement.
- C. Place concrete beam reinforcement support parallel to main reinforcement.
- D. Locate welded wire reinforcement in the top third of slabs. Overlap mesh one lap plus two inches at side and end joints.
- E. Furnish and install dowels or mechanical splices at intersections of walls, columns and piers to permit continuous reinforcement or development lengths at such intersections.
- F. Maintain cover and tolerances in accordance with ACI and CRSI Specifications, unless indicated otherwise on Structural Drawings.

### **3.3 SPLICES**

- A. Do not splice reinforcement except as indicated on Structural Drawings.
- B. Tension couplers may be used and installed in accordance with manufacturer's recommendations.

### **3.4 DOWELS IN EXISTING CONCRETE**

- A. Install dowels and dowel adhesive in accordance with manufacturer's recommendations.
- B. Minimum embedment length into the existing concrete shall be 12 bar diameters, unless noted otherwise.

**END OF SECTION**



## **SECTION 033000: CAST-IN-PLACE CONCRETE**

### **PART 1 GENERAL**

#### **1.1 RELATED SECTIONS**

- A. Division 1 Sections
- B. Section 031000 – Concrete Forming and Accessories.
- C. Section 032000 – Concrete Reinforcement.
- D. Section 036200 – Non-shrink Grout.

#### **1.2 REFERENCES**

- A. The publications listed below form a part of this specification. The publications are referenced to within the text by the basic designation only.

ACI 117 – Standard Specifications for Tolerances for Concrete Construction and Materials.

ACI 301 – Specifications for Structural Concrete.

ACI 305.1 – Specification for Hot Weather Concreting.

ACI 306.1 – Standard Specification for Cold Weather Concreting.

ACI 308.1 – Specification for Curing Concrete.

ACI 311.6 – Specification for Testing Ready Mixed Concrete

ACI 311.7 – Specification for Inspection of Concrete Construction

ACI 318 – Building Code Requirements for Structural Concrete.

ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field.

ASTM C33 – Standard Specification for Concrete Aggregates.

ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

ASTM C94 – Standard Specification for Ready-Mixed Concrete.

ASTM C138 – Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.

ASTM C150 – Standard Specification for Portland Cement.

ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete.

ASTM C173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete.

ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

ASTM C469 – Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression.

ASTM C494 – Standard Specification for Chemical Admixtures for Concrete.

ASTM C595 – Standard Specification for Blended Hydraulic Cements

ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

ASTM C920 – Standard Specification for Elastomeric Joint Sealants

ASTM D994 – Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)

ASTM E1155 – Standard Test Method for Determining  $F_F$  Floor Flatness and  $F_L$  Floor Levelness Numbers.

### 1.3 SUBMITTALS

- A. Refer to Structural Quality Assurance Plan in the Structural Drawings for additional submittal requirements.
- B. Submit the concrete mix designs. Include the following:
  - 1. Documentation of mix design proportions complying with ACI 301.
  - 2. Type and quantities of materials including admixtures
  - 3. Slump
  - 4. Air content
  - 5. Water/cement ratio
  - 6. Fresh unit weight
  - 7. Aggregates sieve analysis
  - 8. Design compressive strength
  - 9. Location of placement in structure
  - 10. Method of placement
  - 11. Method of concrete curing
  - 12. Method of protection of concrete
  - 12. Seven-day and 28-day compressive strengths
- C. Mix design submittals not conforming to the above will be rejected.

### 1.4 QUALITY ASSURANCE

- A. The ready-mixed concrete plant shall be certified for conformance with the requirements of the National Ready Mix Concrete Association.



- B. Refer to the Structural Quality Assurance Plan in the Structural Drawings.
- C. The procedures used in sampling shall include the use of every precaution that will assist in obtaining samples that are truly representative of the nature and condition of concrete sampled.
- D. Concrete sampling shall be performed as the concrete is delivered from the mixer to the conveying vehicle used to transport the concrete to the forms.
- E. Sample the concrete by collecting two or more portions taken at regularly spaced intervals during discharge of the middle portion of the batch. The elapsed time shall not exceed 15 min. between obtaining the first and final portions of the composite sample. Take the samples so obtained within the time limit of 15 min. and combine them into one composite sample for test purposes. In any case do not obtain samples until after all of the water and any admixtures have been added to the mixer. Do not obtain samples from the very first or last portions of the batch discharge. Sample by repeatedly passing a receptacle through the entire discharge stream or by completely diverting the discharge into a sample container. Regulate the rate of discharge of the batch by the rate of revolution of the drum and not by the size of the gate opening.
- F. Start tests for slump, temperature, and air content within 5 min after obtaining the final portion of the composite sample and complete these tests expeditiously. Start molding specimens for strength tests within 15 min. after fabricating the composite sample. Expeditiously obtain and use the sample and protect the sample from the sun, wind, and other sources of rapid evaporation, and from contamination.

## **PART 2 PRODUCTS**

### **2.1 CONCRETE MIX DESIGN**

- A. Establish concrete mix design proportions in accordance with Article 4.2.3 of ACI 301.
- B. Concrete Strength: See Structural Notes in Structural Drawings.
- C. Slump
  - 1. Design concrete with a slump between four and ten inches.
  - 2. If a slump greater than five inches is desired, use a water reducer.
- D. Water/Cementitious Materials Ratio (w/cm): See Structural Notes in Structural Drawings.
- E. Entrained Air Content: See Structural Notes in Structural Drawings.
- F. Fresh Unit Weight
  - 1. Normal weight concrete: Fresh unit weight of 137 to 148 pcf.

### **2.2 MATERIALS**

- A. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
- B. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.

- C. Obtain aggregate from single source.
- D. Obtain each type of admixture from single source from single manufacturer.
- E. Materials designated by specific manufacturer's trade names are approved, subject to compliance with the quality and performance indicated by the manufacturer. Instructions and recommendations, published by the manufacturer of such materials are included in and are a part of these Specifications.

**2.3 CEMENT**

- A. Cement: Type IL Portland Limestone Cement – ASTM C595.

**2.4 FLY ASH**

- A. Fly Ash: Class C or Class F – ASTM C618. When fly ash is used, the quantity shall be a minimum amount of 15 percent and a maximum amount of 25 percent by weight of the total cementitious materials, unless otherwise specified.

**2.5 AGGREGATE**

- A. Fine Aggregate: Fine aggregate complying with ASTM C33. Natural sand is preferred to manufactured sand.
- B. Fine Aggregate in slabs: The gradation of fine aggregate in concrete mix designs for floor slabs shall meet the requirements in the Table below:

Sieve Designation	Percent Passing	
	Normalweight Aggregate	Lightweight Aggregate
3/8 in.	100	100
No. 4	85 to 100	85 to 100
No. 8	80 to 90	–
No. 16	50 to 75	40 to 80
No. 30	30 to 50	30 to 65
No. 50	10 to 20	10 to 35
No. 100	2 to 5	5 to 20

- C. For normalweight concrete, the weight of fine aggregate in the mix proportion shall not exceed 50 percent of the total weight of fine plus coarse aggregate.
- D. Coarse Aggregate: Washed gravel or crushed stone conforming to ASTM C33. When a single size or combinations of two or more sizes of coarse aggregates are used, the final grading shall conform to the grading requirements of ASTM C33, unless otherwise specified or permitted.
  - 1. Unless governed by the maximum size as specified in Section 2 below, the largest practical-size coarse aggregate shall be used. Except for topping slabs 3-in. thick or less the largest size of coarse aggregate in normalweight concrete shall be a nominal 3/4-in. and the largest size of coarse aggregate in lightweight concrete shall be a nominal 1/2-in. For topping slabs that are 3-in. thick or less the maximum size of coarse aggregate shall be 3/8 inch.

2. The nominal maximum size of coarse aggregate shall not exceed three-fourths of the minimum clear spacing between reinforcing bars, one-fifth of the narrowest dimension between sides of forms, or one-third of the thickness of slabs or toppings.

## **2.6 WATER**

- A. Water: Potable water

## **2.7 AIR ENTRAINING AGENT**

- A. Air Entraining Agent: Air entraining agent shall conform with ASTM C260. For normalweight concrete air entrainment shall not be used in flatwork to receive a hard steel-troweled finish.

## **2.8 WATER REDUCER**

- A. Water Reducer: Water reducing agent shall conform with ASTM C494.

## **2.9 ACCELERATORS**

- A. Accelerators: Non-chloride accelerators shall conform with ASTM C494.

## **2.10 RETARDERS**

- A. Retarders: Retarders shall conform with ASTM C494.

## **2.11 CHLORIDE**

- A. Chlorides: Chlorides of any form shall not be used in concrete.

## **2.12 CURING COMPOUND**

- A. Curing Compound: A water-based, VOC-compliant concrete curing agent, hardener, and dustproofer that complies with ASTM C309. The curing agent shall be residue-free and contains no wax, resin, or other materials that would inhibit the bond of subsequent coatings and/or treatments. An example of a curing compound that meets this specification is Med-Cure by W.R. Meadows. Coordinate curing compound with flooring supplier to ensure compatibility.

# **PART 3 EXECUTION**

## **3.1 GENERAL**

- A. Prepare place of deposit, mix, convey, and place in accordance with ACI 301 and ACI 304. If concrete is pumped, use a 5-inch minimum hose diameter, except for placement of metal pan stair treads where a 2-inch minimum hose is permitted.
- B. Wet forms before placing concrete.
- C. Deposit concrete continuously and as near as practical to final position.
- D. Deposit concrete in one layer or in multiple layers. Do not place fresh concrete against concrete that would result in cold joints.

- E. Do no flowing of concrete with vibrators.
- F. Do not place concrete over columns or walls until concrete in columns and walls has reached final setting.
- G. For cast-in-place floor systems place concrete for beams, girders, brackets, column capitals, haunches, and drop panels at same time as concrete for adjacent slabs.
- H. Place and finish concrete members to comply with tolerances in ACI 117.
- I. Do not use aluminum equipment in placing and finishing concrete.
- J. Normalweight concrete for slabs to receive a hard-troweled finish shall not contain an air-entraining admixture or have a total air content greater than 3 percent.

### **3.2 SLABS-ON-GROUND**

- A. Place concrete for slabs-on-ground on properly prepared granular subbase with vapor barrier.
- B. Place thickened slabs for partitions integral with floor slabs.

### **3.3 ADDITION OF WATER AT JOB SITE**

- A. Water may be added at the jobsite if neither the maximum permissible water/cement ratio nor the maximum slump is exceeded. All concrete delivery trucks will have actual batch weight tickets available that clearly indicate the quantity of water that may be added at the jobsite that will not exceed the maximum water/cement ratio.

### **3.4 TIME LIMIT**

- A. Deposit concrete within one and one-half hours after batching.

### **3.5 VIBRATION**

- A. Consolidate concrete by vibration. Consolidate concrete around reinforcement, embedded items, and into corners of forms. Use immersion-type vibrators with nonmetallic heads for consolidating concrete around epoxy-coated or zinc and epoxy dual-coated reinforcing bars.
- B. Do not use vibrators to move concrete in a manner that will result in segregation.
- C. Spacing of immersion vibrator insertions shall not exceed 1-1/2 times the vibrator's radius of action in concrete being consolidated.

### **3.6 WEATHER PROVISIONS**

- A. Do not place concrete while rain, sleet, or snow is falling unless protection is provided. Do not allow precipitation to increase mixing water or to damage concrete surface.
- B. Perform cold weather concreting in accordance with ACI 306. Concrete temperatures at delivery shall meet the requirements of Section 4 in ACI 301. Do not place concrete in contact with surfaces less than 35°F. Unless otherwise specified, this requirement shall not apply to reinforcing steel.

- C. Perform hot weather concreting in accordance with ACI 305. Unless otherwise specified, concrete temperature as placed shall meet the requirements of Section 4 of ACI 301. If temperature of reinforcement, embedments, or forms is greater than 120°F, use a fine mist of water to moisten and cool hot surfaces. Remove standing water before placing concrete.
- D. Protect concrete from drying and excessive temperature for the first seven days. Protect fresh concrete from wind.

### **3.7 CONTRACTION JOINTS**

- A. Obtain Architect/Structural Engineer's approval for location of contraction joints. Do not use contraction joints in framed floors or composite slabs, unless noted in Structural Drawings.
- B. Unless noted otherwise in the architectural or structural drawings, provide contraction joints in slabs-on-ground to form a regular grid with a maximum spacing as noted in the Structural Drawings. The long dimension of the grid shall not exceed 1.5 times the short dimension of the grid. Contraction joints may be saw cut if cut within 24 hours after placement of concrete. Saw cuts shall be a depth equal to one-fourth the slab thickness by one-eighth inch wide. Alternately, contraction joints may be provided by preformed plastic strip inserts.
- C. Provide contraction joints in concrete walls at a maximum spacing of 20-ft. centers, or as noted in the Structural Drawings; coordinate location with Architect. Contraction joints shall be formed as a V-groove on both faces of the wall, 3/4-inch minimum depth.

### **3.8 EXPANSION JOINTS IN CONCRETE WALLS**

- A. Cantilevered and gravity concrete walls shall have a 1/2-in. expansion joint at a spacing not to exceed 60-ft. on center.
- B. The expansion joint shall contain a waterstop and be filled with premolded joint filler.
- C. The expansion joint in the wall shall not continue through the footing.

### **3.9 CONSTRUCTION JOINTS**

- A. Obtain Architect/Structural Engineer's approval for location of construction joints.
- B. Remove laitance and thoroughly clean and dampen construction joints before placement of fresh concrete.
- C. Unless specified in the drawings, locate and detail construction joints to following requirements:
  - 1. Locate construction joints within middle third of spans of slabs, beams, and girders. When a beam intersects a girder within this region, offset joint in girder a distance equal to or greater than twice width of beam;
  - 2. Locate joints in walls and columns at underside of slabs, beams, or girders and at tops of footings or slabs; and
  - 3. Make joints perpendicular to main reinforcement.
- D. Provide keyways where indicated in the Construction Documents. Unless otherwise specified, longitudinal keyways indicated in Contract Documents shall be a minimum of 1-1/2 in. deep in joints in walls and between walls and slabs or footings.

- E. Provide construction, expansion, and contraction joints where indicated in Contract Documents. Submit for acceptance details and locations of construction, expansion, and contraction joints differing from those indicated in Contract Documents.
- F. Design formwork to accommodate waterstop materials. Locate waterstop in construction joints where indicated in Contract Documents. Use waterstop with a maximum practical length to create minimum number of splices.
- G. Use an approved bonding agent applied in accordance with the manufacturer's requirements or portland-cement grout of the same proportions as the mortar in the concrete; or roughen the surface in an approved manner that exposes coarse aggregate and does not leave laitance, loosened aggregate particles, or damaged concrete at surface.

### 3.10 CONCRETE FINISHES

- A. Finish Concrete in accordance with ACI 301.
- B. After form removal, give each formed surface the specified finish. If the Architectural and Structural drawings do not specify a finish, provide a SF-1.0 finish on concrete surfaces not exposed to view and a SF-2.0 finish on concrete surfaces exposed to view.
  - Surface Finish 1.0 (SF1.0)
    - 1. No formwork facing material is specified
    - 2. Patch voids larger than 1-1/2 in. wide or 1/2 in. deep
    - 3. Remove projections larger than 1 in.
    - 4. Tie holes need not be patched
    - 5. Surface tolerance Class D as specified in ACI 117
    - 6. Mockup not required
  - Surface Finish 2.0 (SF2.0)
    - 1. Patch voids larger than 3/4 in. wide or 1/2 in. deep
    - 2. Remove projections larger than 1/4 in.
    - 3. Patch tie holes
    - 5. Surface tolerance Class B as specified in ACI 117
    - 6. Unless otherwise specified, provide mockup of concrete surface appearance and texture
- C. If a Rubbed Finish is specified in the Architectural or Structural drawings, produce the smooth-rubbed finish no later than the day following formwork removal. Wet the surface and rub it with an abrasive such as carborundum brick until uniform color and texture are produced. If insufficient cement paste can be drawn from the concrete itself by the rubbing process, use a grout made with cementitious materials from the same sources as used for in-place concrete.
- D. If a finish is not otherwise specified for the unformed surfaces the following finishes shall apply (Refer to Section 5 of ACI 301 for requirements of each finish):
  - 1. Scratch finish—For surfaces intended to receive bonded cementitious or setting beds
  - 2. Float finish—For walks; steps; and for surfaces intended to receive waterproofing, roofing, insulation, or sand-bed terrazzo
  - 3. Trowel finish—For interior floors
  - 4. Broom finish—For parking slabs and exterior surfaces, including slabs, ramps, walkways, and steps, light broom finish for exterior balconies.
- E. Finish slabs to the following flatness and levelness tolerances:

1.  $F_F35/F_L25$  minimum overall for composite of all measured values and  $F_F24/F_L15$  minimum for any individual floor section.
2. Slabs to receive wood flooring:  $F_F45/F_L30$  minimum overall for composite of all measured values and  $F_F30/F_L20$  minimum for any individual floor section.
3. Architect/Structural Engineer will identify which sections of slabs are to be tested for flatness and levelness.
  - a.  $F_L$  values are applicable only if testing is performed within 72 hours of concrete placement, before tensioning of tendons, and before removal of formwork.  $F_L$  values are not applicable to unshored systems.
  - b.  $F_F$  values are applicable to all types of slab construction and are not subject to any time constraints.

### 3.11 CURING

- A. Begin curing procedures in accordance with Section 5 of ACI 301 immediately following the commencement of the finishing operation. If bleed water sheen is not visible on surface of concrete after strikeoff and initial bull floating, provide initial curing by means of fogging or application of evaporation retarder until final curing method is applied. Do not use fogging in cold weather concreting.
- B. After the initial curing outlined in A., apply the curing procedure as specified below. Apply curing in a manner that prevents marring, marking, or discoloration of finished surface. The curing methods below refer to ACI 301 (Specifications for Structural Concrete) and ACI 308.1 (Specification for Curing Concrete). The curing methods below are described in detail in these documents and the provisions of the curing method specified shall be adhered to. In addition, ACI 308 (Guide to External Curing of Concrete) may be used as a reference guide.
- C. Moist cure the unformed surface of all interior concrete slabs in accordance with ACI 301 and ACI 308 using either of the three methods below. The requirements for each of these curing methods can be found in Section 3 of ACI 308. Keep the concrete surface continually moist a minimum of 3 days. Do not allow the surface to dry or undergo cycles of drying and wetting.
  1. Ponding
  2. Sprinkling
  3. Fogging
- D. If the concrete will be exposed with a polished or stained finish use curing water that is free of substances that will stain or discolor concrete. The staining ability of curing water can be evaluated by means of CRD-C 401.
- E. After the 3-day moist cure period, apply a membrane-forming curing compound in accordance with manufacturer's recommendations. The curing compound used must be compatible with all adhesives to be used on the concrete surface. Do not use a curing compound in areas to receive material that does not adhere to concrete cured with a curing compound.
- F. For formed surfaces, unless otherwise specified, if formwork is loosened or removed so that concrete surface is exposed to ambient air less than 7 days from concrete placement continue curing by either continuous fogging, ponding, continuous sprinkling, or a membrane-forming curing compound as described above and in ACI 301 and ACI 308.
- G. Maintain concrete temperature to prevent freezing of concrete and to ensure strength development. Unless otherwise specified, duration of thermal protection shall be at least 3 days.

- H. Maintain curing measures until the concrete has reached a minimum of 70 percent of the specified 28-day strength compressive strength,  $f_c'$ , but not less than 7 days.

### **3.12 CUTTING CONCRETE**

- A. Obtain Architect/Structural Engineer's written approval prior to cutting concrete for installation of other work.

### **3.13 PATCHWORK AND REPAIRS**

- A. Repair tie holes and other surface defects in formed finishes unless otherwise specified. Where the concrete surface will be textured by sandblasting or bush-hammering, repair surface defects before texturing.
- B. Notify Architect/Structural Engineer of any defective areas (other than tie holes) in concrete to be patched or repaired. Unless otherwise specified or permitted, repair surface defects by the following method. Outline repair area with a 1/2 in. deep saw cut and remove defective concrete down to sound concrete. Leave chipped edges perpendicular to the saw-cut surface or slightly undercut. Do not feather edges. Dampen the area to be patched plus 6 in. around the patch area perimeter. Prepare scrub coat mix using one-part portland cement and one-part sand by loose volume with water. Thoroughly brush scrub coat into the surface. When the scrub coat begins to lose water sheen, apply patching mortar (for concrete exposed to view, mortar shall match adjacent concrete color) and thoroughly consolidate mortar into place. Strike off mortar, finishing flush to the final surface. Leave the patch undisturbed for 1 hour before finishing. Keep the patch damp for 7 days.

**END OF SECTION**



## SECTION 03 30 00

### CAST-IN-PLACE CONCRETE

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. Applicable provisions of Instructions to Bidders, General and Supplementary Conditions, govern work under this section.
- B. Related Requirements Specified Elsewhere:
  - 1. Section 31 20 00: Earthwork

##### 1.02 COORDINATION WITH OTHER TRADES

- A. Cooperate in placement of materials with other trades so that required areas of work will be scheduled properly.
- B. Coordinate with other trades in placement of items set in concrete and required for project completion.

##### 1.03 REFERENCE STANDARDS

- A. ACI Manual of Concrete Inspection (report of committee 6-11, 1961) and accompanying references, latest edition.
- B. Building Code Requirements for Reinforced Concrete (ACI 318-71)
- C. Specifications for Structural Concrete for Buildings (ACI 301-72) (revised 1981)
- D. Standard Specifications for Ready-Mixed Concrete (ASTM C-94)
- E. American Society for Testing and Materials (ASTM)
- F. Concrete Reinforcing Steel Institute (CRSI)
- G. National Ready Mixed Concrete Association (NRMCA)
- H. Southern Standard Building Code (SSBC)

##### 1.04 TESTING AND INSPECTION

- A. Access to project: Engineer and Testing Laboratory to have free access to project where materials are being stored proportioned, and deposited.

- B. Testing Laboratory to provide following services: ASTM E329-72
1. Test Portland Cement, one for each carload or fraction thereof, if requested.
  2. Test coarse and fine aggregates.
  3. Design and test all mixes (admixtures included) as established by Contractor; slump test, air content test: ASTM C192 and C-39.
  4. Test a set of at least 4 cylinders for each class of concrete and each days pour and for each 100 cubic yards or fraction thereof each day.
    - a. Cylinders shall be cured and tested in accordance with ASTM C31 and C39
    - b. Two cylinders tested at 7 days
    - c. Second two cylinders tested at 28 days
    - d. If first three cylinders give low breaks, fourth cylinder shall be held for longer period as directed by Engineer.
  5. Furnish test results to Contractor and Engineer:
    - a. Furnish reports, giving date, location and yardage of pour, specific materials, proportions, consistencies, and class of concrete, test cylinder numbers representing pour, prevailing weather conditions.
- C. Storage of Test Cylinders: Furnish protected space for storage of field cylinders which approximates the condition of curing of concrete being sampled.
- D. Enforcement of Strength Requirements:
1. Should "Control" test cylinders fall below nominal strength necessary changes in design mix should be made.
  2. Should "Field" test cylinders fall below nominal strength:
    - a) Additional curing will be required
    - b) Strength will be evaluated in accordance with ASTM C94, Section 15(d)
  3. Should above requirements not give required strength, or in other case where due to faulty workmanship:
    - a) Load tests conforming to Chapter 4 of A.C.I. building code 318-77 will be required.

4. Should above requirements show strength to be inadequate:
  - a) Strengthening or replacement will be required, per Engineer's direction, at Contractor's expense.
5. Should slump and air-content test fall below minimum notify Engineer. Do not pour concrete until Engineer so approves.

#### 1.05 ENVIRONMENTAL CONDITIONS

- A. Do not start or continue pour during rain or snow:
  1. Pour to suitable cut-off point after start of inclement weather.
  2. Increase cement content placed during rain by one sack per cubic yard
- B. Place concrete in temperatures 40 degrees F and above unless otherwise approved.
- C. Maintain minimum concrete temperature of 50 degrees F for 72 hours after completing pour.

### **PART 2 - PRODUCTS**

#### 2.01 CONCRETE MATERIALS

- A. Concrete: Ready mixed type conforming to ASTM C94.
- B. Portland Cement: ASTM C150 (Type 1 1A), passing 3 day test as indicated in ASTM specification.
- C. Air Entrained Portland Cement: ASTM C175, passing 3 day test indicated in ASTM specification.
- D. Lightweight Aggregates for Concrete: ASTM C330.
- E. Coarse Aggregates: not larger than 1/5 narrowest dimension between forms, or slab thickness. Aggregate absorption shall not exceed five percent. No aggregate shall be larger than 1½".
- F. Sand: Clean hard natural sand conforming to ASTM C33.
- G. Water: clean, free from oil, and injurious amounts of acid, alkali, or organic matter.

#### 2.02 FORMS

- A. Conform to ACI 301.
- B. Wood form materials shall be No. 2 common or better lumber, one-side plyform quality. Douglas fir or spruce plywood; sound undamaged sheets.

- C. Steel Forms: Minimum 14 gage thick, stiffened to support weight of concrete with minimum deflection.
- D. Construction: Forms shall have sufficient strength to carry safely the load of concrete with a construction live load of at least 50 pounds per square foot; be stiff enough to prevent any appreciable bulging, sagging or moving out of position; be tight enough to prevent any appreciable loss of mortar; and be arranged so that they can be safely and easily removed without damaging concrete. Construct and erect forms with the fewest practicable number of joints, and to insure straight, plumb, level, and smooth concrete surfaces with all angles sharp and true to line. Use form oil and wetting as required to accomplish these results.
- E. Form ties: Provide suitable metal form ties of a type that no metal will be within one inch on finished concrete surfaces after form removal.

## 2.03 CONCRETE REINFORCING

- A. Reinforcing steel bars: conform to ASTM A615, Grade 60, billet steel deformed bars; uncoated finish.
- B. Ties and stirrups: conforming to ASTM A615, Grade 40 and bend requirements of ACI 318-77.
- C. Welded wire fabric: conform to ASTM-185.
- D. Accessories: Provide standard accessories for supporting, spacing, and tying concrete reinforcement, as recommended by the American Concrete Institute.
- E. Fabricating and placing: Remove oil and loose scale from steel before placing it. Securely tie and support steel to prevent its displacement prior to and during concrete placement. At each bar splice, provide a wire-tied lap 18" or 30 bar diameters long, whichever is greater and stagger splices on adjacent bars. At each fabric splice, lap fabric at least one mesh.

## 2.04 ANCHOR BOLTS

- A. Conform to ASTM A675, Grade 50. Anchor bolts shall be galvanized on all exposed surfaces in accordance with ASTM A153.
- B. Set all anchor bolts by template, rigidly secure the bolts in place to prevent their displacement, and verify all bolt locations before placing concrete, so that the bolt locations in the completed foundations will conform accurately to the bolt setting dimensions indicated on the foundation drawings.

## 2.05 ACCESSORIES

- A. Vapor Barrier: ASTM D2103, 6 mil thick clear polyethylene film.

- B. Non-Shrink Grout: Premixed compound with non-metallic aggregate, cement, water reducing and plasticizing agents; capable of minimum compressive strength of 2400 psi.
- C. Dovetail Anchor Slots: Minimum 22 gage thick galvanized steel; foam filled, release tapes; sealed slots; bent tab anchors.
- D. Expansion Joints:
  - 1. Asphalt impregnated fiberboard conforming to ASTM D1751-60T at interior, ASTM D1752-60T at exterior. Extend joints full depth of slab.
  - 2. Permanent metal expansion joints shall be galvanized, 28 ga., equal to Wheeling Tensiform TF-50.
  - 3. Seal joints with 1/2" x 1/2" Elastomeric Sealant

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION AND PREPARATION**

- A. Clean area to be poured of debris, shavings, excessive sand or sawdust, tie wire, tags, etc.
- B. Remove dirt, scale, etc. from reinforcing.
- C. Check for alignment of forms, location spacing and anchorage of reinforcing
- D. Check location, spacing, and anchorage of reinforcing.
- E. Place no concrete until forming and reinforcement approved by Engineer. Notify Engineer a minimum of 48 hours prior to commencing concreting operations.
- F. Place no concrete until representative of Testing Laboratory is consulted.
- G. Begin no pour until all equipment (vibrators, chutes, walkboards, tremies, etc.) required is on site and checked for operation, and until finishing crew and equipment are on site.

#### **3.02 QUALITY AND PROPORTIONING**

- A. Contractor responsible to design, furnish concrete which will conform to those specified.
- B. Concrete Proportioning:
  - 1. Minimum allowable compressive strength at 28 days: **3500** psi

2. Maximum allowable water per sack of cement:
    - a) Non-air entrained: 6½
    - b) Air-entrained: 5¼
  3. Slump, range in inches: 3 to 5
  4. Minimum sacks of cement per cubic yard: **6**
  5. Water reducing agent (ounces per 100 lbs. of cement): 4
  6. Fly Ash may be used as a partial substitution for Portland Cement in an amount not greater than 25% (by weight) of cement in the concrete mix.
- C. Admixture Proportions:
1. Calcium Chloride shall not be used
  2. Air entraining agent complying with ASTM C260 added accurately to produce entrained air 3-5 percent by volume in all concrete exposed to the weather. Vary admixture as required to produce satisfactory concrete.
- D. Measurement of Materials:
1. Cement measured by half-sack unless cement is weighed for each batch.
  2. Aggregates proportioned separately by weight with proper compensation for moisture.
  3. Water measured by device capable of accurate measurement of one pint.

### 3.03 MIXING CONCRETE

- A. General: Mix concrete by ready-mix or job-mix, at Contractor's option.
- B. Measure accurately material, thoroughly mix by machine. Mix materials dry; adding water by measurement.
- C. Ready-Mixed Concrete: mixed and delivered to project in accordance with ASTM C94.
- D. Concrete shall be mixed with an amount of water as will leave concrete free of standing water on top of slab in forms.
- E. Consistency: Range in slump for concrete shall be 3 to 5 inches.

### 3.04 DEPOSITING CONCRETE

- A. Preparation: Prior to concrete placement remove debris, water, ice from spaces in which concrete is to be poured.
- B. Inspection: Do not place concrete until inspection and approval of Engineer.
- C. Placement: Deposit concrete rapidly from mixer to forms by methods which will prevent segregation of materials and loss of ingredients. Work concrete into corners and surfaces of forms by hand to assure close contact:
  - 1. Maintain location of reinforcement while pouring
  - 2. Work material around steel, into corners and recesses; compact with mechanical vibrator to fill all void spaces.
  - 3. Deposit each successive batch in one continuous layer by a continuous operation. Do not under any circumstances place any concrete which has taken initial set.
  - 4. Deposit concrete as near as practical to its final position, in layers at such a rate that at all times during placing, concrete will be plastic; no pouring planes will occur; and no thin sheets of concrete will adhere and harden on reinforcing and other embedded items before they are embedded in final concrete body.
- D. Time: Ready-mixed concrete in agitator truck shall be deposited within one and one-half hours time from mixer.
- E. Compaction and Vibration: thoroughly compact deposited concrete around reinforcing, embedded fixtures, and into all part of forms and footings. Use mechanical vibrators where necessary. Take precautions not to work concrete to the point of segregation.
- F. Do not cast any large stones, bricks, or pieces of previously hardened concrete into concrete work. Do not place any concrete on frozen ground, mud, topsoil, or other unsuitable material.
- G. Top surface of each pier foundation shall be a level plane and finished top elevations shall not vary more than  $\frac{1}{4}$ " from these specified.

### 3.05 FINISHES

- A. Light broom or belt finish at all exterior walks and slabs.
- B. Abrasive stone rubbed smooth white finish on exposed above ground vertical surfaces.

### 3.06 CURING AND PROTECTION

- A. Curing: (may be accomplished by one or more of the following methods, upon approval)
1. Surface remaining in contact with forms for 7 days or 75% of required compressive strength has been achieved.
  2. Form and shoring removal shall be subject to on site inspector's prior approval. Remove forms carefully and prevent damage to exposed surfaces, corners, and angles. No steel spreader, tie wires, or other metal shall project or be visible on any concrete surface.
  3. Cover surface with polyethylene film, burlap, or other approved coverings lapped 4" at all edges and joints;
  4. Cover surface with 1 inch layer wet sand;
  5. In lieu of water curing, coat floor slab with approved curing and hardening compound conforming to ASTM 309, applied in accordance with manufacturer's recommendations.
  6. Apply water as required to keep forms and coverings saturated continuously throughout the curing period of at least 7 days
- B. Cold Weather Requirements:
1. Provide adequate equipment for protection and hardening of concrete during freezing or near freezing weather.
  2. Concrete to have temperature between 50 degrees and 90 degrees F. maintained for at least 72 hours.
  3. No salt or chemicals to be used to prevent freezing.
  4. Covering used for temporary protection shall remain in place 24 hours once artificial heat is discontinued.
- C. Hot Weather Requirements:
1. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305R-78 (Revised 1982) and as herein specified.
  2. Hot weather is defined as air temperatures which exceed 90°F or any combination of high temperature, low humidity, and/or high wind velocity which causes a rate of evaporation in excess of 0.2 pounds per square foot per hour as determined by Figure 2.1.5 of ACI 305.



3. Concrete ingredients shall be cooled before mixing to prevent concrete placement temperatures from exceeding 90°F.
  4. Provisions shall be made for ice, windbreaks, shading, fog spraying, sprinkling or wet cover when necessary.
  5. Cure place concrete with wet burlap. Keep burlap constantly wet for 7 days minimum.
- D. Admixtures intended to accelerate hardening not permitted unless prior approval is obtained from Engineer.

### 3.07 DEFECTIVE WORK

A. Remove concrete work when:

1. Not formed as indicated;
2. Beyond tolerances: ACI 347, Section 203, latest edition;
3. Not meeting specified strength;
4. Surface excessively defective in the opinion of the Engineer.

B. Patching:

1. Remove form ties, etc.
2. Cut back bulges, projections, honey combs to sound concrete, minimum one and one-half inch (1½").
3. Patch as soon as possible after removal of forms.
4. Clean area to be patched and apply approved bonding agent.
5. Patch with stiff mixture of sand and cement proportioned same as that used in pour, adding white cement as required to match surfaces adjacent to patched area. (Make sample batches to determine color requirements.)
6. Build large areas in one-quarter inch (¼") thick layers, allowing one hour set between layers, bulging last layer slightly, then finish flush with adjacent surfaces.

**END OF SECTION 03 30 00**



**SECTION 03 30 53  
INCIDENTAL CONCRETE**

**PART 1 GENERAL**

**1.01 GENERAL**

- A. The following specifications shall apply to any and all items of incidental work with Portland Cement with or without reinforcement, including such items as concrete piers to support cast iron pipe above ground, erosion control bulkheads or structures, cradles and encasement, blocking and the like.
- B. All concrete used in the construction of this project shall comply with the requirements herein specified for its particular class and kind.

**PART 2 PRODUCTS**

**2.01 PRODUCTS**

- A. All materials used in this work shall consist of Portland Cement, Sand, Gravel, and Clean Water.
  - 1. The cement used shall be domestic manufacture, either "Standard" or "high Early Strength" Portland Cement, which shall meet all the requirements of the current A.S.T.M. Specifications for the type used at the time it is incorporated in the work.
  - 2. The fine aggregate shall consist of clean, sharp sand, well graded from coarse to fine, consisting of hard, durable particles, free from coarse to fine, consisting of hard, durable particles, free from silt, salt or organic matter. It shall meet all the requirements of the A.S.T.M. Specifications C33, Paragraph 1, 2 and 3, and A.S.T.M. C-40.
  - 3. The coarse aggregate used shall consist of clean washed gravel, free from particles of wood or lumps of clay. Not more than 10% shall pass the No. 4 sieve, and it shall conform with the requirements of A.S.T.M. Specifications C33, Paragraph 5 to 8 inclusive.
  - 4. The water used for mixing concrete shall be clear, free from oil, salt, strong acid, alkali organic matter, and shall be approved by the Architect/Engineer.
  - 5. Reinforcing steel shall conform to the requirements of the "Standard Specifications for Billet-Steel Concrete Reinforcing Bars" of intermediate grade (Serial Designation: A 15-39) or the Standard Specifications for Rail-Steel Concrete Reinforcement Bars (Serial Designation; A-16-35) of the American Society for Testing Materials.

**PART 3 EXECUTION**

**3.01 EXECUTION**

- A. All concrete materials shall be so handled and stored that they will not become damaged after delivery at the site. The cement shall be thoroughly protected from the weather, and the sand and gravel shall be so stored that they will not become intermixed, and so as to prevent the admixture with either of any foreign materials. Reinforcing steel shall be so stored that it will not come in contact with the ground, shall be protected from the weather, and shall be clean and free from rust when incorporated in the work.
- B. Concrete materials shall be mixed in the proportions and in a manner that will produce concrete of the class and strength specified to its use.
- C. Unless indicated otherwise, all concrete shall be Class A which shall have a crushing strength of not less than 3,000 pounds per square inch at 28 days, as determined by the Standard Methods for testing concrete materials.
- D. Class B concrete, which shall have a crushing strength of not less than 2,500 pounds per square inch at 28 days, and shall be used for erosion control bulkheads and blocking pipelines at bends to prevent blowing off under pressure.
- E. Class C concrete which shall have a crushing strength of not less than 2,000 pounds per square inch at 28 days, shall be used for cradles and encasement and may be used for backfill below grade.
- F. After concrete has been properly mixed, it shall be deposited in the forms in reasonably uniform layers and in such manner as to prevent segregation of the aggregates. It shall be thoroughly

spaded or puddled while being placed to insure maximum density and prevent honey-combing.

- G. No concrete shall be deposited when the air temperature is less than 40 degrees F. No material shall be deposited on a frozen sub-grade, nor shall any frozen moisture or material be incorporated into the mixture.
- H. No concrete shall be placed in water, nor shall water be permitted to rise on it or to run over it within a period of 24 hours after it has been placed.
- I. Unsatisfactory concrete, resulting from failure to observe the above requirements or otherwise, shall be removed and replaced as directed by the Architect/Engineer.

**END OF SECTION**

**SECTION 03 35 11  
CONCRETE FLOOR FINISHES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete stains and dyes.
- B. Clear coatings.
- C. Color coatings.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Finishing of concrete surface to tolerance; floating, troweling, and similar operations; curing.
- B. Section 09 66 23 - Resinous Matrix Terrazzo Flooring.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with concrete floor placement and concrete floor curing.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.
- C. Maintenance Data: Provide data on maintenance and renewal of applied finishes.
- D. Warranty Documentation: Manufacturer warranty; ensure that forms have been completed in State of Mississippi's name and registered with manufacturer.

**1.05 QUALITY ASSURANCE**

- A. For slabs indicated to receive concrete polishing system, do not proceed with concrete polishing unless manufacturer's representative and specialized equipment is present for every day of placement.

**1.06 MOCK-UP**

- A. For coatings, construct mock-up area under conditions similar to those that will exist during application, with coatings applied.
- B. Mock-Up Size: 10 feet square.
- C. Locate where directed.
- D. Mock-up may remain as part of the work.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in manufacturer's sealed packaging, including application instructions.

**1.08 FIELD CONDITIONS**

- A. Maintain light level equivalent to a minimum 200 W light source at 8 feet above the floor surface over each 20 foot square area of floor being finished.
- B. Do not finish floors until interior heating system is operational.
- C. Maintain ambient temperature of 50 degrees F minimum.

**1.09 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

**PART 2 PRODUCTS**

**2.01 COATINGS**

- A. Concrete Stain or Dye: Translucent, penetrating compound for interior or exterior use; must be finished with a topical sealer.
- B. High Gloss Clear Coating: Transparent, nonyellowing, acrylic polymer-based coating.

03 35 11

Concrete Floor Finishes

PAGE 1 OF 2

1. Composition: Solvent-based.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that floor surfaces are acceptable to receive the work of this section.
- B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.

#### **3.02 GENERAL**

- A. Apply materials in accordance with manufacturer's instructions.

#### **3.03 COATING APPLICATION**

- A. Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- B. Verify that water vapor emission from concrete and relative humidity in concrete are within limits established by coating manufacturer.
- C. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.
- D. Apply coatings in accordance with manufacturer's instructions, matching approved mock-ups for color, special effects, sealing and workmanship.

**END OF SECTION**

**SECTION 03 45 00  
PRECAST ARCHITECTURAL CONCRETE**

**PART 1 – GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This section includes the performance criteria, materials, production, and erection of architectural precast concrete for the entire project. The work performed under this section includes all labor, material, equipment, related services, and supervision required for the manufacture and erection of the architectural precast concrete work shown on the Contract Drawings.
1. **NOTE: ALL ARCHITECTURAL PRECAST CONCRETE REQUIRED FOR THIS PROJECT SHALL BE "PCI ARCHITECTURAL CERTIFICATION CATEGORY AB."**
- B. This Section includes the following:
1. Architectural precast concrete wall panels.
  2. Architectural precast concrete accessories.
  3. Supports, anchors and attachments.
- C. The most current ASTM and ANSI standards for all materials shall govern.
- D. **NOTE: DESIGN OF ARCHITECTURAL PRECAST CONCRETE (APC) AND ITS CONNECTIONS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. SUBMIT SHOP DRAWINGS, DESIGN LOAD DATA, AND SUPPORT REACTIONS OF ARCHITECTURAL PRECAST CONCRETE ELEMENTS AND THEIR CONNECTIONS SEALED BY AN ENGINEER LICENSED IN THE STATE OF MISSISSIPPI.**
- E. **CONNECTIONS NOTE: CONNECTION CONCEPTS ONLY ARE SHOWN IN THE CONTRACT DOCUMENTS (EVEN IF ACTUAL SIZES OF SUPPORT STEEL ARE SHOWN). THE DESIGN AND FREQUENCY OF CONNECTIONS SHALL BE THE RESPONSIBILITY OF THE ARCHITECTURAL PRECAST CONCRETE SUPPLIER AND THE APC DESIGN ENGINEER IN COORDINATION WITH THE PANEL DESIGN ITSELF. SHOP DRAWINGS SHALL ADEQUATELY SHOW THE APC PANEL ATTACHMENT LOCATIONS TO THE STRUCTURE.**

**1.03 DEFINITIONS**

- A. Design Reference Sample: Sample of approved architectural precast concrete color, finish and texture, pre-approved by Architect.
1. **NOTE: DESIGN REFERENCE SAMPLES HAVE BEEN PRODUCED FOR THE PROJECT AND ARE LOCATED AT THE ARCHITECT'S OFFICE FOR VIEWING. THIS PROJECT REQUIRES ARCHITECTURAL PRECAST CONCRETE PANELS OF TWO DIFFERENT COLORS AS INDICATED THROUGHOUT THE DRAWINGS.**

**1.04 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Provide architectural precast concrete units and connections capable of withstanding design loads within limits and under conditions indicated. Loads are indicated on the Structural Drawings.

**1.05 ACTION SUBMITTALS**

- A. Product Data: Manufacturer's information on accessory products, including pigments, admixtures, inserts, plates, etc. Retain quality control records and certificates of compliance for 5 years or period of warranty, whichever is greater.
- B. Design Mixes: For each concrete mix along with compressive strength and water-absorption tests.
- C. Shop (Erection) Drawings:
1. Detail fabrication and installation of architectural precast concrete units.

2. Indicate layout, unit locations, configuration, unit identification marks, reinforcement, connection details, support items, location of lifting devices, plans, elevations, openings, dimensions, shapes and cross sections.
  3. Indicate aesthetic intent, including joints, drips, chamfers, rustications, or reveals, and extent and location of each surface finish.
  4. Indicate separate face and backup mix locations and thicknesses.
  5. Indicate welded connections, using American Welding Society (AWS) standard symbols, and show the size, length, and type of each weld. Detail loose and cast-in hardware and connections.
  6. Indicate locations, tolerances and details of anchorage devices to be embedded in or attached to structure or other construction.
  7. Indicate locations, extent and treatment of dry joints if two-stage casting is proposed.
  8. Indicate plan views and elevations showing unit locations and dimensions, erection sequences, and bracing plans for special conditions.
  9. Indicate location of each architectural precast concrete unit by same identification mark placed on panel.
  10. Indicate relationship of architectural precast concrete units to adjacent materials.
  11. Design Modifications:
    - a. If design modifications are necessary to meet the performance requirements and field conditions, submit design calculations and drawings. Do not adversely affect the appearance, durability or strength of units when modifying details or materials and maintain the general design concept.
  12. Provide comprehensive engineering design, signed and sealed by qualified professional engineer responsible for its preparation and licensed in the jurisdiction in which the project is located. This design shall show governing panel types, connections, concrete cover, and reinforcement types, including special reinforcement if required, and indicate the location, type, magnitude, and direction of loads imposed on the building's structural frame by the architectural precast concrete.
- D. Samples: Submit samples for initial verification of design intent based on information provided in the Drawings, approximately 12 by 12 by 2 inches (300 by 300 by 50 mm), representative of finishes, color and textures of exposed surfaces of architectural precast concrete units.

#### **1.06 INFORMATIONAL SUBMITTALS**

- A. Qualification Data:
  1. Proof from precast concrete fabricator that they are a PCI-certified plant for Category AA or AB in good standing at the time of project bid.
  2. Proof from precast concrete erector that they are a PCI-certified erector for Category A at the time of project bid.
- B. Welding Certificates: Copies of certificates for welding procedure specifications (WPS) and personnel.
- C. Material Test Reports for Aggregates: Reports from an accredited testing agency that interpret test results and indicate compliance with project requirements.
- D. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements.
  1. Cementitious materials.
  2. Reinforcing materials, including prestressing tendons.
  3. Admixtures.
  4. Bearing pads.
  5. Structural-steel shapes and hollow structural-steel sections.
  6. Other components specified in contract documents with applicable standards.
- E. Field quality control test and special inspection reports.
- F. Maintenance Data: Indicate surface cleaning instructions.



### 1.07 QUALITY ASSURANCE

- A. Fabricator Qualifications: Fabricator shall be experienced in producing architectural precast concrete units similar to those indicated for this project, have a record of successful in-service performance, and comply with the following requirements:
  - 1. Participates in PCI's Plant Certification program at the time of bidding and is designated a PCI-certified plant for Category AA or AB.
  - 2. Firm having at least 5 years of documented experience in production of precast concrete of the type required.
  - 3. Has sufficient production capacity to produce required units without delaying the work.
  - 4. Assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of shop (erection) drawings and comprehensive engineering analysis by a qualified professional engineer.
  - 5. Professional engineer qualifications: A professional engineer who is licensed in the jurisdiction where the project is located and who is experienced in providing engineering services of the kind indicated.
- B. Erector Qualifications: A precast concrete erector whose erecting organization and all erecting crews are certified and designated, prior to beginning work at project site, by PCI's Certificate of Compliance to erect Category A (Architectural Systems) for non-load bearing members.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where the Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of architectural precast concrete that are similar to those indicated for this Project in material, design and extent.
- D. Testing Agency Qualifications: An independent testing agency, acceptable to Authorities Having Jurisdiction qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
- E. Design Standards: Comply with the American Concrete Institute's Building Code Requirements for Structural Concrete and Commentary ACI 318 (ACI 318M) and design recommendations of PCI MNL-120, PCI Design Handbook: Precast and Prestressed Concrete, applicable to the types of architectural precast concrete units indicated.
- F. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL-117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products," and "PCI MNL-135, Tolerance Manual for Precast and Prestressed Concrete Construction."
- G. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code – Steel;" AWS D1.4, "Structural Welding Code – Reinforcing Steel;" and AWS D1.6/D1.6M, "Structural Welding Code - Stainless."
- H. Fire Resistance: Where indicated, provide architectural precast concrete units whose fire resistance satisfies the fire resistance ratings of the contract documents; units must also meet the prescriptive fire resistance requirements of the governing code or be calculated according to PCI 124, Specification for Fire Resistance of Precast/Prestressed Concrete, and be acceptable to authorities having jurisdiction
- I. Preinstallation Conference: Conduct conference at Project site one week prior to commencing work in this section.

### 1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Store units with adequate dunnage and bracing and protect units to prevent contact with soil, staining, and to prevent cracking, distortion, warping or other physical damage. Any pieces damaged after arrival to the site will be the responsibility of the installation contractor.
- B. Store units with non-staining, resilient supports.
- C. Place stored units so identification marks are clearly visible and product can be inspected.

- D. Deliver all architectural precast concrete units to the project site in such quantities and at such times to assure compliance with the agreed project schedule and proper setting sequence so as to limit unloading units temporarily on the ground.
- E. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses which would cause cracking or damage.
- F. Lift and support units only at designated points shown on the Shop (Erection) Drawings.
- G. Place non-staining resilient spacers of even thickness between each unit.
- H. Support units during shipment on non-staining, shock-absorbing material.

## 1.09 SEQUENCING

- A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide locations, setting diagrams, templates, instructions and directions, as required, for installation.

## PART 2 – PRODUCTS

### 2.01 PROJECT SPECIFIC REQUIREMENTS

- A. **THE SCOPE OF WORK FOR APC PANELS IS LIMITED TO PRODUCING REPLICA PANELS OF THOSE CURRENTLY FOUND WITHIN LOBBY OF THE BUILDING. THE INTENT IS TO MATCH THE EXISTING PANELS IN DIMENSION, PROFILE AND TEXTURE. THE COLOR SHALL BE SIMILAR ENOUGH TO THE EXISTING PANELS TO ALLOW PAINTING OF THE SURFACES WITHOUT A DECERNABLE DIFFERENCE BETWEEN THE EXISTING AND NEW PANELS.**

### 2.02 FABRICATORS

- A. Architectural Precast Concrete:
  - 1. Products designated herein as Category AB products are provided by a firm that participates in the PCI Plant Certification program at the time of bidding and is designated a PCI-certified plant for Category AB or AA..

### 2.03 PRECAST UNITS, GENERAL

- A. Precast Architectural Concrete Units: Comply with PCI MNL-120, PCI MNL-122, PCI MNL-123, PCI MNL-135, and ACI 318.
  - 1. Design Loads: Static loads, anticipated dynamic loading, including positive and negative wind loads, thermal movement loads, and erection forces as defined by applicable code.
  - 2. Calculate structural properties of units in accordance with ACI 318.
  - 3. Accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
  - 4. Provide connections that accommodate building movement and thermal movement and adjust to misalignment of structure without unit distortion or damage.
- B. Finish Type A: Ensure exposed-to-view finish surfaces of precast units are uniform in color and appearance.

### 2.04 MOLD MATERIALS

- A. Molds: Rigid, dimensionally stable, nonabsorptive material, warp- and buckle-free material, that will provide continuous and true precast concrete surfaces within fabrication tolerances indicated; non-reactive with concrete and suitable for producing required finishes.
- B. Form-Release Agent: Commercially produced form-release agent that will not bond with, stain, or affect hardening of precast concrete surfaces, and that will not impair subsequent surface or joint treatments of precast concrete.
- C. Form Liners: Units of face design, texture, arrangement, and configuration to match those used for precast concrete design reference sample.
  - 1. Provide solid backing and form supports to ensure that formliners remain in place during concrete placement.

2. Use a manufacturer-recommended form-release agent that will not bond with, stain, or adversely affect hardening of precast concrete surfaces, and that will not impair subsequent surface or joint treatments of precast concrete.
- D. Surface Retarder: Chemical set retarder, capable of temporarily delaying final hardening of newly placed concrete to depth of reveal specified.

## 2.05 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Steel Bar Mats: ASTM A 184/A 184M, assembled with clips, as follows:
  1. Steel Reinforcement: ASTM A 615/A 615M, deformed bars.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A1064/A1064M, fabricated galvanized and chromate wash-treated from steel wire into flat sheets.
- D. Supports: Suspend reinforcement from back of mold. Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place may only be used if they are not visible in the finished face.

## 2.06 CONCRETE MATERIALS

- A. Portland Cement: ASTM C150, Type I or III.
  1. For surfaces exposed to view in finished structure, use grey and/or white portland cement, of same type, brand, and mill source throughout the precast concrete production.
  2. Standard gray Portland cement may be used for non-exposed backup concrete.
- B. Supplementary Cementitious Materials.
  1. Metakaolin Admixture: ASTM C 618, Class N.
- C. Normal-Weight Aggregates: Except as modified by PCI MNL-117, use aggregates that comply with ASTM C33, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for entire project.
  1. Face-Mix Coarse Aggregates: Hard, and durable aggregates, free of material that reacts with cement or causes staining and matches selected sample finish(es).
    - a. Gradation: To match Design Reference Sample.
    - b. Face-Mix Fine Aggregates: Natural or manufactured sand of a material compatible with coarse aggregate, and matches selected sample finish(es).
  2. Backup Concrete Aggregates: ASTM C33 or C330.
- D. Coloring Admixture: ASTM C979, synthetic or natural mineral-oxide pigments that are temperature stable and nonfading.
  1. Color(s): To match Albert & Robinson Architects's sample(s) when incorporated into specified mix design(s); this may include custom color if manufacturer's standard range does not match as approved by Architect; if custom color is required, it shall be provided at no extra cost.
- E. Water: Potable; free from or containing only trace amounts of deleterious material that may affect color stability, setting, or strength of concrete; and complying with chemical limits of PCI MNL-117.
- F. Air Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
- G. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures; certified by manufacturer to not contain any calcium chloride or more than 0.15% chloride ions or other salts by weight of admixture.
  1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
  2. Retarding Admixture: ASTM C494/C494M, Type B.
  3. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D.
  4. Water-reducing and accelerating admixture: ASTM C494/C494M, Type E.
  5. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
  6. High-Range, Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type G.
  7. Plasticizing Admixture for Flowable Concrete: ASTM C1017/C1017M.

03 45 00

PRECAST ARCHITECTURAL CONCRETE

PAGE 5 OF 14

8. Corrosion-inhibiting admixture: ASTM C1582/C1582M.

## 2.07 STEEL CONNECTION MATERIALS

- A. Carbon-Steel Shapes and Plates: ASTM A36/A36M except silicon (Si) content in the range of 0 to 0.03% or 0.15 to 0.25% for materials to be galvanized. Steel with chemistry conforming to the formula  $Si + 2.5P < 0.09$  is also acceptable.
- B. Carbon Steel Headed Studs: ASTM A108, Grades 1010 through 1020, cold finished, AWS D1.1/ D1.1 M, Type A or B, with arc shields and with the minimum mechanical properties specified in PCI MNL-117, Table 3.2.3.
- C. Carbon-Steel Plate: ASTM A283/A 283M, Grade C.
- D. Malleable Iron Castings: ASTM A47/A47M. Grade 32510 or 35028.
- E. Carbon-Steel Castings: ASTM A27/A27M, Grade 60-30 (Grade 415-205).
- F. High-Strength, Low-Alloy Structural Steel: ASTM A572/A572M except silicon (Si) content in the range of 0 to 0.03% or 0.15 to 0.25% for materials to be galvanized. Steel with chemistry conforming to the formula  $Si + 2.5P < 0.09$  is also acceptable.
- G. Carbon-Steel Structural Tubing: ASTM A500/A500M, Grade B or C.
- H. Wrought Carbon-Steel Bars: ASTM A675/A675M, Grade 65 (Grade 450).
- I. Deformed-Steel Wire or Bar Anchors: ASTM A496/A496M or ASTM A706/A 706M.
- J. Carbon-Steel Bolts and Studs: ASTM A307, Grade A or C (ASTM F568M, Property Class 4.6) carbon steel, hex-head bolts and studs; carbon steel nuts (ASTM A563/A563M, Grade A); and flat, unhardened steel washers, ASTM F844.
- K. High-Strength Bolts and Nuts: ASTM A193/A198M, Grade B5 or B7, ASTM A325/A325M, or ASTM A490/A490M, Type 1, heavy hex steel structural bolts, heavy hex carbon steel nuts, (ASTM A563/A563M), and hardened carbon steel washers (ASTM F436/F436M).
- L. Finish: For steel items in exterior walls and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A123/A123M, after fabrication, ASTM A153/A153M, or ASTM F2329 as applicable.
  - 1. For steel shapes, plates, and tubing to be galvanized, limit silicon content of steel to less than 0.03% or to between 0.15% and 0.25%, or limit sum of silicon content and 2.5 times phosphorous content to 0.09%.
  - 2. Galvanizing Repair Paint: Zinc paint with dry film containing not less than 94% zinc dust by weight and complying with DOD-P-21035B or SSPC-Paint 20. Comply with manufacturer's requirements for surface preparation.
- M. Shop-Primed Finish: Prepare surfaces of nongalvanized steel items, except those surfaces to be embedded in concrete, according to requirements in the Society for Protective Coatings SSPC-SP 3 standard Power Tool Cleaning, and shop-apply lead- and chromate-free, rust-inhibitive primer, complying with performance requirements in Master Painters Institute's MPI 79 according to SSPC-PA 1 "Shop, Field, and Maintenance Painting of Steel."

## 2.08 BEARING PADS AND OTHER ACCESSORIES

- A. Provide bearing pads for architectural precast concrete units as recommended by precast concrete fabricator for application:
  - 1. Elastomeric Pads: AASHTO M251, plain, vulcanized, 100% polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet. Surface hardness of 50 to 70 Shore A durometer according to ASTM D2240; minimum tensile strength 2250 psi (15.5 MPa) per ASTM D412.
  - 2. Random-oriented, fiber-reinforced elastomeric pads: Preformed, randomly oriented synthetic fibers set in elastomer. Surface hardness of 70 to 90 Shore A durometer according to ASTM D2240. Capable of supporting a compressive stress of 3000 psi (20.7 MPa) with no cracking, splitting, or delaminating in the internal portions of the pad. Test one specimen for each 200 pads used in project.

3. Cotton-Duck-Fabric-Reinforced Elastomeric Pads: Preformed, horizontally layered cotton-duck fabric bonded to an elastomer. Surface hardness of 80 to 100 Shore A durometer according to ASTM D2240. Conforming to Division II, Section 18.10.2 of AASHTO LRFD Bridge Design Specifications, or Military Specification, MIL-C-882D.
  4. Cotton-duck-fabric-reinforced elastomeric pads: Preformed, horizontally layered cotton-duck fabric bonded to an elastomer. Surface hardness of 80 to 100 Shore A durometer according to ASTM D2240. Conforming to Division II, Section 18.10.2 of the American Association of State Highway and Transportation Officials' AASHTO LRFD Bridge Design Specifications
  5. Frictionless Pads: Tetrafluoroethylene (Teflon), glass-fiber-reinforced pads bonded to stainless or mild-steel plates, or random-oriented, fiber-reinforced elastomeric pads, of type required for in-service stress.
  6. High-Density Plastic: Multimonomer, nonleaching plastic strip capable of supporting loads with no visible overall expansion.
- B. Reglets: Stainless steel, Type 302, felt- or fiber-filled at face opening of slots.
- C. Erection Accessories: Provide clips, hangers, high-density plastic or steel shims, and other accessories required to install architectural precast concrete units.
- D. Welding Electrodes: Comply with AWS standards for steel type and/or alloy being welded.

## 2.09 GROUT MATERIALS

- A. Sand-Cement Grout: Portland cement, ASTM C150, Type I, and clean, natural sand, ASTM C144 or ASTM C404. Mix at ratio of 1 part cement to 2½ to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content of grout shall be less than 0.06% chloride ion by weight of cement when tested in accordance with ASTM C1218/C1218M.
- B. Nonmetallic, Nonshrink Grout: Premixed, prepackaged nonferrous aggregate, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing admixtures; complying with ASTM C1107, Grade A, for dry-pack, and Grades B and C for flowable grout; and of consistency suitable for application within a 30-minute working time. Water-soluble chloride ion content of grout shall be less than 0.06% chloride ion by weight of cement when tested in accordance with ASTM C1218/C 1218M.
- C. Epoxy-Resin Grout: Two-component, mineral-filled epoxy resin complying with ASTM C881/C881M, of type, grade, and class to suit requirements.

## 2.10 CONCRETE MIXTURES

- A. Design mixes may be prepared by a qualified independent testing agency or by qualified precast plant personnel at architectural precast concrete fabricator's option.
- B. Limit water-soluble chloride ions to the maximum percentage by weight of cement permitted by ACI 318 (ACI 318M) or PCI MNL-117 when tested in accordance with ASTM C1218/C1218M.
- C. Normal-Weight Concrete Face and Backup Mixes: Proportion mixes by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on project, to provide normal-weight concrete with the following properties:
1. Compressive strength at 28 days: 5000 psi (34.5 MPa) minimum.
  2. Release strength: As required by design.
  3. Maximum Water-Cementitious Materials Ratio: 0.45.
- D. Water Absorption: 6% by weight or 14% by volume, tested according to ASTM C642, except for boiling requirement.
- E. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL-117.
- F. When other admixtures are included in design mixtures, add them to concrete according to manufacturer's written instructions.

## 2.11 MOLD FABRICATION

- A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement and vibration operations and temperature changes and for prestressing and detensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.
  - 1. Place formliners accurately to provide finished surface texture indicated. Provide solid backing and supports to maintain stability of liners during placing of concrete. Coat form liner with form-release agent.
- B. Maintain molds to provide completed architectural precast concrete units of shapes, lines and dimensions indicated, within fabrication tolerances specified.
  - 1. Form joints are not permitted on faces exposed to view in the finished work.
  - 2. Edge and Corner Treatment: As shown on Drawings.

## 2.12 FABRICATION MATERIALS

- A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.
  - 1. Weld headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."
- B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing architectural precast concrete units to supporting and adjacent construction.
- C. Cast-in reglets, slots, holes, and other accessories in architectural precast concrete units as indicated on Contract Drawing.
- D. Cast-in openings larger than 10 inches (250 mm) in any dimension. Do not drill or cut openings or prestressing strand without approval of Architect. General Contractor and Fabricator shall ensure coordination with Mechanical, Plumbing and Electrical drawings to ensure all penetrations are accounted for through the panels.
- E. Reinforcement: Comply with recommendations in PCI MNL-117 for fabrication, placing, and supporting reinforcement.
  - 1. Clean reinforcement of loose rust and mill scale, earth and other materials that reduce or destroy the bond with concrete. When damage to epoxy coated reinforcing exceeds limits specified ASTM A775/A775M, repair with patching material compatible with coating material and epoxy coat bar ends after cutting.
  - 2. Accurately position, support and secure reinforcement against displacement during concrete- placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
  - 3. Place reinforcing steel and prestressing strand to maintain at least 3/4 -inch (19 mm) minimum concrete cover. Increase cover requirements for reinforcing steel to 1-1/2 inches (38 mm) when units are exposed to corrosive environment or severe exposure conditions. Arrange, space and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
  - 4. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.
- F. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses, and specified in-place loads, whichever govern.
- G. Comply with requirements in PCI MNL-117 and requirements in this section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be

- H. Place face mix to a minimum thickness after consolidation of the greater of 1 inch (25 mm) or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover as indicated on Contract Drawings.
  - 1. Use a single design mixture for those units in which more than one major face (edge) is exposed.
  - 2. Where only one face of unit is exposed, at the fabricator's option, either of the following mixture design/casting techniques may be used.
    - a. A single design mixture throughout the entire thickness of panel.
    - b. Separate mixtures for face and backup concrete, using cement and aggregates for each type, as appropriate, for consecutive placement in the mold. Use cement and aggregate specified for face mixture. Use cement and aggregate for backup mixture complying with specified criteria or as selected by the fabricator.
- I. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.
  - 1. Place backup concrete to ensure bond with face mix concrete.
- J. Thoroughly consolidate placed concrete by internal and/or external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air voids on surfaces. Use equipment and procedures complying with PCI MNL-117.
  - 1. Place self-consolidating concrete without vibration in accordance with PCI TR-6 Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete. If face and backup concrete mixtures are used, ensure adequate bond between concrete mixtures.
- K. Comply with PCI MNL-117 procedures for hot- and cold-weather concrete placement.
- L. Identify pickup points of architectural precast concrete units and orientation in structure on shop (erection) drawings. Imprint or permanently mark casting date on each architectural precast concrete unit on a surface that will not show in finished structure.
- M. Cure concrete, according to requirements in PCI MNL-117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until the compressive strength reaches the design stripping strength.
- N. Repair damaged architectural precast concrete units to meet acceptability requirements in PCI MNL-117 and Architect's approval.

## 2.13 FABRICATION TOLERANCES

- A. Fabricate architectural precast concrete units to shapes, lines, and dimensions indicated, so each finished unit complies with the following product tolerances, which reflect Certification Category AB tolerances.
  - 1. Overall height and width of units, measured at the face exposed to view, as follows:
    - a. 10 ft (3 m) or under:  $\pm\frac{1}{8}$  in. ( $\pm 3$  mm).
    - b. 10 to 20 ft (3 to 6 m):  $+\frac{1}{8}$  in. (+3 mm),  $-\frac{3}{16}$  in. (-5 mm).
    - c. 20 to 40 ft (6 to 12 m):  $\pm\frac{1}{4}$  in. ( $\pm 6$  mm).
    - d. Greater than 40 ft (12 m):  $\pm\frac{1}{16}$  in. per 10 ft ( $\pm 1.5$  mm per 3 m).
  - 2. Overall height and width of units, measured at the face not exposed to view, as follows:
    - a. 10 ft (3 m) or under:  $\pm\frac{1}{4}$  in. ( $\pm 6$  mm).
    - b. 10 to 20 ft (3 to 6 m):  $+\frac{1}{4}$  in. (+6 mm),  $-\frac{3}{8}$  in. (-10 mm).
    - c. 20 to 40 ft (6 to 12 m):  $\pm\frac{3}{8}$  in. ( $\pm 10$  mm).
    - d. Greater than 40 ft (12 m):  $\pm\frac{1}{8}$  in. per 10 ft ( $\pm 3$  mm per 3 m).
  - 3. Total thickness or flange thickness for edges  $\pm\frac{1}{4}$  in. ( $\pm 6$  mm),  $-\frac{1}{8}$  in. (-3 mm).
  - 4. Rib width:  $\pm\frac{1}{8}$  in. ( $\pm 3$  mm).
  - 5. Rib to edge of flange:  $\pm\frac{1}{8}$  in. ( $\pm 3$  mm).
  - 6. Distance between ribs:  $\pm\frac{1}{8}$  in. ( $\pm 3$  mm).
  - 7. Variation from square or designated skew (difference in length of the two diagonal measurements — applies to panel and major openings in panel): Greater of  $\pm\frac{1}{8}$  in. per 72

- in. ( $\pm 3$  mm per 2 m) and  $\pm \frac{1}{2}$  in. (13 mm).
8. Length and width of blockouts and openings within one unit  $\pm \frac{1}{4}$  in. ( $\pm 6$  mm).
  9. Location and dimensions of blockouts hidden from view and used for HVAC and utility penetrations:  $\pm \frac{3}{4}$  in. ( $\pm 19$  mm).
  10. Dimensions of haunches:  $\pm \frac{1}{4}$  in. ( $\pm 6$  mm).
  11. Haunch bearing surface deviation from specified plane:  $\pm \frac{1}{8}$  in. ( $\pm 3$  mm).
  12. Difference in relative position of adjacent haunch bearing surfaces from specified relative position:  $\pm \frac{1}{4}$  in. ( $\pm 6$  mm).
  13. Bowing:  $\pm L/360$ , maximum 1 in. (25 mm).
  14. Local smoothness:  $\frac{1}{4}$  in. per 10 ft (6 mm per 3 m).
  15. Warping:  $\frac{1}{16}$  in. per 12 in. (1.5 mm per 0.3 m) of distance from the nearest adjacent corner.
  16. Tipping and flushness of plates:  $\pm \frac{1}{4}$  in. ( $\pm 6$  mm).
  17. Dimensions of architectural features and rustications:  $\pm \frac{1}{8}$  in. ( $\pm 3$  mm).
  18. Location of rustication joints:  $\pm \frac{1}{8}$  in. ( $\pm 3$  mm).
- B. Position Tolerances: For cast-in items measured from datum line location, as indicated on Shop Drawings.
1. Weld plates:  $\pm 1$  in. ( $\pm 25$  mm).
  2. Inserts:  $\pm \frac{1}{2}$  in. ( $\pm 13$  mm).
  3. Handling devices:  $\pm 3$  in. ( $\pm 75$  mm).
  4. Reinforcing steel and welded wire reinforcement:  $\pm \frac{1}{4}$  in. ( $\pm 6$  mm) where position has structural implications or affects concrete cover; otherwise,  $\pm \frac{1}{2}$  in. ( $\pm 13$  mm).
  5. Reinforcing steel extending out of member:  $\pm \frac{1}{2}$  in. ( $\pm 13$  mm) of plan dimensions.
  6. Prestressing reinforcement:  $\pm \frac{1}{4}$  in. ( $\pm 6$  mm), perpendicular to panel;  $\pm 1$  in. ( $\pm 25$  mm), parallel to panel.
  7. Location of flashing reglets:  $\pm \frac{1}{4}$  in. ( $\pm 6$  mm).
  8. Location of flashing reglets at edge of panel:  $\pm \frac{1}{8}$  in. ( $\pm 3$  mm).
  9. Reglets for glazing gaskets:  $\pm \frac{1}{8}$  in. ( $\pm 3$  mm).
  10. Electrical outlets, hose bibs:  $\pm \frac{1}{2}$  in. ( $\pm 13$  mm).
  11. Location of bearing surface from end of member:  $\pm \frac{1}{4}$  in. ( $\pm 6$  mm).
  12. Allowable rotation of plate, channel inserts, electrical boxes: 2-degree rotation or  $\frac{1}{4}$  in. (6 mm) maximum measured at perimeter of insert.
  13. Position of sleeve:  $\pm \frac{1}{2}$  in. ( $\pm 13$  mm).
  14. Location of window washer track or buttons:  $\pm \frac{1}{8}$  in. ( $\pm 3$  mm).

## 2.14 FINISHES

- A. Exposed panel faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform and straight. Finish exposed-face surfaces of architectural precast concrete units to match approved Design Reference Sample and as follows:
- B. Finish exposed surfaces (top, bottom, return, back) of architectural precast concrete units to match face-surface finish or approved mockup.
  1. Ensure exposed-to-view finish surfaces of precast units are uniform in color and appearance.
- C. Finish unexposed surfaces of architectural precast concrete units to achieve steel-trowel finish.

## 2.15 SOURCE QUALITY CONTROL

- A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL-117 and PCI MNL-135 requirements. If using self-consolidating concrete, also test and inspect according to PCI TR-6, "Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete," and ASTM C1611/C1611M, ASTM C1712, ASTM C1610/1610M, and ASTM C1621/C1621M.
- B. In addition to PCI certification, Contractor will employ an independent testing agency to verify architectural precast concrete fabricator's quality-control and testing methods.



1. Allow Contractor's testing agency access to material storage areas, concrete production equipment, concrete placement and curing facilities. Cooperate with Contractor's testing agency and provide samples of materials and concrete mixes as may be requested for additional testing and evaluation.
- C. Strength of precast concrete units will be considered deficient if units fail to comply with ACI318 (ACI318M) requirements for concrete strength.
- D. Testing: If there is evidence that the concrete strength of precast concrete units may be deficient or may not comply with ACI318 (ACI318M) requirements, fabricator shall employ an independent testing agency to obtain, prepare and test cores drilled from hardened concrete to determine compressive strength according to ASTM C42/C42M and ACI 318 (ACI 318M).
  1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Architect.
  2. Cores will be tested in an air-dry condition.
  3. Strength of concrete for each series of three cores shall be considered satisfactory if the average compressive strength is equal to at least 85% of the 28-day design compressive strength and no single core is less than 75% of the 28-day design compressive strength.
  4. Test results will be made in writing on the same day that tests are performed, with copies to Architect, Contractor and precast concrete fabricator. Test reports will include the following:
    - a. Project identification name and number.
    - b. Date when tests were performed.
    - c. Name of precast concrete fabricator.
    - d. Name of concrete testing agency.
    - e. Identification letter, name and type of precast concrete units or unit(s) represented by core tests; design compressive strength; type of break; compressive strength at breaks, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.
- E. Patching: If core test results are satisfactory and precast concrete units comply with requirements, clean and dampen core holes and solidly fill with precast concrete mix that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.
- F. Acceptability: Architectural precast concrete units that do not comply with acceptability requirements in PCI MNL-117, PCI MNL-135, and PCI Certification Category AB, including concrete strength, manufacturing tolerances, and color and texture range, are unacceptable. Chipped, spalled, or cracked units may be repaired, with repaired units to match the visual mockup. Architect reserves the right to reject any unit if it does not match the accepted sample panel or visual mockup. Replace unacceptable units with precast concrete units that comply with requirements.

### **PART 3 – EXECUTION**

#### **3.01 PREPARATION**

- A. Furnish anchorage devices for precast concrete units to be embedded in or attached to the building structural frame or foundation before start of such work. Provide locations, setting diagrams, templates, and instructions for the proper installation of each anchorage device.

#### **3.02 EXAMINATION**

- A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, bearing surface tolerances, and other conditions affecting precast concrete performance.
- B. Proceed with precast concrete installation only after unsatisfactory conditions have been corrected.
- C. Prior to proceeding with installation, notify precast concrete erector in writing that supporting cast-in-place concrete foundation and building structural framing have attained minimum allowable design compressive strength, or supporting steel or other structure is structurally ready to receive loads from precast concrete units.

### 3.03 ERECTION

- A. Install loose clips, hangers, bearing pads and other accessories required for connecting architectural precast concrete units to supporting members and backup materials.
- B. Precaster or erector shall supply miscellaneous steel preweld connection hardware and install it in the field
- C. Erect architectural precast concrete level, plumb, and square within the specified allowable erection tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment of units until permanent connections are completed.
  - 1. Install temporary steel or plastic spacing shims as precast concrete units are being erected. Surface-weld steel shims to each other to prevent shims from separating.
  - 2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
  - 3. Remove projecting lifting devices and use sand-cement grout to fill voids within recessed lifting devices flush with surface of adjacent precast concrete surfaces when recess is exposed.
  - 4. Unless otherwise indicated, provide for uniform joint widths of  $\frac{3}{4}$  in. (19 mm).
- D. Connect architectural precast concrete units in position by bolting, welding, grouting or as otherwise indicated on approved Erection Drawings. Remove temporary shims, wedges and spacers as soon as practical after connecting and/or grouting are completed.
  - 1. Disruption of roof flashing continuity by connections is not permitted; concealment within roof insulation is acceptable.
- E. Welding: Comply with applicable AWS D1.1/D1.1M, AWS D1.4/D1.4M, and AWS D1.6/D1.6M requirements for welding, welding electrodes, appearance of welds, quality of welds, and methods used in correcting welding work.
  - 1. Protect architectural precast concrete units and bearing pads from damage during field welding or cutting operations, and provide noncombustible shields as required.
  - 2. Welded connections should be clearly detailed to show the type, size, length, and location of all welds. If this information is not presented, the erector shall obtain necessary information from the specialty engineer.
  - 3. Clean weld affected metal surfaces with chipping hammer followed by brushing then apply a minimum 0.004 inch (100  $\mu$ m) thick coat of galvanized repair paint to galvanized surfaces in conformance with ASTM A780.
  - 4. For galvanized metal, clean weld-affected metal surfaces with chipping hammer followed by brushing or power-tool cleaning, and then apply a minimum 0.004-in.-thick (0.10-mm-thick) coat of galvanized repair paint to galvanized surfaces in conformance with ASTM A780/A780M.
  - 5. Visually inspect all welds critical to precast connections. Visually check all welds for completion and remove, reweld or repair all defective welds. This service is to be performed by an AWS-certified welding inspector furnished by Contractor.
- F. At bolted connections, use upset threads, thread-locking compound, or other approved means to prevent loosening of nuts after final adjustment.
  - 1. Where slotted connections are used, verify bolt position and tightness at installation. For sliding connections, properly secure bolt but allow bolt to move within connection slot.
  - 2. For slip critical connections, one of the following methods shall be used to ensure proper bolt pretension:
    - a. Turn-of-nut method, in accordance with American Institute of Steel Construction (AISC).
    - b. Calibrated wrench method, in accordance with AISC.
    - c. Twist-off tension control bolt method meeting ASTM F1852.
    - d. Direct-tension control bolt method meeting ASTM F1852.
  - 3. For slip-critical connections, the method to be used and the inspection procedure to be used shall be approved by Architect and coordinated with the inspection agency

- G. Grouting or Dry-Packing Connections and Joints: Indicate joints to be grouted and any critical grouting sequences on shop (erection) drawings. Grout connections where required or indicated on shop (erection) drawings. Retain flowable grout in place until it gains sufficient strength to support itself, or, pack spaces with stiff dry-pack grout material, tamping until voids are completely filled. Place grout and finish smooth, level, and plumb with adjacent concrete surfaces. Promptly remove grout material from exposed surfaces before it affects finishes or hardens. Keep grouted joints damp for at least 24 hours after initial set.
- H. Seal perimeter and intermediate joints in accordance with Section 07 90 05.
- I. Apply water repellent as specified in Section 07 19 00.

### 3.04 ERECTION TOLERANCES

- A. Erect architectural precast concrete units level, plumb, square, and in alignment, without exceeding the following noncumulative erection tolerances, which reflect Certification Category AB tolerances:
  - 1. Plan location from building grid datum\*:  $\pm\frac{1}{2}$  in. ( $\pm 13$  mm).
  - 2. Plan location from centerline of steel support†:  $\pm\frac{1}{2}$  in. ( $\pm 13$  mm).
  - 3. Top elevation from nominal top elevation:
    - a. Exposed individual panel:  $\pm\frac{1}{4}$  in. ( $\pm 6$  mm).
    - b. Nonexposed individual panel:  $\pm\frac{1}{2}$  in. ( $\pm 13$  mm).
  - 4. Support elevation from nominal support elevation:
    - a. Maximum low:  $\frac{1}{2}$  in. (13 mm).
    - b. Maximum high:  $\frac{1}{4}$  in. (6 mm).
  - 5. Maximum plumb variation over the least of height of structure or 100 ft (30 m)\*: 1 in. (25 mm).
  - 6. Plumb in any 10 ft (3 m) of element height:  $\frac{1}{4}$  in. (6 mm).
  - 7. Maximum jog in alignment of matching edges:
    - a. Exposed panel relative to adjacent panel:  $\frac{1}{4}$  in. (6 mm).
    - b. Nonexposed panel relative to adjacent panel:  $\frac{1}{2}$  in. (13 mm).
  - 8. Joint width (governs over joint taper)  $\pm\frac{1}{4}$  in. ( $\pm 6$  mm)
  - 9. Joint taper exposed to view maximum  $\pm\frac{3}{8}$  in. ( $\pm 10$  mm) but not more than  $\frac{1}{4}$  in. (6 mm) in 10 ft length.
  - 10. Maximum jog in alignment of matching faces:  $\frac{1}{4}$  in. (6 mm).
  - 11. Differential bowing or camber, as erected, between adjacent members of same design:  $\frac{1}{4}$  in. (6 mm).
  - 12. Opening height between spandrels:  $\pm\frac{1}{4}$  in. ( $\pm 6$  mm).
  - 13. NOTE: \*For precast concrete buildings > 100 ft (30 m) tall, tolerances for items "1" and "5" above can increase at the rate of  $\frac{1}{8}$  in. (3 mm) per story to a maximum of 2 in. (50 mm).
  - 14. NOTE: †For precast concrete elements erected on a steel frame, the tolerance in item "2" takes precedence over tolerance dimension listed in item "1."

### 3.05 FIELD QUALITY CONTROL

- A. Testing: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections.
  - 1. Field welds will be subject to visual inspections and non-destructive testing in accordance with ASTM E165 or ASTM E709.
  - 2. Testing agency will report test results promptly and in writing to Contractor and Architect.
- B. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

### 3.06 REPAIRS

- A. Repairs will be permitted provided structural adequacy of units and appearance are not impaired.

- B. Repair damaged units to meet acceptability requirements of PCI MNL-117.
- C. Mix patching materials and repair units so cured patches blend with color, texture and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 10 feet.
- D. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A780/A780M.
- E. Wire-brush, clean, and paint damaged prime-painted components with same type of primer used in shop.
- F. Remove and replace damaged architectural precast concrete units when repairs do not comply with specified requirements.

### **3.07 PROTECTION**

- A. Protect installed architectural precast units from damage due to subsequent construction operations.

### **3.08 CLEANING**

- A. Clean all surfaces of precast concrete to be exposed to view, as necessary, prior to shipping.
- B. Clean mortar, plaster, fireproofing, weld slag and any other deleterious material from concrete surfaces and adjacent materials immediately.
- C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, dirt, stains, and other markings.
  - 1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Protect adjacent work from staining or damage due to cleaning operations.
  - 2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.
- D. Protect precast units components from splashing and other damage.

**END OF SECTION**

**SECTION 036200: NON-SHRINK GROUT**

**PART 1 GENERAL**

**1.1 RELATED SECTIONS**

- A. Division 1 Sections

**1.2 REFERENCES**

ACI 351.4-14 – Specification for Installation of Cementitious Grouting between Foundations and Equipment Bases.

ASTM C1107 – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink).

ASTM C109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens).

**1.3 REFERENCE STANDARDS**

All work related to Non-Shrink Grout shall conform to all requirements of ACI 351.4-14, "Specification for Installation of Cementitious Grouting between Foundations and Equipment Bases," published by the American Concrete Institute, Fannington Hills, Michigan, except as modified by these Contract Documents.

**1.4 QUALITY ASSURANCE**

- A. Refer to the Structural Quality Assurance Plan in the Structural Drawings.

**1.5 SUBMITTALS**

- A. Refer to Structural Quality Assurance Plan in the Structural Drawings for additional submittal requirements.

**PART 2 PRODUCTS**

**2.1 GROUT**

- A. Flowable, non-shrink, non-metallic, packaged hydraulic cement grout that conforms to ASTM C1107.
- B. Compressive Strength: 6,000 psi minimum at 28 days.

**2.2 WATER**

- A. Water: Clean, potable water.

**PART 3 EXECUTION**

**3.1 HANDLING**

- A. Store and protect from moisture and contamination.

**3.2 PREPARATION**

- A. Remove foreign materials including mud and dirt from areas to be grouted.
- B. Use forms to contain grout. Forms shall be set at a distance from the edge of the baseplate on all sides equal to at least the thickness of the grout bed, and no less 1.5-in.

**3.3 MIXING**

- A. Mix grout to its fluid, self-leveling consistency in accordance with manufacturer's recommendations. Mix grout in a paddle-type mortar mixer; do not mix by hand.
- B. Mixing of grout, surface preparation of concrete substrate, placement, thermal control, and curing of grout shall conform to the manufacturer's instructions.
- C. Do not retemper grout. Do not exceed manufacturer's maximum limit on water content or use at a consistency that produces free bleeding.

**3.4 PLACEMENT**

- A. Consolidate to provide grout uniformity. Do not vibrate grout.
- B. Mix grout to its fluid, self-leveling consistency, and place under base plate in a flowable state.

**3.5 PROTECTION**

- A. Protect grout and areas to be grouted from excessive heat and cold in accordance with manufacturer's Specifications. Protect grout from excessive drying shrinkage resulting from wind or direct sunlight. Protect areas grouted from excessive vibrations.

**END OF SECTION**

## **SECTION 042200: CONCRETE UNIT MASONRY**

### **PART 1 GENERAL**

#### **1.1 RELATED SECTIONS**

- A. Division 1 Sections
- B. Section 032000 – Concrete Reinforcement.
- C. Section 033000 – Cast-in-Place Concrete.
- D. Section 042000 – Unit Masonry.

#### **1.2 REFERENCES**

TMS 602 – Specification for Masonry Structures.

ASTM A82 – Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

ASTM A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

ASTM A615 – Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

ASTM A951 - Standard Specification for Steel Wire for Masonry Joint Reinforcement

ASTM C90 – Standard Specification for Loadbearing Concrete Masonry Units.

ASTM C109 – Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. Cube Specimens).

ASTM C140 – Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.

ASTM C144 – Standard Specification for Aggregate for Masonry Mortar.

ASTM C270 – Standard Specification for Mortar for Unit Masonry.

ASTM C404 – Standard Specification for Aggregates for Masonry Grout.

ASTM C476 – Standard Specification for Grout for Masonry.

ASTM C1019 – Standard Test Method for Sampling and Testing Grout.

ASTM C1314 – Standard Test Method for Compressive Strength of Masonry Prisms.

ASTM D2000 - Standard Classification System for Rubber Products in Automotive Applications.

ASTM D2287 – Standard Specification for Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds.

### **1.3 SUBMITTALS**

- A. Refer to Structural Quality Assurance Plan in Structural Drawings for additional submittal requirements.
- B. Submit coarse grout mix design.
- C. Shop Drawings: Submit for masonry reinforcement complying with Section 032000.
- D. Submit procedures for construction of masonry walls to be filled with coarse grout. Procedures should include low lift grouting as applicable to Project.

### **1.4 QUALITY ASSURANCE**

- A. Masonry construction and materials shall conform to all the requirements of TMS 602, except as modified by the requirements of the Construction Documents.
- B. Refer to the Structural Quality Assurance Plan in the Structural Drawings.

### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store materials in a dry condition to protect from elements and prevent contamination, deterioration, or damage due to moisture, temperature changes, contaminants, corrosion, and other causes.

## **PART 2 PRODUCTS**

### **2.1 CONCRETE MASONRY**

- A. Specified Compressive Strength,  $f'_m$ : See Structural Notes in the Structural Drawings.

### **2.2 CONCRETE MASONRY UNITS**

- A. Concrete masonry units: Comply with ASTM C90.
- B. Weight: Lightweight.
- C. Net Area Compressive Strength of unit: As listed in Table 2 of TMS 602 required for the specified  $f'_m$ .
- D. Face Dimensions: 16" long x 8" high nominal, unless indicated otherwise.
- E. Special shapes: Where indicated on the Drawings.
- F. Fire Rating: Where indicated in the Architectural Drawings, provide concrete masonry units that comply with the specified fire ratings.

### **2.3 MORTAR**

- A. Mortar: Type M or Type S in accordance with ASTM C270. Refer to Structural Drawings for locations.



- B. Do not use admixtures that contain chlorides.

## **2.4 COARSE GROUT**

- A. Coarse Grout: In accordance with ASTM C476.
- B. Compressive Strength: See Structural Notes in the Structural Drawings.
- C. Slump: 8 and 11 inches.
- D. Do not use admixtures that contain chlorides.

## **2.5 WATER**

- A. Water: Clean potable water free of deleterious substances.

## **2.6 REINFORCEMENT**

- A. Horizontal and Vertical Reinforcing Bars: Comply with Section 032000.

## **2.7 HORIZONTAL JOINT REINFORCEMENT**

- A. Horizontal Joint Reinforcement: Manufactured with longitudinal, parallel, deformed side wires in accordance with ASTM A951 and of the size specified in the Structural Drawings. Cross wires shall be No. 9 gage, plain, in accordance with ASTM A82, unless noted otherwise in Structural Drawings.
- B. Provide as a minimum, one side wire for each face shell of hollow masonry units. Provide additional side wires or eye sections for adjustable wall ties as specified for multiwythe wall construction.
- C. Ladder type reinforcement shall be used in walls with vertical reinforcement.
- D. Finish: Hot-dipped galvanized in accordance with ASTM A153, Class B-2.
- E. Provide prefabricated corner and tee section accessories.

## **2.8 CONTRACTION JOINT MATERIAL**

- A. Contraction joint material:
  1. Rubber shear keys complying with ASTM D2000, M2AA-805 and with a minimum durometer hardness of 80, or
  2. PVC shear keys complying with ASTM D2287, Type PVC 654-4 and with a minimum durometer hardness of 85.

# **PART 3 EXECUTION**

## **3.1 PREPARATION**

- A. Cold weather masonry construction shall comply with TMS 602, Section 1.8, Paragraph C when either of the following conditions exist:

1. The ambient air temperature falls below 40 degrees Fahrenheit, or
2. The temperature of masonry units is below 20 degrees Fahrenheit.

- B. Hot weather masonry construction shall comply with TMS 602, Section 1.8, Paragraph D when either of the following conditions exist:
1. The ambient air temperature exceeds 100 degrees Fahrenheit, or
  2. The ambient air temperature exceeds 90 degrees Fahrenheit with a wind velocity greater than 8 mph.
  3. When the ambient temperature exceeds 115 degrees Fahrenheit, or exceeds 105 degrees Fahrenheit with a wind velocity greater than 8 mph, implement the requirements of Article 1.8 D.1.a and shade materials and mixing equipment from direct sunlight.

### **3.2 CONCRETE MASONRY UNIT PLACEMENT**

- A. Use dry masonry units. No frozen or wet units shall be used.
- B. Discard cracked, chipped, and spalled masonry units.
- C. Lay hollow units as follows:
1. With full mortar coverage on horizontal and vertical face shells.
  2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, pilasters, and in walls where adjacent to cells or cavities to be filled with grout.
  3. For starting course on footings where cells are not to be grouted, spread out full mortar bed including area under cells.
  4. Maintain joint widths indicated, except for minor variations to maintain joint alignment. If not indicated, lay walls with 3/8 inch joints.
  5. Buttering corners of joints, deep or excess furrowing of mortar joints is not permitted.
- D. Lay units in running bond, unless noted otherwise in the Structural Drawings.
- E. Fully bond external corners of concrete masonry.
- F. Where non-loadbearing masonry partitions extend to underside of floor, roof deck or structural system, stop masonry short 3/8 inch to 1/2 inch to allow for live load deflection. Fill gap with soft joint filler.

### **3.3 GROUT PLACEMENT**

- A. Execute placement of grout in accordance with TMS 602, Section 3.5.
- B. Place coarse grout in maximum 5'-4" lifts, unless intermediate bond beams are present or approved in writing by the architect/structural engineer. In the case of intermediate bond beams in the wall, the maximum lift should be equal to the bond beam spacing.
- C. Do not fill reinforced cells with mortar.

### **3.4 MOVEMENT JOINTS**

- A. Place expansion joints at locations indicated in the Structural Drawings.
1. Do not run any horizontal reinforcing through expansion joints.
- B. Place contraction joints at locations indicated in the Structural Drawings.
1. Install contraction joint material.

2. Do not run horizontal reinforcement through contraction joints, except reinforcement in bond beams at floor and roof levels shall be continuous across contraction joints.

### **3.5 REINFORCEMENT**

- A. Place reinforcing bars as indicated in the Structural Drawings and in accordance with TMS 602, Section 3.4.

### **3.6 HORIZONTAL JOINT REINFORCEMENT**

- A. Place horizontal joint reinforcement in the horizontal mortar beds at spacings noted in the Structural Drawings and noted below.
- B. For masonry below grade, space horizontal joint reinforcing at 8 inches vertically.
- C. Place horizontal joint reinforcement above lintels and below sills at openings. Extend two feet beyond opening.
- D. Joint reinforcement shall be continuous. Lap joint reinforcement a minimum of 8 inches.

### **3.7 ERECTION BRACING**

- A. Design, provide, and install temporary erection bracing during construction as required to stabilize erected masonry until complete structural system is constructed.

### **3.8 CLEANING AND POINTING**

- A. Dry brush masonry surfaces before mortar has set hard to remove mortar crumbs and accumulation.
- B. Clean masonry with commercial brick cleaner approved by brick manufacturer. Protect other work from cleaning materials.
- C. Cut out defective mortar and repoint.

### **3.9 PROTECTION OF FINISHED WORK**

- A. During erection cover top of wall, projections, and sills with strong waterproof membrane at end of each day's work.
  1. Extend and secure cover a minimum of 24 in. down both sides.
- B. Do not apply uniform floor or roof loading for at least 12 hours after placing masonry columns or walls.
- C. Do not apply concentrated loads for at least 3 days after building masonry columns or walls.

**END OF SECTION**



## **SECTION 051200: STRUCTURAL STEEL FRAMING**

### **PART 1 GENERAL**

#### **1.1 RELATED SECTIONS**

- A. Division 1 Sections
- B. Section 052100 – Steel Joist Framing.
- C. Section 053100 – Steel Decking.

#### **1.2 REFERENCES**

AISC – Steel Construction Manual, 14<sup>th</sup> Edition.

AISC 303 – Code of Standard Practice for Steel Buildings and Bridges.

AISC 341-10 – Seismic Provisions for Structural Steel Buildings dated June 22, 2010.

AISC 360-10 – Specification for Structural Steel Buildings.

AISC – Specification for Structural Joints Using ASTM A325 or A490 Bolts prepared by the Research Council on Structural Connections.

AWS D1.1 – Structural Welding Code.

AWS A5.1 – Specification for Carbon Steel Electrodes for Shielded Metal Arc Welding.

AWS A5.5 – Specification for Low-Alloy Steel Electrodes for Shielded Metal Arc Welding.

AWS A5.17 – Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc Welding.

AWS A5.20 – Carbon Steel Electrodes for Flux Cored Arc Welding.

SSPC – Steel Structures Painting Manual.

ASTM A6 – Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling.

ASTM A29 - Standard Specification for Steel Bars, Carbon and Alloy, Hot-Wrought, General Requirements for Grades 1010 through 1020.

ASTM A36 – Standard Specification for Carbon Structural Steel.

ASTM A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM A123 – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

ASTM A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

ASTM A307 – Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.

ASTM A325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 KSI Minimum Tensile Strength.

ASTM A490 – Standard Specification for Structural Bolts, Alloy Steel, Heat-Treated, 150 KSI Minimum Tensile Strength.

ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

ASTM A501 – Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

ASTM A563 – Standard Specification for Carbons and Alloy Steel Nuts

ASTM A572 – Standard Specification for High-Strength Low-Alloy Columbium Vanadium Structural Steel.

ASTM A673 – Standard Specification for Sampling Procedure for Impact Testing of Structural Steel

ASTM A780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

ASTM A992 – Standard Specification for Structural Steel Shapes.

ASTM A1085 – Standard Specification for Cold-Formed Welded Carbon Steel Hollow Structural Sections (HSS)

ASTM B695 – Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel

ASTM F436 – Standard Specification for Hardened Steel Washers.

ASTM F844 – Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use.

ASTM F1554 – Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-Ksi Yield Strength.

ASTM F1852 – Standard Specification for “Twist Off” Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

ASTM F2280 – Standard Specification for “Twist Off” Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 150 ksi Minimum Tensile Strength.

### **1.3 SUBMITTALS**

- A. Refer to Structural Quality Assurance Plan in the Structural Drawings for additional submittal requirements.
- B. Shop Drawings:
  - 1. Contact Structural Engineer's Construction Administrator prior to detailing structural steel shop drawings.
  - 2. Shop drawings shall be submitted in the format of a sheet size that is easily read when printed.
  - 3. Shop drawings shall clearly indicate the profiles, sizes, ASTM Grade, spacing and locations of structural steel members, including connections, attachments, anchorages, framed openings, sizes and types of fasteners, method of tightening fasteners, cambers, and the number, type and spacing of the stud shear connectors and headed studs.
  - 4. Beam sizes shall be shown on the erection drawings (plans).
  - 5. Submit shop drawings for review.
  - 6. Reproduction of Structural Drawings for shop drawings is not permitted. Electronic drawing files will not be provided to the Contractor.
- C. Maintain at construction office written welding procedures for each type of welded joint used in accordance with AWS D1.1.
- D. Submit certification that the fabricator meets the required qualifications and ultrasonic testing reports for complete penetration welds. If fabricator has an independent testing agency inspect fabrication as required by these specifications, submit the name and qualifications of the independent testing agency.
- E. Upon request, submit the erection sequence and procedures to be used by the steel erector.
- F. Submit certification that the erector meets the required qualifications.

#### **1.4 QUALITY ASSURANCE**

- A. Refer to the Structural Quality Assurance Plan in the Structural Drawings.

#### **1.5 STORAGE**

- A. Store materials off ground to permit easy access for inspection and identification. Store steel members and packaged items in a manner that provides protection against contact with deleterious materials.

#### **1.6 FABRICATOR'S QUALIFICATIONS**

- A. Steel fabricator shall meet the requirements in the Structural Quality Assurance Plan in the Structural Drawings.

#### **1.7 ERECTOR'S QUALIFICATIONS**

- A. Steel fabricator shall meet the requirements in the Structural Quality Assurance Plan in the Structural Drawings
- B. Erector shall be experienced in erecting structural systems similar in complexity to this Project as evidenced by 10 completed projects.

- C. Erector shall have a minimum of 5 years experience in the erection of structural steel or is an AISC Certified Advanced Steel Erector.
- D. For qualification of welders, refer to the Structural Quality Assurance Plan in the Structural Drawings.

## **PART 2 PRODUCTS**

### **2.1 ANCHOR RODS**

- A. Anchor Rods: Headed rod or a threaded rod with a heavy hexagonal nut and plate washer welded to the bottom of the threaded rod conforming to ASTM F1554.
- B. Nuts and Washers: Two hexagonal nuts and two plate washers conforming to ASTM A36 for each anchor rod assembly.

### **2.2 ROLLED STEEL SHAPES, PLATES, AND BARS**

- A. Rolled Steel Shapes, Plates, and Bars: ASTM A36; ASTM A572, Grade 50; or ASTM A992 as indicated by the Structural Drawings. ASTM A572, Grade 50 may be substituted for ASTM A992.

### **2.3 SQUARE, RECTANGULAR AND ROUND STEEL HOLLOW STRUCTURAL SECTIONS (HSS)**

- A. Hollow structural sections:
  - 1. Rectangular and Square: ASTM A500 Grade B, 46 ksi minimum yield strength
  - 2. Round: ASTM A500 Grade B, 42 ksi minimum yield strength

### **2.4 PIPE STEEL STRUCTURAL SECTIONS**

- A. Pipe Structural Sections: ASTM A53, Gr. B, 35 ksi minimum yield strength.

### **2.5 NON-HIGH-STRENGTH FASTENERS**

- A. Non-High-Strength Bolts: ASTM A307, Grade A, 60 ksi minimum, where noted on the Structural Drawings.
- B. Hardened Steel Washers: ASTM F436.

### **2.6 HIGH-STRENGTH FASTENERS**

- A. High-Strength Bolts: ASTM A325 or ASTM A490 as noted on the Structural Drawings. 3/4-inch minimum diameter.
- B. Hardened steel washers shall conform to ASTM F436.
- C. Spline-Type Tension Control Bolts: ASTM spline-type tension control bolts with plain hardened washers and suitable nuts are an acceptable alternate design bolt assembly.
- D. Do not use load indicating washers.

### **2.7 EXPANSION ANCHORS**



- A. Expansion Anchors: See Structural Notes.

## **2.8 ADHESIVE ANCHORS**

- A. Adhesive Anchors: See Structural Notes.

## **2.9 SCREW ANCHORS**

- A. Screw Anchors: See Structural Notes.

## **2.10 HEADED STUDS**

- A. Headed Studs: shall conform to the requirements of AWS D1.1. Provide studs with the diameter shown on the Structural Drawings.

## **2.11 STUD SHEAR CONNECTORS**

- A. Stud Shear Connectors: ASTM A108, 3/4-inch diameter in compliance with AWS D1.1.

## **2.12 WELD ELECTRODES**

- A. Weld Electrodes: AWS A5.1, A5.5, A5.17, or A5.20 E-70 series low hydrogen electrodes.
- B. Provide E-70 series, low hydrogen electrodes with a minimum Charpy V-Notch (CVN) toughness of 20 ft.-lb. at 0 degrees Fahrenheit and 40 ft.-lb. at 70 degrees Fahrenheit for demand critical welds. Refer to the Structural Drawings for locations of demand critical welds.
- C. Properly store electrodes to maintain flux quality.

## **2.13 PAINT**

- A. Oxide Primer: AISC Specifications, Code of Standard Practice, and SSPC Steel Structure Painting Manual, unless indicated otherwise.
- B. Paint Primer: Free of lead and chromate and comply with State and Federal volatile organic compound (VOC) requirements.
- C. Paint Primer: Compatible with finish coating.

## **2.14 GALVANIZE**

- A. Galvanized Coating: ASTM A123.
- B. Galvanize Bolts, Nuts, and Washers: ASTM A153 when used to connect steel members that are specified to be galvanized.
- C. Expansion Anchors, Adhesive Anchors, or Screw Anchors: Where specified to be galvanized, anchors shall be mechanically galvanized in accordance with ASTM B695, Class 65, Type I.

## **PART 3 EXECUTION**

### **3.1 GENERAL**

- A. Fabricate and erect structural steel in accordance with AISC Specifications and Code of Standard Practice.
- B. Notify Architect/Structural Engineer and Structural Testing/Inspection Agency at least 48 hours prior to structural steel fabrication and erection.

### **3.2 ANCHOR ROD SETTING**

- A. Provide templates for setting anchor rods. Position anchor rods by using templates with two nuts to secure in place prior to placement of concrete.
- B. Do not erect steel where anchor rod nuts will not have full threads.

### **3.3 CONNECTIONS**

- A. Provide a minimum of two fasteners at each bolted connection.
- B. Ensure fasteners are lubricated prior to installation.
- C. Provide high-strength bolted connections in accordance with AISC Specifications for Structural Joints using ASTM A325 or A490 Bolts.
- D. Provide connections for expansion and contraction where steel beams connect to concrete walls or concrete columns and at expansion joints. Secure nuts on bolts against loosening. (Dent threads with a chisel.)

### **3.4 FASTENER INSTALLATION**

- A. Bolts shall be installed in holes of the connection and brought to snug tight condition. Tighten connection progressing systematically from the most rigid part to the free edges of the connection to minimize relaxation of the bolts.
- B. High-strength bolts installed shall have a hardened washer under the element turned in tightening.
- C. Installation and tightening of bolts shall conform to the AISC Specifications for Structural Joints.

### **3.5 EXPANSION ANCHOR INSTALLATION**

- A. Install in accordance with manufacturer's recommendation and the ICC ESR report for the particular anchor used.
- B. Minimum Embedment: See Structural Notes on Drawings.

### **3.6 ADHESIVE ANCHOR INSTALLATION**

- A. Install in accordance with manufacturer's recommendation and the ICC ESR or IAPMO-UES report for the particular anchor used.
- B. Minimum Embedment: See Structural Notes on Drawings.

### **3.7 SCREW ANCHOR INSTALLATION**

- A. Install in accordance with manufacturer's recommendation and the ICC ESR report for the particular anchor used.
- B. Minimum Embedment: See Structural Notes on Drawings.

### **3.8 HEADED STUDS**

- A. Headed studs shall be installed in accordance with AWS D1.1 with the resulting in-place length after burn-off as shown on the Structural Drawings.
- B. Do not locate headed studs closer than 1-1/4 inches from the edge of embedded steel member to the centerline of the stud.
- C. Remove ceramic arc shields after welding studs.

### **3.9 STUD SHEAR CONNECTORS FOR COMPOSITE CONSTRUCTION**

- A. Stud shear connectors shall be installed in accordance with AWS D1.1 with the resulting in-place length after burn-off as shown on the Structural Drawings.
- B. Stud shear connectors shall be placed as follows:
  - 1. Studs shall be uniformly spaced along beams.
  - 2. Locate studs directly over the web of beams with flanges less than 0.3 inches thick.
  - 3. Minimum spacing shall be 4½ inches along the longitudinal axis of the beam and 3 inches transverse to the longitudinal axis of the beam.
  - 4. Where double rows of studs are required, begin double rows at each end of the beam. If possible, locate the studs at least 2 inches from the edge of the flange to the centerline of stud, but in no case locate the stud less than 1-1/4 inches from the edge of the flange to the centerline of stud.
  - 5. Refer to the Structural Drawings for additional placement guidelines.
- C. Remove ceramic arc shields after welding studs.

### **3.10 WELDING**

- A. Comply with AWS D1.1. Use prequalified weld procedures.
- B. Provide end returns where fillet welds terminate at ends or sides. Returns shall be continuous for a distance of not less than two times the nominal size of the weld.
- C. Complete penetration joints shall be backgouged to sound metal before the second side is welded or have 1/4-inch root opening with 3/16 x 1 inch backing bar. Access holes are required. Filling access holes is not required.
- D. Remove all slag and weld splatter from deposited weld metal.

### **3.11 SPLICING**

- A. Splice members only where indicated unless authorized in writing by Structural Engineer.

- B. Provide shim plates at bottom flange splice at continuous beam splices with different depths.

### **3.12 CUTTING**

- A. Do not use flame cutting to correct errors unless authorized in writing.
- B. Re-entrant corners shall have a minimum radius of one inch and be free of notches. Notches and gouges resulting from flame cutting shall be finished to a smooth appearance.

### **3.13 MILL SCALE**

- A. Remove loose mill scale.

### **3.14 BOLT HOLES**

- A. Cut, drill, or punch holes perpendicular to metal surfaces. Do not enlarge holes by burning. Drill or punch holes in bearing plates. Remove burrs.

### **3.15 PAINTING**

- A. Paint steel that is not encased in concrete, plaster, or sprayed fireproofing. Do not shop paint in areas to be field welded, contact surfaces of slip critical connections, or areas to receive special finishes.
- B. Field paint as required steel that has been welded or that is unpainted after connections have been tightened.

### **3.16 GALVANIZING**

- A. Galvanize shelf angles that support the exterior building veneer, for example brick shelf angles.
- B. Galvanize environmentally exposed steel, for example mechanical equipment supports.
- C. Touch-up welds and abrasions in galvanized members in accordance with ASTM A780.

**END OF SECTION**

## **SECTION 053100: STEEL DECKING**

### **PART 1 GENERAL**

#### **1.1 RELATED SECTIONS**

- A. Division 1 Sections
- B. Section 051200 – Structural Steel Framing.
- C. Section 052100 – Steel Joist Framing.

#### **1.2 REFERENCES**

AISI – Specifications for the Design of Cold-Formed Steel Structural Members.

AWS D1.1 – Structural Welding Code.

AWS A5.5 – Specifications For Low Alloy Steel Covered Arc-Welding.

SDI 31 – Design Manual for Composite Decks, Form Decks, and Roof Decks

SDI RDCH1 – Roof Deck Construction Handbook

SDI DDMO3 – Diaphragm Design Manual, Third Edition

ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

ASTM A1008 – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

ASTM C1513 – Standard Specification for Steel Tapping Screws for Cold-Formed Steel-Framing Connections.

#### **1.3 SUBMITTALS**

- A. Notify the Structural Engineer prior to detailing shop drawings.
- B. Submit detailed shop drawings showing layout and types of deck panels, weld sizes, weld patterns and conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories.
- C. Submit manufacturer's information including section properties, deck gage, material yield strength, etc. for each type of steel deck required. The submittal shall demonstrate that the deck complies with the minimum section and material properties indicated in the structural notes and this Specification.

- D. Submit supporting documentation and manufacturer's information for deck that does not comply with the minimum section and material properties specified. Deck shall be designed for the design criteria outlined herein and the submittal shall be stamped and signed by an Engineer licensed in the project state.
- E. Upon request, submit mill certification that the steel supplied meets these Specifications.
- F. Upon request, submit written welding procedures.
- G. Submit manufacturer's certification of compliance with supplementary framing, sump pans, cant strips, curb openings, special jointing and other accessories.

#### **1.4 QUALITY ASSURANCE**

- A. Refer to the Structural Quality Assurance Plan in the Structural Drawings.
- B. Welders shall be certified by AWS for the welding process involved.

#### **1.5 STORAGE**

- A. Store materials off ground to permit easy access for inspection and identification. Store steel members and packaged items in a manner that provides protection against contact with deleterious materials.

### **PART 2 PRODUCTS**

#### **2.1 GENERAL**

- A. Provide steel deck sheets of three spans minimum wherever possible.

#### **2.2 DECK ATTACHMENT**

- A. Use E-60 series electrodes conforming to AWS A5.5.
- B. Provide weld washers for material thinner than 22 gage.
- C. Provide screws conforming to ASTM C1513.

#### **2.3 ROOF DECK**

- A. Roof Deck: Steel sheets, minimum yield strength of 33,000 pounds per square inch, ASTM A653, Grade 33 or higher, deck types and gages as indicated on Drawings.
- B. Finish: Galvanized, G60 coating.
- C. End and Side Laps: 2-inch flush, nested unless otherwise indicated or specified.

#### **2.4 PERMANENT FORM DECK**

- A. Permanent Form Deck: Steel sheets, minimum yield strength of 60,000 pounds per square inch, ASTM A653, gage as indicated on Drawings.

- B. Finish: Galvanized, G60 coating.

### **PART 3 EXECUTION**

#### **3.1 GENERAL**

- A. Installer must examine the areas and conditions under which metal decking is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- B. Steel deck shall be installed in accordance with the approved shop drawings, requirements of the Steel Deck Institute, the manufacturer's recommendations, and any applicable regulatory, safety guidelines.

#### **3.2 PLACEMENT**

- A. Place steel deck units on supporting steel framework and adjust to final position before permanently fastening. Install deck units and accessories in accordance with manufacturer's recommendations and the Drawings, and as specified herein.

#### **3.3 CUTTING**

- A. Cut holes in deck indicated by the Drawings. Other holes required shall be supplied by those requiring them. Obtain written authorization for additional holes and cutting not indicated on erection drawings.

#### **3.4 WELDING**

- A. Perform welding in accordance with AWS Structural Welding Code.
- B. Install weld washers for deck thinner than 22 gage.

#### **3.5 CONCENTRATED LOADS**

- A. Concentrated loads suspended from the steel deck shall not exceed 50 pounds. No more than one suspended load shall be located in the sheet width in any span.

#### **3.6 DECK SUPPORTS**

- A. Fasten deck to steel framework at ends and at each intermediate support by welding according to manufacturer's specifications unless indicated otherwise on structural drawings or otherwise specified herein. Do not weld deck in place until all bolted and welded connections for the structural frame are complete. A minimum of one floor over the area to be decked is to be bolted and welded prior to welding deck in place.

#### **3.7 ROOF DECK**

- A. Place roof deck in straight alignment. Lap ends of sheets two inches.
- B. Attach side laps of roof deck with screws spaced at a maximum of 24 inches on center for spans greater than 4 feet unless shown otherwise on the Drawings.

- C. Weld roof deck in place by welding with 5/8-inch puddle welds spaced 12 inches on center at each support, unless shown otherwise by the Drawings.
- D. Where screws are required in the drawings, screw fasteners shall extend through the steel connection a minimum of three exposed threads.

### **3.8 PERMANENT FORMS**

- A. Place forms in straight alignment for the entire length of the run of the sheets. Lap ends of sheets two inches.
- B. Attach side laps of deck with screws spaced at a maximum of 24 inches on center for spans greater than 4'-0 unless, unless shown otherwise on the Drawings.
- C. Weld deck in place with 1/2-inch puddle welds and weld washers with welds on each side of the sheet plus two intermediate welds at each support, unless shown otherwise on the Drawings.

**END OF SECTION**



## **SECTION 054100: COLD-FORMED EXTERIOR STEEL STUD FRAMING**

### **PART 1 GENERAL**

#### **1.1 RELATED SECTIONS**

- A. Division 1 Sections.

#### **1.2 REFERENCES**

AISI S100-07 – North American Specification for the Design of Cold-Form Steel Structural Members.

AISI S200-07 – North American Standard for Cold-formed Steel Framing – General Provisions.

ANSI Z49.1 – Safety in Welding, Cutting, and Allied Processes.

ASTM A653 – Standard Specification for Sheet Steel, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.

ASTM A924 – Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

AWS D1.3 – Structural Welding Code: Sheet Steel.

SSMA – Steel Stud Manufacturers Association Product Technical Information.

#### **1.3 DESIGN REQUIREMENTS**

- A. Design of the following is the sole responsibility of the Contractor:
  - 1. Cold-formed exterior steel studs including tracks, bridging, and window or door framing.
  - 2. Any required temporary and permanent restraint/bracing.
- B. Cold-formed exterior steel stud framing shall be designed by a Structural Engineer licensed in the Project state. Design criteria includes, but not limited to, the following:
  - 1. Deflection of steel studs shall not exceed  $L/600$ .
  - 2. Wind pressure for Components and Cladding as indicated in the Structural Drawings.
- C. Cold-formed steel design, fabrication and erection shall conform to AISI S100 and AISI S200.
- D. Stud depth, layout and configuration of cold-formed exterior steel studs shall be compatible with the plans, sections, and details of the Construction Documents.
- E. Exterior studs shall not be designed to be braced at the top by the bottom of a structural steel beam unless the delegated design also includes stud bracing/kickers to the floor diaphragm if it occurs at a floor, or at the top of an adjacent steel beam if it occurs at the roof .

#### **1.4 SUBMITTALS**

- A. Refer to Structural Quality Assurance Plan in the Structural Drawings for additional submittal requirements.
- B. Shop Drawings
  - 1. Shall include but not necessarily be limited to the following:
    - a. Plans, cross-sections, or elevations as necessary to adequately depict component locations.
    - b. Framing details at wall openings including jamb members, headers, sills, and connections.
    - c. Connection details showing screw types and locations, weld lengths or other fastener requirements.
    - d. Bracing locations and details. Any required bracing to the primary structure that is not shown in the Construction Documents shall be specifically identified.
  - 2. Design loads.
  - 3. Shall be sealed by an Engineer licensed in the Project state.
- C. Submit manufacturer's product information clearly describing quality, performance and finish for steel studs.
- D. Submit manufacturer and Installer qualifications.

#### **1.5 QUALITY ASSURANCE**

- A. Refer to the Structural Quality Assurance Plan in the Structural Drawings.
- B. Manufacturer shall have a minimum of three years documented experience in the manufacturing of products required by the Construction Documents.
- C. Installer shall have a minimum of three years documented experience.

### **PART 2 PRODUCTS**

#### **2.1 MATERIALS**

- A. Studs and accessories which are 12, 14, or 16 gage shall meet the requirements of ASTM A446, Grade D with a minimum yield of 50,000 psi. Studs and accessories which are 18 or 20 gage shall meet the requirements of ASTM A446, Grade A with a minimum yield of 33,000 psi.
- B. Studs and accessories shall have a G60 galvanized coating meeting the requirements of ASTM A525.

#### **2.2 ACCESSORIES**

- A. Bridging: 1-1/2-inch deep by 16 gage minimum.
- B. Strap Bracing: Minimum of 1-1/2-inch wide by 18 gage unless noted otherwise.
- C. Tracks: Deep leg type, unpunched, same gage, size, and finish as studs with minimum 18 gage thickness.

- D. Compensation Tracks / Slip Tracks: Deep leg type with a flange width of 2½ inches. Track shall be same nominal depth as stud/track with allowance for slip of standard deep leg track. Minimum 14 gage.
- E. Plates, Gussets, Clip Angles: Minimum 14 gage. Clip angles shall be a minimum of 2 inches x 2 inches.
- F. Self-drilling, Self-tapping Screws: Hot-dip galvanized conforming to values given in the referenced SSMA document.
- G. Anchorage Devices:
  - 1. Powder Actuated Fasteners shall be manufactured from AISI 1062 or AISI 1065 steel austempered to a minimum core hardness of 50-54Rc and possess the following properties:
    - Tensile strength = 270,000 psi
    - Shear strength = 162,000 psi
    - All fasteners shall meet the requirements of ASTM B-633-78.
    - Fasteners shall be a minimum 9/64-inch diameter.
    - Fasteners shall be zinc plated.
    - Fastener minimum design values shall be in accordance with manufacturer's recommendations.
  - 2. Expansion anchors shall be stud type, and shall be zinc plated in accordance with ASTM B633, Type III Fe/Zn 5. Expansion anchors shall be a minimum of 3/8-inch diameter with 2-1/2-inch embedment into concrete unless noted otherwise in the Drawings.
- H. Welding: AWS D1.3-8 Structural Welding Code-Sheet Metal (field welding of material shall not be permitted for 20 gage material or thinner).
- I. Acoustical Sealant: USG, or approved equal.
- J. Sizes and thicknesses are minimum acceptable, regardless of load. Actual sizes shall be determined by Steel Stud manufacturer in accordance with loads given in the Structural Notes. Minimum listed size shall not be construed to be the actual designed component size.

## **PART 3 EXECUTION**

### **3.1 ERECTION**

- A. General:
  - 1. Framing components shall be cut squarely for attachment to perpendicular members or, as required, for angular fit against abutting members.
  - 2. Erect framing plumb, level, and square.
  - 3. Studs shall be plumbed, aligned, and securely attached to the flanges or web of both the upper and lower tracks.
  - 4. Fastening of components shall be with self-drilling screws or welds. Wire tying of components shall not be permitted. Touch-up field welds and scratched or damaged finish to studs with zinc rich paint.
  - 5. Splices in framing components shall not be permitted other than in runner tracks.
  - 6. Runner tracks shall be securely anchored to the supporting structure.

- B. Studs Spacing: Stud manufacturer shall determine stud spacing at interior and corner zones to resist Component and Cladding Loads given in the Structural Notes. Stud spacing shall not exceed 16 inches, center-to-center, regardless of design loads.
- C. Stud Tracks: Before installing stud tracks for exterior walls, apply two 1/2- inch round beads of acoustical sealant longitudinally under stud tracks to seal runner to floor.
- D. Door Openings: Install multiple studs each side of door openings as shown on the approved Shop Drawings.
  - 1. Install headers between door jambs at top of doors as shown on the approved Shop Drawings.
  - 2. On top of headers, install runners to receive bottom ends of studs over door openings.
- E. Window Openings: Install multiple studs each side of window openings as shown on the approved Shop Drawings.
  - 1. Install headers and sills between window jambs shown on the approved Shop Drawings.
  - 2. On top of headers and bottom of sills, install runners to receive short studs.
  - 3. Where shown on the Architectural Drawings, attach wood blocking to stud framing with 1/2-inch diameter galvanized bolts 12 inches on-center. Coordinate attachment of window system to blocking/stud framing prior to erection of metal stud framing.
  - 4. Where indicated on the Structural Drawings (for example, at windows over 8 feet wide and at cantilevered parapets), attach studs / track to structural steel reinforcement with self-drilling screws.
- F. Corners: Construct using a minimum of three studs designed to resist the design loads.
- G. Between Studs: Install framing for attachment of electrical boxes, mechanical and for other items to be anchored to walls.
- H. At Butting Walls: Place studs not more than 2 inches from walls.
- I. Insulation: In all multiple jamb studs and multiple headers not accessible to insulation contractors, insulation equal to that specified elsewhere shall be provided.

**END OF SECTION**

**SECTION 05 50 00  
METAL FABRICATIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop and site fabricated steel and aluminum items.
- B. All misc. items shown in the drawings but not included in the structural drawings or related specifications in other parts of the project manual or exactly specified in the drawings.
- C. Bollards.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 53 - Incidental Concrete: Placement of metal fabrications in concrete.
- B. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- C. Section 05 51 00 - Metal Stairs.
- D. Section 05 52 13 - HANDRAILS AND RAILINGS.
- E. Section 09 91 13 - Exterior Painting: Paint finish.
- F. Section 09 91 23 - Interior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2020.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
- F. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.
- G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.
- I. ASTM B211/B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2019.
- J. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2012.
- K. ASTM B211M - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold-Finished Bar, Rod, and Wire (Metric); 2012.
- L. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
- M. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2023.
- N. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- O. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

- P. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

#### 1.04 SUBMITTALS

- A. See Section 01 33 00 - Shop Drawings, Product Data and Samples, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths. Welded connections shall be designed by the fabricator, unless noted otherwise.
  2. Design data: Submit drawings and supporting calculations, signed and sealed by a qualified professional structural engineer.
    - a. Include the following, as applicable:
      - 1) Design criteria.
      - 2) Engineering analysis depicting stresses and deflections.
      - 3) Member sizes and gauges.
      - 4) Details of connections.
      - 5) Support reactions.
      - 6) Bracing requirements.

#### 1.05 QUALITY ASSURANCE

- A. Design any miscellaneous components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in Mississippi.

### PART 2 PRODUCTS

#### 2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36/A36M. All exterior lintels are to be galvanized.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, hot-dip galvanized finish.
- E. Slotted Channel Framing: ASTM A653/A653M, Grade 33.
- F. Slotted Channel Fittings: ASTM A1011/A1011M.
- G. Mechanical Fasteners: Same material as or compatible with materials being fastened; type consistent with design and specified quality level.
- H. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- I. Provide any steel sections, fasteners, bolts, nuts, washers, etc. listed above as galvanized or stainless steel where indicated in the drawings
- J. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- K. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- L. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

#### 2.02 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- B. Aluminum-Alloy Bars: ASTM B211/B211M, 6061 alloy, T6 temper.
- C. Bolts, Nuts, and Washers: Stainless steel.

#### 2.03 FABRICATION

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.

- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

#### **2.04 FABRICATED ITEMS**

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; galvanized finish and painted.
- B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; galvanized finish.
- C. Lintels: As detailed; galvanized finish and painted.
- D. Slotted Channel Framing: Fabricate channels and fittings from structural steel complying with the referenced standards; factory-applied, rust-inhibiting thermoset acrylic enamel finish.

#### **2.05 FINISHES - STEEL**

- A. Prime paint steel items.
  - 1. Exceptions: Galvanize items to be embedded in concrete or masonry and items specified for exterior painted finish.
  - 2. Exceptions: Do not prime surfaces in direct contact with concrete or masonry, where field welding is required, and items to be covered with sprayed fireproofing.
- B. All exterior exposed steel surfaces must be galvanized and painted as required by Section 09 91 13.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: Prime all steel as required by Section 09 91 23.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

#### **2.06 FINISHES - ALUMINUM**

- A. Exterior Aluminum Surfaces: Class I natural anodized.
- B. Interior Aluminum Surfaces: Class I natural anodized.
- C. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

#### **2.07 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

#### **3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.

- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete.

### **3.03 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on shop drawings.
- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain approval prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

**END OF SECTION**



**SECTION 05 51 00  
METAL STAIRS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Stairs with concrete treads.
- B. Structural steel stair framing and supports.
- C. Handrails and guards.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 53 - Incidental Concrete: Concrete fill in stair pans and landings.
- B. Section 05 50 00 - METAL FABRICATIONS.
- C. Section 05 52 13 - HANDRAILS AND RAILINGS: Metal handrails for the stairs specified in this section.
- D. Section 09 91 23 - Interior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- D. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2023.
- E. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- G. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- H. SSPC-SP 2 - Hand Tool Cleaning; 2018.

**1.04 SUBMITTALS**

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths. All welded connections shall be designed by the stair supplier/fabricator, unless noted otherwise.

**1.05 QUALITY ASSURANCE**

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in Mississippi, or personnel under direct supervision of such an engineer.

**PART 2 PRODUCTS**

**2.01 METAL STAIRS - GENERAL**

- A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
  - 1. Regulatory Requirements: Provide stairs and railings that comply with most stringent requirements of local, state, and federal regulations; where requirements of Contract Documents exceed those of regulations, comply with Contract Documents.
  - 2. Handrails: Comply with applicable accessibility requirements of ADA Standards.

3. Structural Design: Provide complete stair and railing assemblies that comply with the applicable local code.
    - a. Stair Capacity: Uniform live load of 100 lb/sq ft and a concentrated load of 300 lb with deflection of stringer or landing framing not to exceed 1/180 of span.
  4. Dimensions: As indicated on drawings.
  5. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
  6. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
  7. Separate dissimilar metals using paint or permanent tape.
- B. Metal Jointing and Finish Quality Levels:
1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
    - a. Welded Joints: Continuously welded and ground smooth and flush.
    - b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
    - c. Exposed Edges and Corners: Eased to small uniform radius.
    - d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.
  - C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
  - D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

## 2.02 METAL STAIRS WITH CONCRETE TREADS

- A. Jointing and Finish Quality Level: Architectural, as defined above.
- B. Risers: Closed.
- C. Treads: Metal pan with field-installed concrete fill.
  1. Concrete Depth: 1-1/2 inches, minimum.
  2. Tread Pan Material: Steel sheet.
  3. Tread Pan Thickness: As required by design; 14 gauge, 0.075 inch minimum.
  4. Pan Anchorage to Stringers: Continuously welded, from top or bottom.
  5. Concrete Reinforcement: Welded wire mesh.
- D. Risers: Same material and thickness as tread pans.
  1. Riser/Nosing Profile: Sloped riser with rounded nosing of minimum radius.
  2. Nosing Depth: Not more than 1-1/2 inch overhang.
  3. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch wide.
- E. Stringers: Rolled steel channels.
  1. End Closure: Sheet steel of same thickness as risers welded across ends.
- F. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.
- G. Railings: As indicated in Drawings..
- H. Under Side of Stair: Exposed to view, to be finished same as specified for other exposed to view surfaces.

## 2.03 HANDRAILS AND GUARDS

- A. Wall-Mounted Rails: See Section 05 52 13.
- B. Guards: Pipe railings, see Section 05 52 13.

## 2.04 MATERIALS

- A. Steel Sections: ASTM A 36/A 36M.
- B. Concrete Fill: Type specified in Section 03 30 53, Incidental Concrete.
- C. Concrete Reinforcement: Mesh type as detailed, galvanized.

## **2.05 ACCESSORIES**

- A. Steel Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, and galvanized to ASTM A153/A153M where connecting galvanized components.
- B. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- C. Shop and Touch-Up Primer: SSPC-Paint 15, and comply with VOC limitations of authorities having jurisdiction.

## **2.06 SHOP FINISHING**

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime Painting: Use specified shop- and touch-up primer.
  - 1. Preparation of Steel: In accordance with SSPC-SP 2 Hand Tool Cleaning.
  - 2. Number of Coats: One.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 PREPARATION**

- A. When field welding is required, clean and strip primed steel items to bare metal.
- B. Supply items required to be cast into concrete with setting templates.

### **3.03 INSTALLATION**

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Provide anchors, plates, angles, hangers, and struts required for connecting stairs to structure.
- C. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- D. Provide welded field joints where specifically indicated on shop drawings. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
- F. Obtain approval prior to site cutting or creating adjustments not scheduled.
- G. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

**END OF SECTION**



## SECTION 05 51 33

### INCLINED METAL LADDERS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Aluminum Ships Ladders.

##### 1.2 RELATED SECTIONS

- A. Section 05 12 00 - Structural Steel Framing: Roof structure, opening supports and miscellaneous supports.

##### 1.3 SUBMITTALS

- A. Submit under provisions of Division 1.
- B. Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings for Ladders:
  - 1. Plan and section of ladder installation.

##### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store ladder until installation inside under cover. If stored outside, under a tarp or suitable cover.

##### 1.5 WARRANTY

- A. Limited Warranty: One year against defective material and workmanship, covering parts only, no labor or freight. Defective parts, if deemed so by the manufacturer, will be replaced at no charge, freight excluded, upon inspection at manufacturer's plant which warrants same.

#### PART 2 PRODUCTS

##### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Precision Ladders, LLC, which is located at: P. O. Box 2279 ; Morristown, TN 37816-2279; Toll Free Tel: 800-225-7814; Tel: 423-586-2265; Fax: 423-586-2091; Web: [www.PrecisionLadders.com](http://www.PrecisionLadders.com)
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

##### 2.2 ALUMINUM SHIPS LADDER

- A. Aluminum Ships Ladder and Components: Ladder, mounting brackets and handrails on both sides.
  - 1. Model: Model SL Aluminum Ships Ladder as manufactured by Precision Ladders, LLC.
  - 2. Capacity: Unit shall support a 500 lb (227 kg) total load without failure.
  - 3. Ladder Stringer: 5 inch by 2 inch by 3/16 inch (127 mm by 51 mm by 5 mm) extruded 6005-T5 aluminum channel. Pitch: 60 to 75 degrees.
  - 4. Ladder Mounting Brackets:

05 51 33

INCLINED METAL LADDERS

PAGE 1 OF 2

- a. Floor Bracket: 2 inch by 3 inch by 1/4 inch (51 mm by 76 mm by 6 mm) aluminum angle.
  - b. Top Bracket: 4-3/4 inch by 5 inch by 2 inch by 1/4 inch (121 mm by 127 mm by 6 mm) aluminum angle.
5. Handrails: 1-1/4 inches (32 mm) Schedule 40, 6005-T5 aluminum pipe provided with internal aluminum fittings.

## **2.3 FABRICATION**

- A. Completely fabricate ladder ready for installation before shipment to the site.
- B. Completely fabricate handrail components ready for field assembly to ladder before shipment to site.

## **2.4 FINISHES**

- A. Mill finish on aluminum components is standard.
- B. Optional finishes are powder coat or clear anodized.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- B. Examine materials upon arrival at site. Notify the carrier and manufacturer of any damage.

### **3.2 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.

### **3.3 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

**SECTION 05 52 13  
HANDRAILS AND RAILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall mounted handrails.
- B. Stair railings and guardrails (as designed/shown in the drawings).

**1.02 RELATED REQUIREMENTS**

- A. Section 05 51 00 - Metal Stairs: Handrails other than those specified in this section.
- B. Section 09 21 16 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.
- C. Section 09 91 23 - Interior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2021a.
- E. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2021.
- F. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).
- G. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

**1.04 SUBMITTALS**

- A. See Section 013300 - Shop Drawings, Product Data and Samples for submittal procedures
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths. All welded connections shall be designed by the fabricator, unless noted otherwise.

**1.05 QUALITY ASSURANCE**

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in Mississippi, or personnel under direct supervision of such an engineer.

**PART 2 PRODUCTS**

**2.01 RAILINGS - GENERAL REQUIREMENTS**

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 50 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E 935.
- C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E 935.

- D. Allow for expansion and contraction of members and building movement without damage to connections or members.
- E. Dimensions: See drawings for configurations and heights.
- F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
  - 1. For anchorage to concrete, provide inserts to be cast into concrete, for welding anchors.
  - 2. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting anchors.
  - 3. For anchorage to stud walls, provide backing plates, for bolting anchors.
- G. Provide welding fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

## **2.02 STEEL PIPE HANDRAILS AND GUARDRAILS**

- A. Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing.
- B. Steel Pipe: ASTM A 53/A 53M Grade B Schedule 40, galvanized finish.
- C. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- D. Exposed Fasteners: No exposed bolts or screws.
- E. Straight Splice Connectors: Steel welding collars.
- F. All exterior steel for handrail and guardrail assemblies shall be galvanized.
- G. Galvanizing: In accordance with requirements of ASTM A123/A123M.
- H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

## **2.03 FABRICATION**

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Welded Joints: Provide welded field joints where specifically indicated on shop drawings. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
- F. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
- G. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete with setting templates, for installation as work of other sections.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.



- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Field weld anchors as indicated on shop drawings. Touch-up welds with primer. Grind welds smooth.
- F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

**3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

**END OF SECTION**



**SECTION 05 73 00  
DECORATIVE METAL RAILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Railing systems.
  - 1. Interior post-supported railing and guard rail systems with glass infill panels.

**1.02 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- C. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures; 2006.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- E. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- G. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings; 1999, with Editorial Revision (2022).
- H. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2020.
- I. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2024.
- J. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing; 2021.
- K. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- L. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023, with Editorial Revision.
- M. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.
- N. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2021.
- O. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.
- P. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2021.
- Q. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).
- R. AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel; 2017, with Amendment (2021).
- S. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019.
- T. NAAMM AMP 500-06 - Metal Finishes Manual; 2006.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene preinstallation meeting one week before starting work of this section. Attendees include:
  - 1. General Contractor.
  - 2. Manufacturer's representative.
  - 3. Albert & Robinson Architects.
  - 4. State of Mississippi's representative.
  - 5. Other subcontractors of adjacent work.

#### 1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, including description of materials, components, finishes, fabrication details, glass, anchors, and accessories.
- B. Shop Drawings: Indicate railing system elevations and sections, details of profile, dimensions, sizes, connection attachments, anchorage, size and type of fasteners, and accessories. Indicate anchor and joint locations, brazed connections, transitions, and terminations.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
  - 2. Include design engineer's seal and signature on each sheet of shop drawings.
- C. Samples: Submit one of each item below for each type and condition shown.
  - 1. Glass: 12 by 12 inches, showing color, thickness, and edge condition.
  - 2. Railing: 12-inch long section of handrail showing color, finish, and connection detail.
- D. Test Reports: Submit test reports from independent testing agency showing compliance with specified design and performance requirements.
- E. Manufacturer's Instructions: Indicate installation.
- F. Designer's qualification statement.
- G. Manufacturer's qualification statement.
- H. Fabricator's qualification statement.
- I. Welders' qualification statement.
- J. Installer's qualification statement.
- K. Maintenance Data: Manufacturer's instructions for care and cleaning.
- L. Executed warranty.

#### 1.05 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in Mississippi or personnel under direct supervision of engineer.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.
- C. Fabricator Qualifications: Certified in accordance with AISC 201 and IAS AC172.
- D. Installer Qualifications:
  - 1. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- E. Welder Qualifications: Welding processes and welding operators certified in accordance with AWS B2.1/B2.1M within 12 months of scheduled welding work.
- F. Templates: Supply installation templates, reinforcing, and required anchorage devices.

#### 1.06 MOCK-UPS

- A. Provide mock-up of railing system, freestanding center rail, and guardrail, \_\_\_\_ feet long by \_\_\_\_ feet wide, indicating each type of material, cladding, and finish.
- B. Locate where directed.
- C. Mock-up may remain as part of work.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in factory-provided protective coverings and packaging.
- B. Protect materials against damage during transit, delivery, storage, and installation at site.
- C. Inspect materials upon delivery for damage. Replace damaged items.
- D. Prior to installation, store materials and components under cover in dry location.

## 1.08 FIELD CONDITIONS

- A. Ambient Conditions:
1. Do not install railings until project is enclosed and ambient temperature of space is minimum 65 degrees F and maximum 95 degrees F.
  2. Maintain ambient temperature of space at minimum 65 degrees F and maximum 95 degrees F for 24 hours before, during, and after railing installation.

## 1.09 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard 1-year warranty against defects in materials, fabrication, finishes, and installation commencing on mm-dd-yyyy; complete forms in State of Mississippi's name and register with manufacturer.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Decorative Metal Railings:
1. Viva Railings, LLC; \_\_\_\_\_: [www.vivarailings.com/#sle](http://www.vivarailings.com/#sle).
  2. Substitutions: See Section 01 60 00 - Product Requirements.
  3. **NOTE: OBTAIN GLAZED DECORATIVE METAL RAILING SYSTEMS FROM A SINGLE SOURCE FROM A SINGLE MANUFACTURER. SYSTEMS MUST BE DESIGNED, ENGINEERED AND FABRICATED BY THE MANUFACTURER OF THE RAILIING SYSTEM.**

### 2.02 RAILING SYSTEMS

- A. General: Factory- or shop-fabricated to suit project conditions, for proper connection to building structure, and in largest sizes practical for delivery to site.
- B. Performance Requirements: Applying loads simultaneously not required; design and fabricate railings and anchorages to resist loads without failure, damage, or permanent set, including:
1. Lateral Force: 75 lb minimum, when tested in accordance with ASTM E935.
  2. Distributed Load: 50 lbf/ft minimum, applied vertically and horizontally at top of handrail, when tested in accordance with ASTM E935.
  3. Concentrated Loads: 200 lb minimum, applied to handrail horizontally and vertically, in accordance with ASTM E935.
  4. Handrails: Comply with ADA Standards.
- C. Assembly: Use slip-on, nonweld mechanical fittings, flanges, escutcheons, and wall brackets to join lengths, seal open ends, and conceal exposed mounting bolts and nuts.
- D. Joints: Machined smooth with hairline seams; tightly fitted and secured.
- E. Field Connections: Provide sleeves to accommodate site assembly and installation.
- F. Glazed Post Railing System: Engineered, post-supported railing system with glass infill panels.
1. Configuration: Guardrail with separate handrail.
  2. Top Rail: None.
  3. Grip Rail: Round, stainless steel, 1-1/2-inch diameter.
    - a. #6 Satin Finish.
  4. Fin Posts:
    - a. Configuration: Composite stainless steel (#6 satin finish) and wood.
    - b. Mounting: As indicated on drawings.
  5. Glass: As specified in this section.
  6. Glass Mounts: Pressure clamps infill mounts, same metal as railing; no holes drilled in glass.
  7. Handrail Brackets: Same metal as railing.
  8. Basis of Design: Viva Railings, LLC; FIN Railing System: [www.vivarailings.com/#sle](http://www.vivarailings.com/#sle).

### 2.03 MATERIALS

- A. Stainless Steel Components: ASTM A666, Type 304.

1. Stainless Steel Tubing: ASTM A554, Type 304, 16-gauge, 0.0625-inch minimum metal thickness, 1-1/2-inch diameter.
  2. Stainless Steel Bars, Shapes and Moldings: ASTM A276/A276M, Type 304.
  3. Fasteners: Type 304 stainless steel.
    - a. Fasteners for Anchoring to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
    - b. Provide concealed fasteners for interconnecting railing components and for attaching railings to other work.
- B. Glass: Laminated safety glass; ASTM C1172.
1. Plastic Interlayer: Minimum 0.060 inch thick.
    - a. Interlayer material: SGP.
    - b. Interlayer color: Clear.
  2. Impact Strength: Category II, tested in accordance with 16 CFR 1201.
  3. Thickness: As required by structural loads, but not less than 5/8 inch thick.
  4. Configuration: As indicated on drawings.
  5. Glass Panel Edge Finish: Clean-cut or flat-grind edges to produce smooth, square edges with slight chamfers at junctions of edges and faces.
  6. Color: Clear, no tint. Low-iron type.
  7. Decorative Film: Provide as indicated in Drawings.

#### 2.04 FABRICATION

- A. General: Fabricate glazed decorative metal railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings and guards to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- F. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- G. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- H. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.
- I. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, handrail brackets, miscellaneous fittings, and anchors to interconnect railing members to other Work.
- J. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- K. Welded and Brazed Joints: Make visible joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.
  1. Ease exposed edges to small uniform radius.
  2. Welded Joints:
    - a. Carbon Steel: Perform welding in accordance with AWS D1.1/D1.1M.
    - b. Stainless Steel: Perform welding in accordance with AWS D1.6/D1.6M.

## 2.05 FINISHES

- A. General: Comply with NAAMM AMP 500-06.
  - 1. Complete mechanical finishes before fabrication. After fabrication, finish joints, bends, abrasions, and surface blemishes to match sheet.
  - 2. Protect mechanical finishes on exposed surfaces from damage.
  - 3. Appearance: Limit variations in appearance of adjacent pieces to one-half of range represented in approved samples. Noticeable variations in same piece are not acceptable. Install components within range of approved samples to minimize contrast.
- B. Stainless Steel Finishes:
  - 1. Remove tool marks, die marks, and stretch lines before finishing.
  - 2. Dull Satin: No.6.
  - 3. Directional Finishes: Run grain with long dimension of each item.
  - 4. After polishing, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

## 2.06 ACCESSORIES

- A. Nonweld Mechanical Fittings for Stainless Steel Railings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- B. Welding Fittings: Factory- or shop-welded from matching pipe or tube; joints and seams ground smooth.
- C. Anchors and Fasteners: Provide anchors, fasteners, and other attachment devices required to attach to structure. Ensure attachment devices are of same material as components unless indicated otherwise.
  - 1. Stainless Steel Fasteners: Type 304.
  - 2. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing; provide only where exposed fasteners are unavoidable.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that substrate and site conditions are acceptable and ready to receive work.
- B. Verify field dimensions of locations and areas to receive work.
- C. Notify Albert & Robinson Architects immediately of conditions that would prevent satisfactory installation.
- D. Do not proceed with work until detrimental conditions are corrected.

### 3.02 PREPARATION

- A. Protection of In-Place Conditions: Protect existing work before proceeding with installation.
- B. Review installation drawings before beginning installation. Coordinate diagrams, templates, instructions, and directions for installation of anchorages and fasteners.
- C. Clean surfaces to receive railings. Remove materials and substances detrimental to installation.

### 3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, and with tight joints, except where necessary for expansion.
- C. Anchor securely to structure.
- D. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.
- E. Isolate dissimilar materials with bituminous coating, bushings, grommets, or washers to prevent electrolytic corrosion.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per floor level, noncumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

### **3.05 FIELD QUALITY CONTROL**

- A. Manufacturer Services: Provide services of manufacturer's field representative to observe railing installation.

### **3.06 CLEANING**

- A. Remove protective film from exposed metal surfaces.
- B. Metal: Clean exposed metal finishes with potable water and mild detergent in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents, or other substances that may damage material or finish.
- C. Glass and Glazing: Clean glazing surfaces; remove excess glazing sealant compounds, dirt, and other substances.

### **3.07 PROTECTION**

- A. Protect installed components and finishes from damage after installation.
- B. Repair damage to exposed, making finishes indistinguishable from undamaged areas.
- C. Replace finishes and components that have irreparable damage. Ensure damaged areas are indistinguishable from undamaged finishes and surfaces.

**END OF SECTION**



**SECTION 06 10 00  
ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. CHECK CODE SUMMARY IN DRAWINGS FOR REQUIREMENT OF FIRE TREATMENT FOR MEMBERS INCLUDED IN THIS SECTION. TYPE 1 OR 2 CONSTRUCTION REQUIRES FIRE TREATMENT FOR ALL WOOD COMPONENTS EXCEPT WHERE ALLOWABLE.
- B. Roof-mounted curbs.
- C. Roofing nailers.
- D. Preservative treated wood materials.
- E. Fire retardant treated wood materials.
- F. Miscellaneous framing and sheathing.
- G. Communications and electrical room mounting boards (when not specified elsewhere).
- H. Concealed wood blocking, nailers, and supports.
- I. Miscellaneous wood nailers, furring, and grounds.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 50 00 - METAL FABRICATIONS: Miscellaneous steel connectors and support angles for wood framing.
- B. Section 06 20 00 - Finish Carpentry.
- C. Section 07 41 13.16 - Standing-Seam Metal Roof Panels.
- D. Section 07 52 16 - SBS-Modified Bitumen Membrane Roofing.
- E. Section 07 62 00 - Sheet Metal Flashing and Trim.
- F. Section 07 92 00 - Joint Sealants.
- G. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.
- H. Section 31 31 16 - Termite Control: Field-applied termiticide and mildewcide for wood materials.

**1.03 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- B. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2017).
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood; 2021.
- E. PS 20 - American Softwood Lumber Standard; 2010.
- F. SPIB (GR) - Grading Rules; 2014.
- G. AF&PA – National Design Specification for Wood Construction with 2005 Supplement.
- H. ALSC – American Lumber Standards Committee: Softwood Lumber Standards.
- I. APA – American Plywood Association.
- J. AWPA C1 – All Timber Products Preservative Treatment by Pressure Process.
- K. AWPA C20 – Structural Lumber Fire-Retardant Treatment by Pressure Process.
- L. SPIB – Southern Pine Inspection Bureau.
- M. WCLIB – West Coast Lumber Inspection Bureau.

- N. WWPA – Western Wood Products Association.

#### **1.04 SUBMITTALS**

- A. For treated materials, submit certification by treating plant stating chemicals and process used, net amount of preservative retained and conformance with applicable standards.
- B. For all dimensioned lumber, submit letters of certificate stating the species and grade of lumber used.
- C. Submit product data for metal framing anchors, connectors, and construction adhesives.

#### **1.05 QUALITY ASSURANCE**

- A. Comply with National Design Specification for Wood Construction.
- B. Perform Work in accordance with the following agencies:
  - 1. Lumber Grading Agency: Certified by ALSC.
  - 2. Plywood Grading Agency: Certified by APA.
- C. Identify all wood products by official grade mark, except for wood products exposed to view submit manufacturer's certificate that lumber meets specified requirements.
  - 1. Lumber: Grade stamp to contain symbol of inspection agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded, where applicable and condition of seasoning at time of manufacture.
  - 2. Structural Panel: Panel grade, span rating, exposure durability classification, product standard thickness, and mill number.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Protect the installed work and materials of all other trades.
- C. In the advent of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.
- D. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. Species: Southern Pine, unless otherwise indicated.
  - 2. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
  - 3. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at [www.alsc.org](http://www.alsc.org), and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
    - a. Redwood Inspection Service (RIS).
    - b. Southern Pine Inspection Bureau (SPIB).
    - c. West Coast Lumber Inspection Bureau (WCLIB).
    - d. Western Wood Products Association (WWPA).
    - e. National Lumber Grades Authority (NLGA - Canadian)
- B. Lumber fabricated from old growth timber is not permitted.

#### **2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: Kiln-dry or MC15.

- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.

### 2.03 CONSTRUCTION PANELS

- A. When not specified elsewhere, provide as follows:
  - 1. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- B. Other Applications:
  - 1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
  - 2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
  - 3. Other Locations: PS 1, C-D Plugged or better.

### 2.04 ACCESSORIES

- A. Fasteners and Anchors:
  - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
  - 2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.

### 2.05 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  - 1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
  - 2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Fire Retardant Treatment:
  - 1. Exterior Type: AWWA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Treat rough carpentry items as indicated.
    - c. Do not use treated wood in direct contact with the ground.
  - 2. Interior Type A: AWWA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
    - a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
    - b. Treat rough carpentry items as indicated .
    - c. Do not use treated wood in applications exposed to weather or where the wood may become wet.
- C. Preservative Treatment:
  - 1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
    - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.

- b. Treat lumber exposed to weather.
  - c. Treat lumber in contact with roofing, flashing, or waterproofing.
  - d. Treat lumber in contact with masonry or concrete.
  - e. Treat lumber less than 18 inches above grade.
  - f. Treat lumber in other locations as indicated.
2. Preservative Pressure Treatment of Plywood Above Grade: AWP A U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative.
- a. Kiln dry plywood after treatment to maximum moisture content of 19 percent.
  - b. Treat plywood in contact with roofing, flashing, or waterproofing.
  - c. Treat plywood in contact with masonry or concrete.
  - d. Treat plywood less than 18 inches above grade.
  - e. Treat plywood in other locations as indicated.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Coordinate installation of rough carpentry members specified in other sections.

#### **3.02 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.
- D. Discard unit of material with defects that might impair quality of work, and units that are too small to fabricate work with minimum joints or optimum joint arrangement.
- E. Installer must examine the substrate structure and the conditions under which the carpentry Work is to be installed, and notify the Contractor in writing of conditions detrimental to the Work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- F. Coordinate carpentry Work with other Work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other Work.

#### **3.03 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim. Form to shapes as shown and cut as required for true line and level of Work to be attached. Coordinate location with other Work involved.
- B. Attach framing and blocking members to substrate as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry Work. Where possible, anchor to formwork before concrete placement.
- C. Provide permanent grounds of dressed, preservative treated, key bevelled lumber not less than 1 1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.
- D. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- E. Any wood framing and blocking members concealed within non-combustible assemblies must be fire-treated where indicated in Drawings and/or required by applicable local codes.
- F. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

- G. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- H. Where wood furring is required, install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finished Work.
- I. Provide the following specific non-structural framing and blocking at minimum:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Handrails.
  - 4. Grab bars.
  - 5. Towel and bath accessories.
  - 6. Wall-mounted door stops.
  - 7. Chalkboards and marker boards.
  - 8. Wall paneling and trim.
  - 9. Joints of rigid wall coverings that occur between studs.

### **3.04 ROOF-RELATED CARPENTRY**

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at each roof opening except where prefabricated curbs are specified and where specifically indicated otherwise; form corners by alternating lapping side members.

### **3.05 INSTALLATION OF CONSTRUCTION PANELS**

- A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  - 3. Install adjacent boards without gaps.

### **3.06 TOLERANCES**

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.
- C. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

### **3.07 CLEANING**

- A. Site cleaning per Section 01 74 00, Cleaning.
  - 1. Comply with applicable regulations.
  - 2. Do not burn scrap on project site.
  - 3. Do not burn scraps that have been pressure treated.
  - 4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
- B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
- C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**



**SECTION 06 20 00  
FINISH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Finish carpentry items.
- B. Wood door frames, glazed frames.
- C. Wood casings and moldings.
- D. Hardware and attachment accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 06 41 00 - Architectural Wood Casework: Shop fabricated custom cabinet work.
- C. Section 09 91 13 - Exterior Painting: Painting of finish carpentry items.
- D. Section 09 91 23 - Interior Painting: Painting of finish carpentry items.

**1.03 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- C. BHMA A156.9 - American National Standard for Cabinet Hardware; 2010.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

**1.05 SUBMITTALS**

- A. See Section 01 33 00 - Administrative Requirements for submittal procedures.
- B. Product Data:
  - 1. Provide data on fire retardant treatment materials and application instructions.
  - 2. Provide instructions for attachment hardware and finish hardware.
- C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
  - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
  - 2. Provide elevations, sections and jointing details.
  - 3. Indicate materials to be used including wood species and finish.
  - 4. Indicate fastening methods.
  - 5. Indicate and accessories required to be used and submit cut sheets for each (including reveals).
  - 6. Indicate all hardware to be used and submit cut sheets for approval.
- D. Samples: Submit two samples of each type of finish carpentry to be installed including but not limited to panels, trim, moldings, base, casings, reveals, hardware. Wood samples shall be finished per final product requirements and shall be no less than 12 inches in length or 12 x 12 inches if panelized.

**1.06 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

### 1.07 MOCK-UPS

- A. Provide column wrap mock-up, full size, illustrating finish and construction.
- B. Locate where directed.
- C. Mock-up may remain as part of the work.

### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.
- B. Protect from moisture damage.
- C. Handle materials and products to prevent damage to edges, ends, or surfaces.

## PART 2 PRODUCTS

### 2.01 FINISH CARPENTRY ITEMS

- A. Unless otherwise indicated provide products of quality specified by AWI Architectural Woodwork Quality Standards Illustrated for Premium grade.
- B. Interior Woodwork Items:
  - 1. Species as required on the drawings but no less than solid cherry premium grade for transparent finish and/or cherry veneer premium grade panels for transparent finish.

### 2.02 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.

### 2.03 LUMBER MATERIALS

- A. Lumber Species (transparent finish only): Species, sizes, dimensions and shapes are indicated in the drawings.
  - 1. Grade: Clear (no knots).
  - 2. Species Note: If species is not indicated in drawings, then use cherry with no variations in color in the wood.
  - 3. Grain Direction: Vertical.
  - 4. Moisture Content: 6% max.
  - 5. Final Finish: Suitable for transparent finish.
- B. Lumber Species (painted finish only): Species, sizes, dimensions and shapes are indicated in the drawings.
  - 1. Grade: Select.
  - 2. Species Note: If species is not indicated in drawings, then use poplar.
  - 3. Moisture Content: 6% max.
  - 4. Final Finish: Suitable for opaque finish.

### 2.04 SHEET MATERIALS

- A. Hardwood Plywood: Veneer core, type of glue recommended for application; premium architectural grade "A" Cherry face species.
- B. Finish Plywood (hardwood for transparent finish): Veneer species and thickness indicated in drawings.
  - 1. Grade: A-3 if only one side is visible in finished installation.
  - 2. Grade: A-1 if both sides are visible in finished installation.
  - 3. Species Note: If veneer species is not indicated in drawings, then use cherry with no variations in color in the wood.
- C. Finish Plywood (softwood for opaque finish): Veneer species and thickness indicated in drawings.
  - 1. Grade: A-C if only one side is visible in finished installation.
  - 2. Grade: A-A if both sides are visible in finished installation.
  - 3. Species Note: If veneer species is not indicated in drawings, then use pine, sanded smooth for finishing.



## **2.05 FASTENINGS**

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- B. Fasteners: Of size and type to suit application; stainless steel finish in concealed locations and stainless steel finish in exposed locations.
- C. Concealed Joint Fasteners: Threaded steel.

## **2.06 ACCESSORIES**

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Lumber for Shimming and Blocking: Softwood lumber.
- C. Metal reveals: Size and scope as required in the drawings. Color to be selected.
- D. Primer: Alkyd primer sealer.
- E. Wood Filler: Solvent base, tinted to match surface finish color.

## **2.07 HARDWARE**

- A. Hardware: Provide as specified in drawings.
- B. Substitutions: See Section 01 63 00.

## **2.08 WOOD TREATMENT (WHERE REQUIRED)**

- A. Factory-Treated Lumber: Comply with requirements of AWPA U1 - Use Category System for pressure impregnated wood treatments determined by use categories, expected service conditions, and specific applications.
- B. Fire Retardant Treatment (FR-S Type): Chemically treated and pressure impregnated; capable of providing flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
- C. Provide identification on fire retardant treated material.
- D. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.
- E. Kiln dry wood after pressure treatment to maximum 19 percent moisture content.

## **2.09 FABRICATION**

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. Fit exposed sheet material edges with 3/8 inch matching hardwood edging. Use one piece for full length only.
- C. Shop prepare and identify components for book match grain matching during site erection.
- D. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

## **2.10 SHOP FINISHING**

- A. Sand work smooth and set exposed nails and screws.
- B. Apply wood filler in exposed nail and screw indentations.
- C. On items to receive transparent finishes, use wood filler that matches surrounding surfaces and is of type recommended for the applicable finish.
- D. Prime paint surfaces in contact with cementitious materials.
- E. Back prime woodwork items to be field finished, prior to installation.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

### **3.02 INSTALLATION**

- A. Set and secure materials and components in place, plumb and level.
- B. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- C. Install trim with nails at min 24" and max 32" inch on center.
- D. Install prefinished paneling with full bed contact adhesive applied to substrate.

### **3.03 PREPARATION FOR SITE FINISHING**

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
- B. Site Finishing: See Section 09 91 13 and 09 91 23.
- C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

### **3.04 TOLERANCES**

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

**END OF SECTION**

**SECTION 06 41 00**  
**ARCHITECTURAL WOOD CASEWORK**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Specially fabricated cabinet units.
- B. Cabinet hardware for items not shown in drawings.
- C. Preparation for installing utilities.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 06 20 00 - Finish Carpentry.
- C. Section 09 91 23 - Interior Painting: Site finishing of cabinet exterior and interior.
- D. Section 12 36 00 - Countertops.

**1.03 REFERENCE STANDARDS**

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- B. AWI (QCP) - Quality Certification Program; Current Edition.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- D. AWMAC (GIS) - Guarantee and Inspection Services Program; Current Edition.
- E. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- F. BHMA A156.9 - American National Standard for Cabinet Hardware; 2010.
- G. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; 2009.
- H. UL (DIR) - Online Certifications Directory; Current Edition.
- I. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- J. GSA CID A-A-1936 - Adhesive, Contact, Neoprene Rubber; Federal Specifications and Standards; Revision A, 1996.

**1.04 SUBMITTALS**

- A. See Section 01 33 00 - Shop Drawings, Product Data and Samples, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes. Scale of drawings is to be 1-1/2 inch equals 1 foot, minimum.
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet substrate and finish.
- E. Samples: Submit actual sample items of proposed pulls and hinges, demonstrating hardware design, quality, and finish.
- F. Sustainable Design Submittal: Documentation for sustainably harvested wood-based` components.

**1.05 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
- B. Perform work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Custom quality, unless other quality is indicated for specific items.

### **1.06 MOCK-UPS**

- A. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories.
- B. Locate where directed.
- C. Mock-up may remain as part of the work.

### **1.07 PRE-INSTALLATION MEETING**

- A. Convene not less than one week before starting work of this section.

### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Protect units from moisture damage.

### **1.09 FIELD CONDITIONS**

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

## **PART 2 PRODUCTS**

### **2.01 CABINETS**

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Plastic Laminate Faced Cabinets: Custom grade.
- C. Cabinet Component Construction::
  - 1. Adjustable Shelf Loading: 40 psf.
  - 2. Cabinet Style: As indicated for each location.
  - 3. Cabinet Doors and Drawer Fronts: As indicated.
  - 4. Drawer Side Construction: Multiple-dovetailed.
  - 5. Drawer Construction Technique: Dovetail joints.

### **2.02 WOOD-BASED COMPONENTS**

- A. Wood fabricated from old growth timber is not permitted.
- B. Hardwood Edgebanding: Use solid hardwood edgebanding matching species, color, grain, and grade for exposed portions of cabinetry.

### **2.03 LUMBER MATERIALS**

- A. For Plastic or Metal Laminated Finish Millwork, Medium Density Fiberboard: Pressed wood fiber with resin binder per ANSI A208.2; thicknesses are as follows unless noted otherwise in drawings.
  - 1. Cabinet Frame: 3/4" MDF.
  - 2. Exposed Stiles and Rails: 3/4" MDF.
  - 3. Internal Construction: 3/4" MDF.
  - 4. Edge Banding: Use solid hardwood edge banding covered with corresponding laminate.
- B. For Stained Millwork, Hardwood Lumber: NHLA; graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated,, Grade I/Premium; average moisture content of 4-9 percent; species and grade as follows:
  - 1. Cabinet Frame: Solid Stock Wood: Species Cherry, Grade A.
  - 2. Exposed Stiles and Rails: Solid Stock Wood: Species Cherry, Grade A.
  - 3. Internal Construction: Solid Stock Wood: Species See Panel Materials below.

### **2.04 PANEL MATERIALS**

- A. For Plastic or Metal Laminated Finish Millwork, Medium Density Fiberboard: Pressed wood fiber with resin binder per ANSI A208.2; thicknesses are as follows unless noted otherwise in drawings.
  - 1. Door and Drawer Fronts: 3/4" MDF
  - 2. Drawer Construction: 1/2" MDF

3. Gables and Backs: 1/2" and 1/4" (as shown in drawings) MDF
  4. Shelving: 3/4" MDF
  5. Edge Banding: Use solid hardwood edge banding covered with corresponding laminate.
- B. For Stained Millwork, Hardwood Plywood: HPVA HP-1; graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, core materials of veneer (wood plies), type of glue recommended for application; face veneer and cuts as follows:
1. Exposed Surfaces: Grade AA, Cherry rotary cut, slip-matched.
  2. Door and Drawer Fronts: Species Cherry, Grade "A".
  3. Drawer Construction: Species 3/4" Custom Birch Veneer Plywood, Grade "A".
  4. Gables and Backs: Species 1/2" Custom Birch Veneer Plywood, Grade "A".
  5. Shelving: Species 3/4" Custom Birch Veneer Plywood, Grade "A".
  6. Use as backing for plastic laminate for shelving and backs unless otherwise indicated.
- C. Hardwood Edge Banding: Use solid hardwood edge banding matching species, color, grain, and grade for exposed portions of cabinetry that are stained.

## 2.05 LAMINATE MATERIALS

- A. Plastic Laminate Manufacturers:
1. Wilsonart, LLC: [www.wilsonart.com](http://www.wilsonart.com).
  2. Substitutions: See Section 01 63 00 - Substitutions and Product Options.
- B. Metal Laminate Manufacturer:
1. Wilsonart, LLC[<>]: [www.wilsonart.com](http://www.wilsonart.com).
  2. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Provide specific types as indicated.
- D. Plastic Laminate: In accordance with AWI Quality Standards Illustrated, 0.039 inch Post Forming quality; through color, as selected from manufacturer's standard selection pattern, and matte surface texture as selected.
- E. Metal Laminate Sheet: Colored metallic decorative layer pressed over kraft paper core sheets impregnated with phenolic resin.
- F. Edge Banding: Match color, pattern and finish of corresponding plastic laminate.
- G. Laminate Backing Sheet: 0.020 inch Backing Sheet grade, undecorated plastic laminate.

## 2.06 ACCESSORIES

- A. Adhesive: GSA CID A-A-1936 contact adhesive.
- B. Fasteners: Size and type to suit application.
- C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- D. Concealed Joint Fasteners: Threaded steel.

## 2.07 HARDWARE

- A. Use list of hardware below only if NOT listed or shown in the drawings.
- B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments.
- C. Countertop Brackets: Fixed, concealed vertical leg, side-of-stud mounting.
1. Materials: Steel L-shapes.
    - a. Finish: Manufacturer's standard, factory-applied, powder coat.
    - b. Color: Black.
    - c. Vertical Leg: 16 inches.
    - d. Support Member Depth: 3/8 inches.
    - e. Support Member Width: 2.5 inches

- f. Support Member Length: 21 inches.
- 2. Products:
  - a. Centerline Brackets; Front Mounting Plus Bracket: [www.countertopbracket.com/#sle](http://www.countertopbracket.com/#sle).
  - b. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Shelf Brackets: Knape & Vogt # 161LL and 24".
- E. ARCHITECTURAL GRADE: Drawer and Door Pulls: HAFELE #155.99.007, HANDLE, STEEL, NICKLE PLATED BRUSHED FINISH; CENTER-TO-CENTER: 6.29" (160MM); OVERALL LENGTH: 7.87" (200MM)..
- F. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, zinc with bright nickel finish; Hafele # 235.10.621. Install locks on all base and upper cabinet doors.
- G. Catches: Magnetic. Hafele # 246.36.300 black double magnetic catch; Hafele #246.29.301 black magnetic catch
- H. Drawer Slides: Knape & Vogt #1300
  - 1. Type: Full extension.
  - 2. Static Load Capacity: Heavy Duty grade.
  - 3. Mounting: Side mounted.
  - 4. Stops: Integral type.
- I. Hinges: European style concealed self-closing type, steel with nickel-plated finish.

## 2.08 FABRICATION

- A. Cabinet Style: As indicated for each location.
- B. Cabinet Doors and Drawer Fronts: As indicated.
- C. Drawer Construction Technique: Dovetail joints.
- D. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- E. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- F. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- G. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet from sink cut-outs.
  - 1. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- H. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

### 3.02 INSTALLATION

- A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- B. Use fixture attachments in concealed locations for wall mounted components.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinets to floor using appropriate angles and anchorages.

- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

**3.03 ADJUSTING**

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

**3.04 CLEANING**

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

**END OF SECTION**





## SECTION 07 16 16

### CRYSTALLINE CONCRETE WATERPROOFING

#### PART 1 - GENERAL

- 1.01 SCOPE: This section covers the requirements of a crystalline waterproofing additive to concrete structures including precast concrete manholes, below ground concrete structures, and retaining walls as indicated on the drawings and as specified herein.
- 1.02 REFERENCES:
- A. American Society for Testing and Materials (ASTM)
  - B. Army Corp. of Engineers (CRD)
  - C. American Concrete Institute (ACI) - Reference 308
  - D. NSF International (NSF)
- 1.03 SYSTEM DESCRIPTION
- A. The concrete waterproofing admixture shall be of the cementitious crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capacity voids of the concrete.
  - B. The system shall cause the concrete to become sealed against the penetration of liquids from any direction, and shall protect the concrete from deterioration due to harsh environmental conditions.
  - C. The design shall include the use of the crystalline waterproofing repair materials that generate a non-soluble crystalline formation in the concrete.
- 1.04 SYSTEM PERFORMANCE REQUIREMENTS
- A. **Testing Requirements:** Crystalline waterproofing system shall be tested in accordance with the following standards and conditions, and the testing results shall meet or exceed the performance requirements as specified herein.
  - B. **Independent Laboratory:** Testing shall be performed by an independent laboratory meeting the requirements of ASTM E 329-90 and certified by the United States Bureau of Standards. Testing laboratory shall obtain all concrete samples and waterproofing product samples.
  - C. **Crystalline Formation:** Crystallizing capability of waterproofing system shall be evidenced by independent SEM (Scanning Electron Microscope) photographs showing crystalline formations within the concrete matrix.

- D. **Permeability:** Independent testing shall be performed according to U.S. Army Corps of Engineers CRD-C48-73 "Permeability of Concrete". Treated concrete samples shall be pressure tested to 150 psi (350 foot head of water) or 1.05 MPa (106 m head of water). The treated samples shall exhibit no measurable leakage.
- E. **Chemical Resistance:** Independent testing shall be performed to determine "Sulfuric Acid Resistance of Concrete Specimens". Treated concrete samples (dosage rates of 3%, 5% and 7%) shall be tested against untreated control samples. All samples shall be immersed in sulfuric acid and weighed daily until a control sample reaches a weight loss of 50% or over. On final weighing the percentage weight loss of the treated samples shall test significantly lower than the control samples.
- F. **Compressive Strength:** Independent testing shall be performed according to ASTM C39 "Compressive Strength of Cylindrical Concrete Specimens". Concrete samples containing the crystalline waterproofing additive shall be tested against untreated control sample. At 28 days, the treated samples shall exhibit a minimum of 10% increase in compressive strength over the control sample.
- G. **Potable Water Approval:** Independent testing shall be performed according to NSF Standard 61, and approval for use of waterproofing material on structures holding potable water shall be evidenced by NSF certification.

#### 1.05 SUBMITTALS

- A. **General:** Submit listed submittals in accordance with conditions of the Contract and with Division 1 Submittal Procedures Section.
- B. **Product Data:** Submit product data, including manufacturer's specifications, installation instructions, and general recommendations for waterproofing applications. Also include manufacturer's certification or other data substantiating that products comply with requirements of Contract Documents.
- C. **Test Reports:** Submit, for acceptance, complete test reports from approved independent testing laboratories certifying that waterproofing system conforms to performance characteristics and testing requirements specified herein.
- D. **Manufacturer's Certification:** Provide certificate signed by manufacturer or manufacturer's representative certifying that the materials to be installed comply in all respects with the requirements of this specification.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Admixture shall be Xypex Admix C-1000-T as manufactured by Xypex Chemical Corporation. The admixture shall contain a red dye to ensure visible detection in the concrete.

## 2.03 MIXES

- A. The dosage rate for the admixture should be 3.5% by weight of cement or as recommended by the manufacturer.

## PART 3 – EXECUTION

### 3.01 MATERIALS PREPARATION

- A. Xypex Admix C-1000-T must be added to the concrete at the time of batching. It is recommended that the Admix powder be added first to the rock and sand and blended thoroughly for 2-3 minutes before adding cement and water.
- B. Blend total concrete mix using normal practices to ensure formation of homogeneous mixture.
- C. For precast concrete manufacturers this usually means adding the Admixture into their pan type mixers.
- D. For ready-mix batch plants the Admixture can be evenly distributed on a plant conveyor belt carrying the rock and sand, or the dry powder Admix can be added to the truck first and then 30-50% of the required water for the concrete batch is dispensed along with 300-500 pounds of aggregate and mixed thoroughly for 2-3 minutes. The rest of the materials are then added to the truck and mixed for at least 5 minutes.

### 3.02 APPLICATION

- A. Placement of concrete shall be in accordance with the Section 03 30 00.
- B. Retardation of set may occur when using Admixture. The amount of retardation will depend upon the concrete mix design and the dosage rate of the admix. Consult with the manufacturer regarding proper dosage rate.
- C. Concrete that contains Admixture must be cured as per “Standard Practice for Curing Concrete”, (ACI 308).
- D. Normal backfilling procedures may be used after concrete has cured for at least 7 days.
- E. After the base and joints of the precast manhole have been grouted, apply two coats of Concentrate to all grouted surfaces at a rate of 1.5 lbs. per square yard to a properly prepared surface in accordance with manufacturer’s written instructions.

**END OF SECTION 07 16 16**



**SECTION 07 21 00  
THERMAL INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Batt insulation and vapor retarder in exterior wall construction.
- B. Batt insulation in walls and ceilings as indicated in drawings.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 21 19 - Foamed-In-Place Insulation: Plastic foam insulation other than boards.
- B. Section 07 52 16 - SBS-Modified Bituminous Membrane Roofing: Insulation specified as part of roofing system.
- C. Section 09 21 16- Gypsum Board Assemblies: Exterior sheathing and acoustic insulation inside walls and partitions.
- D. Section 09 24 00 - Portland Cement Plastering.

**1.03 REFERENCE STANDARDS**

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2021.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- E. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2012.
- F. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2012.
- G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 33 00 - Shop Drawings, Product Data, and Samples, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

**1.05 FIELD CONDITIONS**

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

**PART 2 PRODUCTS**

**2.01 APPLICATIONS**

- A. Insulation in Metal Framed Walls: Batt insulation with no vapor retarder.
- B. Insulation Above Lay-In Acoustical Ceilings: Batt insulation with no vapor retarder.

**2.02 MINERAL FIBER BLANKET INSULATION MATERIALS**

- A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, comply with ASTM C665; friction fit.

1. Use 6" (R-21) batts in exterior wall construction.
  2. Use 6" acoustical batts above acoustical ceiling tiles.
  3. Use appropriate thickness acoustical batts inside interior walls to fill cavities.
  4. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  5. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
  6. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
  7. Thickness and Thermal Resistance: Thickness of insulation shall match depth of studs unless noted otherwise. Minimum R-values for insulation thickness as follows: 3-5/8 inch (R-value of 13), 6 inch (R-value of 21), and 12 inch (R-value of 38). Provide a minimum R-Value of R-30 for ALL above ceiling thermal batt insulation.
  8. Facing: Unfaced.
  9. Products:
    - a. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
    - b. Johns Manville: [www.jm.com](http://www.jm.com).
    - c. Owens Corning Corp: [www.owenscorning.com](http://www.owenscorning.com).
  10. Substitutions: See Section 01 63 00 - Substitutions and Product Options.
- B. Enclosure for Recessed Ceiling Fixtures: Mineral fiber insulation box enclosure with foil facing on exterior side for placement over recessed ceiling light fixture; flame spread index of 25 or less, and smoke development index of 450 or less when tested in accordance with ASTM E84.
1. Light Fixture Size: As indicated on drawings.
  2. Thermal Resistance: R-value of 4.2 per inch, minimum, at 75 degrees F, minimum, when tested according to ASTM C518.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

#### **3.02 BATT INSTALLATION**

- A. Install insulation in accordance with manufacturer's instructions.
- B. Install in exterior wall gap spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Retain insulation batts in place with spindle fasteners at 12 inches on center.
- F. Coordinate work of this section with construction of continuous air barrier as specified in Section 07 27 26 Fluid-Applied Membrane Air Barriers.

#### **3.03 PROTECTION**

- A. Do not permit installed insulation to be damaged prior to its concealment.

**END OF SECTION**

**SECTION 07 21 19**  
**FOAMED-IN-PLACE INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Foamed-in-place insulation.
  - 1. In exterior wall crevices (closed cell spray foam).
  - 2. At junctions of dissimilar wall and roof materials (closed cell spray foam).

**1.02 REFERENCE STANDARDS**

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- B. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2012.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- D. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2021.
- E. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- F. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.
- G. FM 4880 - Class 1 Fire Rating of Insulated Wall or Wall and Roof/Ceiling Panels, Interior Finish Materials or Coatings and Exterior Wall Systems; 2010.
- H. NFPA 275 - Standard Method of Fire Tests for the Evaluation of Thermal Barriers; 2022.
- I. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2015.
- J. UL 1040 - Standard for Safety Fire Test of Insulated Wall Construction; Current Edition, Including All Revisions.
- K. UL 1715 - Standard for Safety Fire Test of Interior Finish Material; Current Edition, Including All Revisions.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

**1.04 SUBMITTALS**

- A. See Section 01 33 00 - Shop Drawings, Product Data, and Samples, for submittal procedures.
- B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.
- C. Certificates: Certify that products of this section meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- F. Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.

- B. Installer Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience, and approved by manufacturer.

### **1.06 MOCK-UPS**

- A. Where building has a full, free-standing exterior wall mock-up, include this product in the mock-up. Where building does not have a full, free-standing exterior wall mock-up, provide a mock-up of this product in place as directed by the Architect for approval before building-wide installation of this product begins.
- B. Mock-up may remain as part of work.

### **1.07 FIELD CONDITIONS**

- A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Foamed-In-Place Insulation: Two-component, medium-density, closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
  - 1. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and fire protection requirements.
    - a. Fire Protection: Provide 15-minute thermal barrier of 1/2 inch gypsum board or equivalent material complying with NFPA 275 test method, or foamed-in-place insulation either exposed or with covering that complies with FM 4880, NFPA 286, UL 1040, or UL 1715.
  - 2. Thermal Resistance: R-value of 6.9, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
  - 3. Water Vapor Permeance: Class II Vapor retarder; 1 perms, maximum, when tested at intended thickness in accordance with ASTM E96/E96M, desiccant method.
  - 4. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.
  - 5. Air Permeance: 0.04 cfm per square foot, maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf.
  - 6. Closed Cell Content: At least 90 percent.
  - 7. Surface Burning Characteristics: Flame spread/Smoke developed index of 75/450, maximum, when tested in accordance with ASTM E84.
  - 8. Basis of Design:
    - a. Accella Polyurethane Systems; BaySeal CCX SPF: [www.accellapolyurethane.com/#sle](http://www.accellapolyurethane.com/#sle).
    - b. Substitutions: See Section 01 63 00.

### **2.02 ACCESSORIES**

- A. Primer: As required by insulation manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify work within construction spaces or crevices is complete prior to insulation application.
- B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation or overcoat adhesion.

### **3.02 PREPARATION**

- A. Mask and protect adjacent surfaces from over spray or dusting.
- B. Apply primer in accordance with manufacturer's instructions.

### **3.03 APPLICATION**

- A. Apply insulation in accordance with manufacturer's instructions.



- B. Apply insulation by spray method, to a uniform monolithic density without voids.
- C. Patch damaged areas.
- D. Where applied to voids, gaps and crevices, assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.
- E. Trim excess away for applied trim or remove as required for continuous sealant bead.

**3.04 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements for additional requirements.
- B. Inspection will include verification of insulation and overcoat thickness and density.

**3.05 PROTECTION**

- A. Do not permit subsequent construction work to disturb applied insulation.

**END OF SECTION**



**SECTION 07 27 26**  
**FLUID-APPLIED MEMBRANE AIR BARRIERS, VAPOR PERMEABLE**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes the following:
1. Materials and installation methods for fluid-applied, vapor permeable air barrier membrane system located in the non-accessible part of the wall.
  2. Materials and installation methods to bridge and seal air leakage pathways in roof and foundation junctions, window and door openings, control and expansion joints, masonry ties, piping and other penetrations through the wall assembly.
- B. Related Sections include the following:
1. Section 07 62 00 – Sheet Metal Flashing and Trim
  2. Section 07 90 05 – Joint Sealants

**1.03 DEFINITIONS**

- A. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

**1.04 PERFORMANCE REQUIREMENTS**

- A. General: Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. The building envelope shall be designed and constructed with a continuous air barrier to control air leakage into, or out of the conditioned space. An air barrier shall also be provided for interior partitions between conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by more than 50% of the difference between the conditioned space and design ambient conditions. The air barrier shall have the following characteristics:
1. It must be continuous, with all joints made airtight.
  2. It shall have an air permeability not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2178.
  3. It shall have an air permeability not to exceed 0.04 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2357.
  4. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
  5. It shall be durable or maintainable.
  6. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
    - a. Foundation and walls
    - b. Walls and windows or doors
    - c. Different wall systems
    - d. Wall and roof

- e. Wall and roof over unconditioned space
- f. Walls, floor and roof across construction, control and expansion joints
- g. Walls, floors and roof to utility, pipe and duct penetrations
7. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.

#### 1.05 REFERENCES

- A. The following standards and publications are applicable to the extent referenced in the text. The most recent version of these standards is implied unless otherwise stated.
- B. American Society for Testing and Materials (ASTM)
  1. ASTM C1193 Guide for Use of Joint Sealants
  2. ASTM D412 Standard Test Methods for Rubber Properties in Tension
  3. ASTM D570 Test Method for Water Absorption of Plastics
  4. ASTM D1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting
  5. ASTM D1876 Test Method for Peel Resistance of Adhesives
  6. ASTM D1938 Test Method for Tear Propagation Resistance of Plastic Film and Sheeting
  7. ASTM D1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
  8. ASTM D4258 Practice for Surface Cleaning Concrete for Coating
  9. ASTM D4263 Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
  10. ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
  11. ASTM E96 Test Methods for Water Vapor Transmission of Materials
  12. ASTM E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover
  13. ASTM E1186 Practice for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems
  14. ASTM E2178 Standard Test Method for Air Permeance of Building Materials
  15. ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
  16. NFPA 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components

#### 1.06 SUBMITTALS

- A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.
- B. Shop Drawings: Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strip, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
  1. Include details of interfaces with other materials that form part of air barrier
  2. Include details of mockups
- C. Samples: Submit representative samples of the following for approval:
  1. Fluid-Applied membrane
  2. Self-Adhered Transition Membrane
  3. Self-Adhered Through Wall Flashing
- D. Product Certificates: For air barriers, certifying compatibility of air barrier and accessory materials with Project materials that connect to or that come in contact with the barrier; signed by product manufacturer.
- E. Qualification Data: For Applicator.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers, submit certified test report showing compliance with

07 27 26

FLUID-APPLIED MEMBRANE AIR BARRIERS, VAPOR PERMEABLE

PAGE 2 OF 8

requirements specified for ASTM E2178.

- G. Warranty: Submit a sample warranty identifying the terms and conditions stated in Article 1.10.

### **1.07 QUALITY ASSURANCE**

- A. Manufacturer: Air barrier systems shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of waterproofing and air barriers. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified and include a list of projects of similar design and complexity completed within the past five years.
- B. Source Limitations: Obtain primary air-barrier material and through wall flashing through one source from a single manufacturer. Should project require a vapor permeable and a vapor impermeable air barrier on same project, obtain vapor-permeable and vapor impermeable air barrier and through wall flashing from one source from a single manufacturer.
- C. Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- D. Mockups: Before beginning installation of air barrier, provide air barrier work for exterior wall assembly mockups, incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.
1. Coordinate construction of mockup to permit inspection by Owner's testing agency of air barrier before external insulation and cladding is installed
  2. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved
- E. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Preinstallation conference shall include the Contractor, installer, Architect, and system manufacturer's field representative. Agenda for meeting shall include but not be limited to the following:
1. Review of submittals
  2. Review of surface preparation, minimum curing period and installation procedures
  3. Review of special details and flashings
  4. Sequence of construction, responsibilities and schedule for subsequent operations
  5. Review of mock-up requirements
  6. Review of inspection, testing, protection and repair procedures

### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer's instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.
- B. Do not double-stack pallets of fluid applied membrane components on the job site. Provide cover on top and all sides, allowing for adequate ventilation.
- C. Protect fluid-applied membrane components from freezing and extreme heat.
- D. Sequence deliveries to avoid delays but minimize on-site storage.

### **1.09 PROJECT CONDITIONS**

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer. Protect substrates from environmental conditions that affect performance of air barrier. Do not apply air barrier to a wet substrate or during snow, rain, fog, or mist.

## 1.10 WARRANTY

- A. Submit manufacturer's warranty that air barrier and accessories are free of defects at time of delivery and are manufactured to meet manufacturer's published physical properties and material specifications.
- B. Warranty Period: Five years from date of completion of the air barrier membrane installation.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. GCP Applied Technologies, 62 Whittemore Avenue, Cambridge, MA.
- B. Substitutions: See Section 01 63 00 – Substitutions and Product Requirements.

### 2.02 FLUID-APPLIED, VAPOR PERMEABLE MEMBRANE AIR BARRIER

- A. FLUID-APPLIED AIR BARRIER MEMBRANE: Perm-A-Barrier® VPL, as manufactured by GCP Applied Technologies, 62 Whittemore Avenue, Cambridge, MA; a fluid-applied, vapor permeable, acrylic membrane that cures to form a resilient, monolithic, fully bonded elastomeric membrane when applied to construction surfaces. The membrane provides superior protection against the damaging effects of air and liquid water ingress on the building structures. Product shall meet the following requirements:
  - 1. Membrane Air Permeance: ASTM E2178: Not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa)
  - 2. Assembly Air Permeance: Provide a continuous air barrier assembly that has an air leakage not to exceed 0.04 cfm/sq. ft. of surface area under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. of surface area at 75 Pa) when tested in accordance with ASTM E2357.
  - 3. Water Vapor Permeance: ASTM E96, Method B: Greater than 10 perms
  - 4. Pull Adhesion: ASTM D4541: minimum 20 psi or substrate failure to glass faced wall board, minimum 100 psi to concrete/CMU
  - 5. Low temperature flexibility: ASTM D1970: Pass at minus 20 degrees Fahrenheit (at minus 29 degrees Celsius).
  - 6. Water resistance of in-place membrane: ASTM E331: Pass. No water penetration after 90 minutes @ 299 Pa (6.24 psf) tested over OSB and gypsum sheathing.
  - 7. Nail sealability: ASTM D1970: Pass UV Exposure Limit: Equal to or greater than 180 calendar days
  - 8. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly
- B. TRANSITION MEMBRANE: Perm-A-Barrier Detail Membrane manufactured by GCP Applied Technologies; a 0.9 mm (36 mils) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (4 mil) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:
  - 1. Water Vapor Transmission: ASTM E96, Method B: 0.05 perms (2.9 ng/Pa s. sq. m.) maximum
  - 2. Air Permeance at 75 Pa (0.3 in. water) pressure difference: 0.0006 L/s. sq. m (0.00012 cfm/ sq. ft.) maximum
  - 3. Puncture Resistance: ASTM E154: 178 N (40 lbs.) minimum
  - 4. Lap Adhesion at minus 4 degrees Celsius (25 degrees Fahrenheit): ASTM D1876: 880 N/m (5.0 lbs./in.) of width
  - 5. Low Temperature Flexibility: ASTM D1970: Unaffected to minus 43 degrees Celsius (minus 45 degrees Fahrenheit)
  - 6. Tensile Strength: ASTM D412, Die C Modified: minimum 2.7 MPa (400 psi)
  - 7. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C: minimum 200%
- C. TRANSITION ALUMINUM MEMBRANE: Perm-A-Barrier Aluminum flashing manufactured by GCP Applied Technologies; a 0.9 mm (35 mils) of self-adhesive rubberized asphalt integrally bonded to 0.1 mm (5 mil) of aluminum film to provide a min. 1.0 mm (40 mil) thick membrane.

Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:

1. Water Absorption: ASTM D570: max 0.1% by weight
  2. Puncture Resistance: ASTM E154: 355N (80 lbs) min.
  3. Lap Adhesion at minus 4 degrees Celsius (25 degrees Fahrenheit): ASTM D1876 Modified: 880 N/m (5.0 lbs./in.) of width
  4. Low Temperature Flexibility: ASTM D1970 Modified: Unaffected to minus 26 degrees Celsius (minus 15 degrees Fahrenheit)
  5. Tensile Strength: ASTM D412, Die C Modified: minimum 4.1 MPa (600 Psi)
  6. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C Modified: minimum 200%
- D. FLEXIBLE MEMBRANE WALL FLASHING: Perm-A-Barrier Wall Flashing manufactured by GCP Applied Technologies; a 0.8 mm (32 mils) of self-adhesive rubberized asphalt integrally bonded to 0.2 mm (8 mil) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:
1. Water Vapor Transmission: ASTM E96, Method B: 0.05 perms (2.9 ng/ Pa s. sq. m.) maximum
  2. Water Absorption: ASTM D570: max. 0.1% by weight
  3. Puncture Resistance: ASTM E154: 356 N (80 lbs.) minimum
  4. Tear Resistance
    - a. Initiation ASTM D1004: min. 58 N (13.0 lbs.) M.D.
    - b. Propagation ASTM D1938: min. 40 N (9.0 lbs.) M.D.
  5. Lap Adhesion at minus 4 degrees Celsius (25 degrees Fahrenheit): ASTM D1876: 880 N/m (5.0 lbs./in.) of width
  6. Low Temperature Flexibility: ASTM D1970: Unaffected to minus 43 degrees Celsius (minus 45 degrees Fahrenheit)
  7. Tensile Strength: ASTM D412, Die C Modified: minimum 5.5 MPa (800 psi)
  8. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C: minimum 200%

### 2.03 PRIMERS

- A. Primer for Self-Adhered Transition Membrane and Flexible Membrane Wall Flashing: Perm-A-Barrier WB Primer manufactured by GCP Applied Technologies; a water-based primer which imparts an aggressive, high tack finish on the treated substrate.
1. Flash Point: No flash to boiling point
  2. VOC Content: Not to exceed 10 g/L
  3. Application Temperature: minus 4 degrees Celsius (25 degrees Fahrenheit) and above
  4. Freezing point (as packaged): minus 7 degrees Celsius (21 degrees Fahrenheit)
- B. Primer for Self-Adhered Transition Membrane and Flexible Membrane Wall Flashing: Perm-A-Barrier Primer Plus manufactured by GCP Applied Technologies; a water-based primer which imparts an aggressive, high tack finish on the treated substrate. Product shall have the following minimum physical properties:
1. Color: Milky White (wet), Clear (dry)
  2. Weight: 8.25 lbs./gal.
  3. Solids Content (by weight): 53-57%
  4. Solvent Type: Water
  5. VOC Content: Not to exceed 1 g/L
  6. Application Temperature: 4 degrees Celsius (40 degrees Fahrenheit) and above

### 2.04 PENETRATIONS & TERMINATION SEALANT

- A. Liquid Membrane for Details and Terminations and Substrate Patching: Bituthene Liquid Membrane manufactured by GCP Applied Technologies; a two-part, elastomeric, trowel grade material designed for use with fluid-applied membranes, self-adhered membranes and tapes. 10 g/L maximum VOC content.

- B. Sealant for Details, Final Terminations and Sheathing Joint Treatment: S100 Sealant manufactured by GCP Applied Technologies: a one-part, neutral curing, ultra-low modulus material designed for use with fluid-applied membranes, self-adhered membrane and tapes. 98 g/L maximum VOC content.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrates and conditions are ready to accept the Work of this section. Notify Architect in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.
- B. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the membranes. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints full-flush. Curing compounds or release agents used in concrete construction must be resin based without oil, wax or pigments.

### **3.02 SURFACE PREPARATION**

- A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods that are acceptable to manufacturer of the fluid-applied air barrier assembly.
- B. Exterior sheathing panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws. Pre-treat all board joints with 50 – 75 mm (2-3 in.) wide, manufacturer's recommended mesh-style wallboard tape. Gaps greater than 6 mm (1/4 in.) should be filled with mastic or caulk, allowing sufficient time to fully cure before application of the mesh-style wallboard tape and fluid applied air barrier system.
- C. Masonry Substrates: Apply air and vapor barrier over concrete block and brick with smooth trowel-cut mortar joints, struck full and flush. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat.
- D. Related Materials: Treat construction joints and install flashing as recommended by manufacturer.
- E. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
- F. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- G. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- H. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate patching membrane.
- I. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- J. At changes in substrate plane, apply sealant or Bituthene Liquid Membrane at sharp corners and edges to form a smooth transition from one plane to another.
- K. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

### **3.03 JOINT TREATMENT**

- A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C1193 and air barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D4258 before coating surfaces.
  - 1. Prime substrate as required.
- B. Gypsum Sheathing: Fill joints with S100 Sealant per manufacturer's written instructions.



### **3.04 AIR BARRIER MEMBRANE INSTALLATION**

- A. Apply air barrier membrane to achieve a continuous air barrier according to air barrier manufacturer's written instructions.
- B. Apply air barrier membrane within manufacturer's recommended application temperature ranges.
- C. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.
  - 1. Vapor-Permeable Membrane Air Barrier: 70-mil (1.8-mm) wet film thickness, 40-mil (1.0-mm) dry film thickness.
- D. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
- E. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

### **3.05 TRANSITION MEMBRANE INSTALLATION**

- A. Install strips, transition membrane, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
- B. Apply primer to substrates to receive transition membrane at required rate and allow to dry. Limit priming to areas that will be covered by transition tape in same day. Re-prime areas exposed for more than 24 hours.
  - 1. Prime glass-fiber-surfaced gypsum sheathing not covered with air membrane material with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- D. At end of each working day, seal top edge of strips and transition membrane to substrate with termination sealant.
- E. Apply joint sealants forming part of air barrier assembly within sealant manufacturer's recommended application temperature ranges. Consult sealant manufacturer when sealant cannot be applied within these temperature ranges.
- F. Wall Openings: Prime concealed perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition membrane so that a minimum of 3 inches (75 mm) of coverage is achieved over both substrates.
  - 1. Transition Membrane: Roll firmly to enhance adhesion.
- G. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.
- H. Repair punctures, voids, and deficient lapped seams in strips and transition membrane. Slit and flatten fish-mouths and blisters. Patch with transition membrane extending 6 inches (150 mm) beyond repaired areas in strip direction.

### **3.06 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:
  - 1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes
  - 2. Continuous structural support of air barrier system has been provided
  - 3. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions, and mortar droppings

4. Site conditions for application temperature and dryness of substrates have been maintained
  5. Maximum exposure time of materials to UV deterioration has not been exceeded
  6. Surfaces have been primed, if applicable
  7. Laps in strips and transition membrane have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fish-mouths
  8. Termination sealant has been applied on cut edges
  9. Strips and transition membrane have been firmly adhered to substrate
  10. Compatible materials have been used
  11. Transitions at changes in direction and structural support at gaps have been provided.
  12. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal
  13. All penetrations have been sealed
- C. Tests: Testing to be performed will be determined by Owner's testing agency from among the following tests:
1. Qualitative Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E1186.
- D. Remove and replace deficient air barrier components and retest as specified above.

### **3.07 CLEANING AND PROTECTION**

- A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
- B. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace main air barrier material exposed for more than 180 days.
- C. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.
- D. Remove masking materials after installation.

**END OF SECTION**

## SECTION 07 52 16

### SBS-MODIFIED BITUMEN MEMBRANE ROOFING

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Work shall include, but is not limited to, the following:
  - 1. Preparation of existing steel roof deck and existing concrete roof deck, and all flashing substrates.
  - 2. SBS-modified bitumen vapor retarder (air barrier).
  - 3. Insulation
  - 4. Cover-board
  - 5. SBS-modified bitumen base ply heat-welded & mechanically fastened.
  - 6. SBS-modified bitumen cap sheet heat-welded.
  - 7. SBS-modified bitumen membrane flashings.
  - 8. Liquid-applied, reinforced flashings.
  - 9. Sheet metal flashings and sheet metal roof edge system.
  - 10. All related materials and labor required to complete specified roofing necessary to receive specified manufacturer's warranty.
  
- B. System Summaries:
  - 1. System #1- Existing Steel Deck
    - a. Existing Steel Deck
    - b. Sopravap'r self-adhered directly to steel deck
    - c. Sopra-ISO Base Layer (mechanically attached); thickness as indicated in Drawings.
    - d. Sopra-ISO Tapered (adhered)
    - e. Sopraboard pre-secured; thickness as indicated in Drawings.
    - f. Soprafix Base 612 mechanically attached
    - g. Sopralene Flam 180 FR GR heat welded
  - 2. System #1- Existing Concrete Deck
    - a. Existing Concrete Deck
    - b. Sopravap'r self-adhered directly to concrete deck (or as required method by mfr to properly attach and warrant product to existing concrete deck).
    - c. Sopra-ISO Base Layer (mechanically attached); thickness as indicated in Drawings.
    - d. Sopra-ISO Tapered (adhered)
    - e. Sopraboard pre-secured; thickness as indicated in Drawings.
    - f. Soprafix Base 612 mechanically attached
    - g. Sopralene Flam 180 FR GR heat welded

##### 1.02 RELATED SECTIONS

- A. Division 01 00 00 General Requirements

##### 1.03 DEFINITIONS

- A. ASTM D 1079-Definitions of Term Relating to Roofing, Waterproofing and Bituminous Materials.

- B. The National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual, Fifth Edition Glossary.

#### **1.04 PRE-INSTALLATION MEETINGS**

- A. Convene prior to commencing work at a time and location to be determined by the Owner/Owner's Representative.

#### **1.05 REFERENCES**

- A. AMERICAN SOCIETY OF CIVIL ENGINEERS - Reference Document ASCE 7, Minimum Design Loads for Buildings and Other Structures.
- B. AMERICAN STANDARD OF TESTING METHODS (ASTM):
  1. ASTM C 836 - Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
  2. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants
  3. ASTM C 1177/C 1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  4. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Insulation Board.
  5. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Damp proofing, and Waterproofing.
  6. ASTM D 1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
  7. ASTM D 3019 - Standard Specification for Lap Cement Used with Asphalt Roll Roofing, Non-Fibered, Asbestos-Fibered, and Non-Asbestos-Fibered.
  8. ASTM D 3746 - Standard Test Method for Impact Resistance of Bituminous Roofing System.
  9. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
  10. ASTM D 5147 - Standard Test Methods for Sampling and Testing Modified Bituminous Sheet Material.
  11. ASTM D 5849 - Standard Test Method for Evaluating Resistance of Modified Bituminous Roofing Membrane to Cyclic Fatigue (Joint Displacement)
  12. ASTM D 6164 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
  13. ASTM D 6298 - Standard Specification for Fiberglass Reinforced Styrene-Butadiene-Styrene (SBS) Modified Bituminous Sheets with a Factory Applied Metal Surface.
  14. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.
  15. ASTM E 1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.
- C. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI):
  1. ANSI/SPRI/FM 4435/ES-1 Wind Design Standard for Edge System Used with Low Slope Roofing System.
  2. ANSI/SPRI FX-1, Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners.
  3. ANSI/SPRI IA-1, Standard Field Test Procedure for Determining the Mechanical Uplift Resistance of Insulation Adhesives over Various Substrates.
  4. ANSI/FM 4474- American National Standard for Evaluating the Simulated Wind Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures.
- D. FACTORY MUTUAL (FM):

1. FM 4450 - Approval Standard - Class I Insulated Steel Roof Decks.
  2. FM 4470 - Approval Standard - Class I Roof Covers.
- E. INTERNATIONAL CODES COUNCIL (ICC):
1. 2012 International Building Code (IBC).
- F. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA).
- G. SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION INC. (SMACNA) Architectural Sheet Metal Manual.
- H. UNDERWRITERS LABORATORY (UL):
1. UL 790 Standard Test Methods for Fire Tests of Roof Coverings.
  2. UL 1256 – Fire Test of Roof Deck Constructions.

#### **1.06 ACTION SUBMITTALS**

- A. ISO 9001 Certificate: Manufacturer shall be an ISO 9001 registered company.
- B. Product Data Sheets: Submit manufacturer's product data sheets, installation instructions and/or general requirements for each component.
- C. Material Safety Data Sheets: Submit manufacturer's Material Safety Data Sheets (MDS) for each component.
- D. Sample/Specimen Warranty from the manufacturer and contractor.
- E. Shop Drawings: Provide roof plan and applicable roof system detail drawings.

#### **1.07 INFORMATIONAL SUBMITTALS**

- A. Contractor Certification: Submit written certification from roofing system manufacturer certifying that the applicator is authorized by the manufacturer to install the specified materials and system.

#### **1.08 CLOSEOUT SUBMITTALS**

- A. Warranty: Provide manufacturer's and contractor's warranties upon substantial completion of the roofing system.

#### **1.09 QUALITY ASSURANCE**

- A. MANUFACTURER QUALIFICATIONS:
1. PRODUCT QUALITY ASSURANCE PROGRAM: Manufacturer shall be an ISO 9001 registered company.
  2. Manufacturer shall have 20 years of experience manufacturing SBS-modified bitumen roofing materials.
  3. Trained Technical Field Representatives, employed by the manufacturer, independent of sales.
  4. Provide reports in a timely manner of all site visit reports.
  5. Provide specified warranty upon satisfactory project completion.

**B. CONTRACTOR QUALIFICATIONS:**

1. Contractor shall be authorized by the manufacturer to install specified materials prior to the bidding period through satisfactory project completion.
2. Applicators shall have completed projects of similar scope using same materials as specified herein.
3. Contractor shall provide full time, on-site superintendent or foreman experienced with the specified roof system through satisfactory project completion.
4. Applicators shall be skilled in the application methods for all materials.
5. Contractor shall maintain a daily record, on-site, documenting material installation and related project conditions.
6. Contractor shall maintain a copy of all submittal documents, on-site, available at all times for reference.

**1.10 DELIVERY, STORAGE AND HANDLING**

- A. Refer to each product data sheet or other published literature for specific requirements.
- B. Deliver materials and store them in their unopened, original packaging, bearing the manufacturer's name, related standards, and any other specification or reference accepted as standard.
- C. Protect and store materials in a dry, well-vented, and weatherproof location. Only materials to be used the same day shall be removed from this location. During cold weather, store materials in a heated location, removed only as needed for immediate use.
- D. When materials are to be stored outdoors, store away from standing water, stacked on raised pallets or dunnage, at least 4 in or more above ground level. Carefully cover storage with "breathable" tarpaulins to protect materials from precipitation and to prevent exposure to condensation.
- E. Carefully store roof membrane materials delivered in rolls on-end with selvage edges up. Store and protect roll storage to prevent damage.
- F. Properly dispose of all product wrappers, pallets, cardboard tubes, scrap, waste, and debris. All damaged materials shall be removed from job site and replaced with new, suitable materials.

**1.11 SITE CONDITIONS**

- A. SAFETY:
  1. The contractor shall be responsible for complying with all project-related safety and environmental requirements.
  2. Heat-welding shall include heating the specified membrane ply using propane roof torches or electric hot-air welding equipment. The contractor shall determine when and where conditions are appropriate to utilize heat-welding equipment. When conditions are determined by the contractor to be unsafe to proceed, equivalent SBS-modified bitumen materials and methods shall be utilized to accommodate requirements and conditions.
  3. Refer to NRCA CERTA recommendations, local codes and building owner's requirements for hot work operations.
  4. The contractor shall review project conditions and determine when and where conditions are appropriate to utilize the specified liquid-applied, or semi-solid roofing materials. When conditions are determined by the contractor to be unsafe or undesirable to proceed, measures shall be taken to prevent or eliminate the unsafe or undesirable

exposures and conditions, or equivalent approved materials and methods shall be utilized to accommodate requirements and conditions.

5. The contractor shall review project conditions and determine when and where conditions are appropriate to utilize the specified hot asphalt-applied materials. When conditions are determined by the contractor to be unsafe or undesirable to proceed, measures shall be taken to prevent or eliminate the unsafe or undesirable exposures and conditions, or equivalent approved materials and methods shall be utilized to accommodate requirements and conditions.
6. The contractor shall refer to product Material Safety Data Sheets (MDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

**B. ENVIRONMENTAL CONDITIONS:**

1. Monitor substrate temperature and material temperature, as well as all environmental conditions such as ambient temperature, moisture, sun, cloud cover, wind, humidity, and shade. Ensure conditions are satisfactory to begin work and ensure conditions remain satisfactory during the installation of specified materials. Materials and methods shall be adjusted as necessary to accommodate varying project conditions. Materials shall not be installed when conditions are unacceptable to achieve the specified results.
2. Precipitation and dew point: Monitor weather to ensure the project environment is dry before, and will remain dry, during the application of roofing materials. Ensure all roofing materials and substrates remain above the dew point temperature as required to prevent condensation and maintain dry conditions.
3. Mopping asphalt application: Primer, where used, shall be fully dry before applying hot asphalt. Take all necessary measures and monitor all conditions, to ensure the specified asphalt temperature is no less than 400°F (204°C) at the point of contact with the specified membrane as it is rolled into the hot asphalt.
4. Cold adhesive application: Primer, where used, shall be fully dry before proceeding. During cold weather, store the specified membrane adhesives, flashing cements and mastics in heated storage areas. Take all necessary measures and monitor application conditions, to ensure the adhesive and cement materials are no less than 70°F (21°C) at the point of contact with the membrane.
5. Self-adhered membrane application: During cold weather, store the specified self-adhered membrane and primer materials in heated storage areas to ensure materials remain no less than 70°F (21°C) during application. Ensure conditions allow primer to remain tacky, but not wet so that primer will transfer to finger when touched. Self-adhered primer should not fully dry and lose tack before applying the self-adhered membrane. Ensure conditions remain satisfactory to achieve membrane adhesion as specified.
6. Heat-Welding Application: Take all necessary precautions and measures to monitor conditions to ensure all environmental conditions are safe to proceed with the use of torches and hot-air welding equipment. Combustibles, flammable liquids and solvent vapors that represent a hazard shall be eliminated and primers shall be fully dry before proceeding with heat-welding operations. Refer to NRCA CERTA recommendations.

**1.12 PERFORMANCE REQUIREMENTS**

**A. WIND UPLIFT RESISTANCE:**

1. Performance testing shall be in accordance with ANSI/FM 4474, FM 4450, FM 4470, UL 580 or UL 1897.
  - a. Roof System Design Pressures: Calculated in accordance with ASCE 7, or applicable standard, for the specified roof system attachment requirements:
    - i. Field of Roof (Zone 1): - 75 psf.

- ii. Perimeter of Roof (Zone 2): - 135 psf.
- iii. Corners of Roof (Zone 3): - 142 psf.

**B. FIRE CLASSIFICATION:**

- 1. Performance testing shall be in accordance with UL 790, ASTM E108, FM 4450 or FM 4470 to meet the 1/4:12 roof slope requirement.
  - a. Meets requirements of UL Class A or FM Class A.
- 2. Performance testing shall be in accordance with UL 1256, FM 4450 or FM 4470 to meet the specified requirements for interior flame spread and fuel contribution.
  - a. Meets requirements of UL 1256, or FM Class 1.

**C. ROOF SLOPE:**

- 1. Finished roof slope for SBS modified bitumen surfaces shall be ¼ inch per foot (2 percent) minimum for roof drainage.

**D. IMPACT RESISTANCE:**

- 1. Performance testing for impact resistance shall be in accordance with FM 4450, FM 4470, ASTM D3746 or CGSB 37-GP 56M to meet the specified impact resistance requirements.
  - a. Meets requirements for FM-SH (Severe Hail), ASTM D3746, or CGSB 37-GP 56M.

**E. CYCLIC FATIGUE:**

- 1. The roof system shall pass ASTM D5849 Standard Test Method for Evaluating Resistance of Modified Bituminous Roofing Membrane to Cyclic Fatigue (Joint Displacement). Passing results shall show no signs of cracking, splitting or tearing over the joint.
  - a. Roof system shall pass Test Condition 5, tested at -4°F (-20°C) in accordance with ASTM D5849. (**SOPREMA Sopralene polyester reinforced membranes**).

**F. ENERGY CONSERVATION REQUIREMENTS:**

- 1. Polyisocyanurate Insulation "R" Value: Long-term thermal resistance (LTTR) values of the specified foam insulation shall be determined in accordance with CAN/ULC-S770.
- 2. Polyisocyanurate Insulation "R" Value: Shall be determined in accordance with ASTM C1289-11a.
- 3. Thermal Resistance 'R' for the specified roof insulation system shall include the continuous insulation (ci) above the roof deck.
  - a. Total Thermal Resistance R Value, continuous insulation (ci) above-deck: R 23.1 min.

**G. ROOF EDGE SYSTEM SECUREMENT:**

- a. Performance testing in accordance with ANSI/SPRI ES-1.
- b. Performance testing meets requirements for specified roof system design pressures.

**1.13 WARRANTY**

- A. Manufacturer's No Dollar Limit (NDL) Warranty. The manufacturer shall provide the owner with the manufacturer's warranty providing labor and materials to for 20 years from the date the warranty is issued.
- B. The contractor shall guarantee the workmanship and shall provide the owner with the contractor's warranty covering workmanship for a period of 2 years from completion date.



## **PART 2 PRODUCTS**

### **2.01 MANUFACTURER**

- A. SINGLE SOURCE MANUFACTURER: All SBS modified bitumen membrane and flashing sheets shall be manufactured by a single supplier with 20 years or more manufacturing history in the US.
  - 1. Comply with the Manufacturer's requirements as necessary to provide the specified warranty.
- B. PRODUCT QUALITY ASSURANCE PROGRAM: Manufacturer shall be an ISO 9001 registered company. A 'Quality Compliance Certificate (QCC) for reporting/confirming the tested values of the SBS-Modified Bitumen Membrane Materials will be supplied upon request.
- C. ACCEPTABLE MANUFACTURER:
  - 1. Basis of Design: SOPREMA, located at: 12251 Seaway Rd. Gulfport, MS 39503; Tel:228-731-5659; Website: www.soprema.us.
  - 2. Acceptable Alternate Manufacturers: Siplast & Firestone. All acceptable manufacturers must meet physical performance of Basis of Design Materials.

### **2.02 ROOFING SYSTEM**

- A. ROOFING SYSTEM BASIS OF DESIGN: SOPREMA

### **2.03 SBS-MODIFIED BITUMEN MEMBRANES**

- A. FIELD BASE PLY AT STEEL DECK AND CONCRETE DECK:
  - 1. Field base ply, mechanically fastened:
    - a. SOPREMA Soprafix Base 612: SBS-modified bitumen membrane ply with plastic burn-off film on the top and bottom surfaces. Non-woven polyester reinforcement. Mechanically fastened in 4 in (minimum) heat-welded side-laps. Base ply for heat-welded cap sheet applications.
      - i. Thickness: 118 mils (3.0 mm)
      - ii. Width: 39.4 in (1 m)
      - iii. Length: 32.8 ft (10 m)
      - iv. Meets or exceeds ASTM D6164, Type I, Grade S.
- B. FLASHING BASE PLY AT STEEL DECK AND CONCRETE DECK:
  - 1. Flashing base ply, heat-welded:
    - a. SOPREMA Sopralene Flam 180: SBS-modified bitumen membrane with plastic burn-off film on top and bottom surfaces. Non-woven polyester reinforcement.
      - i. Thickness: 114 mils (2.9 mm)
      - ii. Width: 39.4 in (1 m)
      - iii. Length: 32.8 ft (10 m)
      - iv. Meets or exceeds ASTM D6164, Type I, Grade S.
- C. FIELD AND FLASHING CAP SHEET AT STEEL DECK AND CONCRETE DECK:
  - 1. Field cap sheet heat-welded:
    - a. SOPREMA Sopralene Flam 180 FR GR: SBS-modified bitumen membrane Cap Sheet with a burn-off film bottom surface and mineral granule top surface. Non-woven polyester reinforced. UL Class A for specified roof slope requirements.
      - i. Thickness: 157 mils (4.0 mm)

- ii. Width: 39.4 in (1 m)
- iii. Length: 32.8 ft (10 m)
- iv. Meets or exceeds ASTM D6164, Type I, Grade G.
- v. Granule Surfacing:
  - a) White mineral granules.

## 2.04 THERMAL INSULATION SYSTEM AND SUBSTRATE BOARD

### A. PARAPET WALL SUBSTRATE

- 1. As indicated in Drawings.

### B. RIGID INSULATION

- 1. Polyisocyanurate insulation (SOPREMA Sopra-ISOr):
  - a. SOPREMA Sopra-ISO (base layer): Closed cell polyisocyanurate foam core bonded on each side to a glass fiber-reinforced felt facer.
    - i. Thickness: Total thickness as indicated in drawings to meet specified insulation system thermal resistance 'R' value .
    - ii. Meets or exceeds ASTM C1289, Type II, Class 1, Grade 2 (20 psi).
  - b. SOPREMA Sopra-ISO Tapered: Closed cell polyisocyanurate foam core bonded on each side to a glass fiber-reinforced felt facer, tapered to provide slope.
    - i. Taper: 1/4 in per foot. Insulation, crickets and saddles provided with taper as required for positive roof slope.
    - ii. Meets or exceeds ASTM C1289, Type II, Class 1, Grade 2 (20 psi).

### B. COVER-BOARD

- 1. Asphaltic roof board
  - a. SOPREMA, SOPRABOARD, Resisto Board, Ecology Roof System Corp. ERS Ecology Roof Board, Viridian Systems, LLC., Pika Ply Recovery Board, IKO Industries, Ltd., ProtectoBoard, Henry Company Recover Board: Mineral fortified, asphaltic roof substrate board with glass fiber facers. For use as roof cover-board and for vertical flashing substrate. Asphaltic roof board shall be manufactured by the membrane supplier.
    - i. Thickness: As indicated in Drawings.
    - ii. Dimensions: 4 x 8 ft acceptable for mechanical attachment, and insulation adhesive application.
    - iii. Puncture Resistance: 90 lbf
    - iv. Moisture Absorption: <1.0%
    - v. Compressive Strength: 1610 psi

### C. INSULATION CANT AND TAPERED STRIP

- 1. Cant strip, rigid mineral wool
  - a. SOPREMA SopraRock Cant Strips, Roxul Cant Strips: High density, mineral wool, bitumen coated cant strips.
    - i. Length: 4 ft sections.
    - ii. Cross-section dimensions: 1.5 thick x 4 in face width. 2 in thick x 5 in face width. Size as required for flashing conditions.
    - iii. Surface: Bitumen coated, sanded.
    - iv. Meets or exceeds ASTM C726.
- 2. Cant strip, expanded perlite
  - a. High density, laminated board made of high strength fibers and expanded perlite.
    - i. Length: 4 ft sections.
    - ii. Cross Section dimensions: 1 in thick x 3 in face, 1 in thick x

- iii. 4 in face, 1.5 in thick x 4 in face, 1.5 in thick x 5 in face. Size as required for flashing conditions.
- iv. Meets or exceeds ASTM C728.
- 3. Tapered edge strip and boards:
  - a. Expanded perlite, blended with binders and fibers.
    - i. Dimensions: 6 in x 1/2 in, 12 in x 1/2 in, 1 in or 1-1/2 in, 18 in x 1 in or 1-1/2 in. Size as required.
    - ii. Meets or exceeds ASTM C728.

## 2.05 ACCESSORIES

### A. PRIMERS

- 1. SOPREMA Elastocol 500 Primer: Asphalt cut-back primer. Primer for the preparation of roof membrane and flashing substrates for asphalt, heat-welded, hot asphalt and COLPLY and COLPLY MODIFIED ADHESIVE, solvent-based, cold adhesive-applied and cement applications.
  - a. Meets or exceeds ASTM D41
  - b. VOC content: 350 g/L or less.

### B. GENERAL PURPOSE ROOFING CEMENT AND MASTIC

- 1. SOPREMA Sopramastic: SBS Mastic. Fiber-reinforced, roofing cement, packaged in 5 gallon pails. General purpose roofing cement for low-slope roofing used for sealing membrane T-joints and membrane edges along terminations, transitions and at roof penetrations.
  - a. VOC Content: 190 g/L or less.
  - b. Meets or exceeds ASTM D4586, Type I, Class II.
- 2. SOPREMA Sopramastic: SBS Mastic. Fiber-reinforced, roofing cement, packaged in 10.4 oz caulk tubes. General purpose roofing cement for low-slope roofing used for sealing membrane T-joints and membrane edges along terminations, transitions and at roof penetrations.
  - a. VOC Content: 190 g/L or less.
  - b. Meets or exceeds ASTM D4586, Type I, Class II.

### C. GENERAL PURPOSE SEALANT

- 1. SOPREMA Sopramastic SP1: General purpose, paintable, gun-grade, elastomeric, polyether moisture curing sealant for sealing SBS membrane terminations, Kynar 500 PVDF, horizontal and vertical construction joints.
  - a. VOC Content: 20 g/L or less.
  - b. Meets or exceeds ASTM C920, Type S, Grade NS, Class 50.
  - c. Standard color, custom color.

### D. INSULATION FASTENERS AND PLATES

- 1. SOPREMA #12 DP Fastener and 3 in stress plate: Insulation system fasteners and metal stress plates.
- 2. SOPREMA #14 MP Fastener and 3 in stress plate: Insulation system fasteners and metal stress plates.

### E. MEMBRANE FASTENERS AND PLATES

- 1. SOPREMA #14 MP Fastener: Membrane base ply fastener.
- 2. SOPREMA 2 in Seam Plate: Membrane base ply seam plate.
- 3. SOPREMA 2.4 in Seam Plate: Membrane base ply seam plate.

### F. LIQUID-APPLIED REINFORCED FLASHING SYSTEM

1. SOPREMA Alsan Flashing: Single-component, polyurethane-bitumen resin with polyester reinforcing fleece fabric fully embedded into the resin to form roof system flashings.
  - a. VOC Content: 250 g/L.
  - b. Alsan Flashing: Liquid resin, Meets or exceeds ASTM C836.
  - c. Alsan PolyFleece: Non-woven polyester reinforcement.
  - d. Surfacing: Alsan Flashing with mineral granules broadcast into wet Alsan Flashing to match adjacent SBS-modified bitumen cap sheet.
  
- G. MINERAL GRANULES
  1. SOPREMA Granules: No. 11, mineral coated colored granules, color to match cap sheet, supplied by membrane cap sheet manufacturer.
  
- H. EXPANSION JOINT
  1. SOPREMA Soprajoint: Low-profile, polyester knit-reinforced, SBS-modified bitumen expansion joint membrane. Top surface consists of an aluminum-clad bond-breaker, with plastic burn-off film on the bottom surface for torch or hot air welding.
    - a. Thickness: 160 mils (4.0 mm)
    - b. Width: 18 in (457 mm)
    - c. Roll Length: 32.8 ft (10 m)
    - d. Expansion joint, maximum unsupported span: 2 in (51 mm)
    - e. Expansion joint, maximum displacement: 5/8 in (16 mm)
  
- I. SHEET METAL FLASHING
  1. Contractor shall furnish all sheet metal flashings, counter flashings, roof edge system, and all other related sheet metal flashings and associated fasteners necessary to flash and counter flash the specified roofing system.
  2. Sheet metal flashing materials and fasteners shall be compatible with adjacent materials, to accommodate all project related exposures.
  3. Pre-Finished (Mill Finished) Sheet Metal Flashing Material: Aluminum.
  4. Roof Edge System: Tested per ANSI/SPRI ES-1 to meet or exceed design pressures at roof edge.
  
- J. SHEET METAL, ROOF EDGE SYSTEM
  1. Roof edge system shall include all components and associated fasteners included by the manufacturer to comply with specified performance requirements. Contractor shall provide all other related fasteners and sealants not provided as part of the roof edge system, and required in the manufacturer's product data sheets.
  
  2. Sopra Metal: Engineered Roof Edge System.
    - a. Material: Aluminum
    - b. Gauge/Thickness: 24 gauge
    - c. Finish: Kynar 500 Color selected from manufacturer's color chart. Mill-Finished Aluminum.
    - d. Tested per ANSI/SPRI ES-1 to meet or exceed design pressures at roof edge.
    - e. FM Approved.
  
  3. SOPREMA Reglet and Flashing. Engineered, formed metal counterflashing metal.
    - a. Material: Aluminum
    - b. Gauge/Thickness: 24 gauge
    - c. Finish: Kynar 500 Color selected from manufacturer's color chart. Mill-Finished Aluminum.

**PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examination includes visual observations, qualitative analysis, and quantitative testing measures as necessary to ensure conditions remain satisfactory throughout the project.
- B. The contractor shall examine all roofing substrates including, but not limited to: insulation materials, roof decks, walls, curbs, rooftop equipment, fixtures, and wood blocking.
- C. The applicator shall not begin installation until conditions have been properly examined and determined to be clean, dry and, otherwise satisfactory to receive specified roofing materials.
- D. During the application of specified materials, the applicator shall continue to examine all project conditions to ensure conditions remain satisfactory to complete the specified roofing system.

### **3.02 PREPARATION**

- A. Before commencing work each day, the contractor shall prepare all roofing substrates to ensure conditions are satisfactory to proceed with the installation of specified roofing materials. Preparation of substrates includes, but is not limited to, substrate repairs, securement of substrates, eliminating all incompatible materials, and cleaning.
- B. Where conditions are found to be unsatisfactory, work shall not begin until conditions are made satisfactory to begin work. Commencing of work shall indicate contractor's acceptance of conditions.

### **3.03 INSULATION SYSTEM APPLICATION**

- A. Follow insulation system component product data sheets, published general requirements and approvals.
- B. Install all insulation system components on clean, dry, uniform and properly prepared substrates.
- C. All insulation system boards shall be carefully installed and fitted against adjoining sheets to form tight joints.
- D. Insulation system boards that must be cut to fit shall be saw-cut or knife-cut in a straight line, not broken. Chalk lines shall be used to cut insulation components. Uneven or broken edges shall not be accepted. Remove dust and debris that develops during cutting operations.
- E. Stagger successive layers of insulation 12 inches vertically and laterally to ensure board joints do not coincide with joints from the layers above and below.
- F. Crickets, saddles, and tapered edge strips shall be installed before installing Cover-boards.
- G. Install tapered insulation, saddles and crickets as required to ensure positive slope for complete roof drainage.
- H. Cover-boards shall be installed to fit tight against adjacent boards. When required by the Cover-board manufacturer, a uniform gap shall be provided between Cover-boards using a uniform guide placed between board joints to form a gap between all boards during installation.

- I. The finished insulation system surface shall be tight to, and flush with, adjacent substrates to form a satisfactory substrate to install specified roof membrane and flashings.
- J. Install specified cants where required for membrane flashing transitions.

### **3.04 INSULATION FASTENER APPLICATION**

- A. Fasten (Insulation Base Layer, Insulation, Cover-board) to the deck using specified insulation fasteners and plates.
- B. Evenly distribute fasteners as required by the board manufacturer's published requirements.
- C. Fasten the insulation to meet the specified wind uplift resistance performance requirements and warranty requirements.
- D. Minimum insulation fastening requirement:
  - 1. Field of Roof (Zone 1): 5 fasteners per 4x8 ft board.
  - 2. Perimeter of Roof (Zone 2): 5 fasteners per 4x8 ft board.
  - 3. Corners of Roof (Zone 3): 5 fasteners per 4x8 ft board.
- E. For insulation and Cover-boards located partially within the defined perimeter and/or corners, install fastening for the entire board as specified herein.

### **3.05 PRIMER APPLICATION**

- A. Examine all substrates, and conduct adhesion peel tests as necessary, to ensure satisfactory adhesion is achieved.
- B. Apply the appropriate specified primer to dry, compatible substrates as required to enhance adhesion of new specified roofing materials.
- C. Apply primer using brush, roller, or sprayer at the rate published on the product data sheet.
- D. Asphalt Primer: Apply (ELASTOCOL 500) primer to dry compatible masonry, metal, wood and other required substrates before applying asphalt and heat-welded membrane plies. Primer is optional for solvent-based SBS adhesives and cements, refer to product data sheets.
- E. Project conditions vary throughout the day. Monitor changing conditions, monitor the drying time of primers, and monitor the adhesion of the membrane plies. Adjust primer and membrane application methods as necessary to achieve the desired results.

### **3.06 HEAT WELDING**

- A. The Contractor is responsible for project safety. Where conditions are deemed unsafe to use open flames, manufacturer's alternate membrane application methods shall be used to install SBS modified bitumen membrane and flashings. Acceptable alternate installation methods include hot asphalt, cold adhesive-applied, self-adhered membranes and mechanically fastened plies. Hot-air welding equipment may be used in lieu of roof torches to seal membrane side and end laps where heat welding the laps is necessary. Refer to NRCA CERTA, local codes and building owner's requirements for hot work operations.

- B. Single or multi-nozzle, hand-held propane roof torches shall be used to install heat-welded membrane and flashing plies. Multi-nozzle carts (dragon wagons) may also be utilized to install membrane plies. Seven (7) nozzle carts are recommended for more uniform heat application in lieu of five (5) nozzle carts.

### **3.07 SBS MASTIC AND GENERAL-PURPOSE ROOFING CEMENT APPLICATION**

- A. Apply SOPREMA Sopramastic general purpose SBS mastic and roofing cement to seal drain leads, metal flanges, seal along membrane edge at terminations, and where specified and required in detail drawings.
- B. Do not use general purpose SBS mastics and roofing cement where flashing cement applications are required. Do not use SBS mastics and roofing cement beneath SBS-modified bitumen membrane and flashing plies.
- C. Apply general purpose SBS mastic and elastic roofing cement using caulk gun, or notched trowel at 2.0 – 2.5 gallons per square on each surface. Application rates vary based on substrate porosity and roughness. Tool-in as necessary to seal laps
- D. Embed matching granules into wet cement where exposed.

### **3.08 HEAT-WELDED, FULLY ADHERED MEMBRANE APPLICATION**

- A. Follow material product data sheets and published general requirements for installation instructions.
- B. Ensure environmental conditions are safe and satisfactory, and will remain safe and satisfactory, during the application of the heat-welded membrane and flashings.
- C. Ensure all primers are fully dry before beginning heat-welding operations.
- D. Unroll membrane onto the roof surface and allow time to relax prior to heat welding.
- E. Starting at the low point of the roof, lay out the membrane to ensure the plies are installed perpendicular to the roof slope, shingled to prevent back-water laps.
- F. Ensure all roofing and flashing substrates are prepared and acceptable to receive the heat-welded membrane.
- G. Cut membrane to working lengths and widths to conform to rooftop conditions, and lay out to always work to a selva edge.
- H. Ensure specified side-laps and end-laps are maintained. End-laps should be staggered 3 feet apart.
- I. Direct roof torch on the roll as necessary to prevent overheating and damaging the membrane and substrates.
- J. As the membrane is unrolled, apply heat to the underside of the membrane until the plastic burn-off film melts away. Continuously move the torch side-to-side across the underside of

- the roll to melt the bitumen on the underside of the sheet, while continuously unrolling membrane.
- K. While unrolling and heating the sheet, ensure a constant flow hot bitumen approximately 1/4 to 1/2-inch flows ahead of the roll as it is unrolled, and there is 1/8 to 1/4-inch bleed out at all laps.
  - L. Adjust the application of heat to the underside of the membrane and to substrate as required for varying substrates and environmental conditions.
  - M. At the 6-inch end-laps, melt the plastic burn-off film from the top surface or embed granules and remove surfacing, where present, using a torch or hot-air welder.
  - N. At end-laps, cut a 45-degree dog-ear away from the selvage edge, or otherwise ensure the membrane is fully heat-welded watertight at all T-joints.
  - O. Each day, physically inspect all side and end-laps, and ensure the membrane is sealed watertight. Where necessary, use a torch or hot-air welder and a clean trowel to ensure all laps are fully sealed.
  - P. Inspect the installation each day to ensure the plies are fully adhered. Repair all voids, wrinkles, open laps and all other deficiencies.
  - Q. Offset cap sheet side and end-laps away from the base ply laps so that cap sheet laps are not located within 18 inch of base ply laps.

**3.09 MECHANICALLY FASTENED MEMBRANE, BASE PLY APPLICATION (SOPREMA SOPRAFIX)**

- A. Refer to agency approvals for fastening and other system requirements.
- B. Mechanically fastened membrane base ply installation:
  - 1. Follow product data sheets and published detail requirements for additional installation instructions.
  - 2. Ensure environmental conditions are satisfactory, and will remain satisfactory, during the application.
  - 3. Unroll the sheet onto the roof surface and allow time to relax before fastening. The sheet should relax in order to prevent wrinkling once fastened.
  - 4. Starting at the low point of the roof, lay out the membrane to ensure the plies are installed perpendicular to the roof slope, shingled to prevent back-water laps.
  - 5. Remove all wrinkles from the sheet.
  - 6. Ensure all roofing and flashing substrates are prepared and acceptable to receive the mechanically fastened membrane.
  - 7. Ensure the specified side-lap and end-lap widths are maintained. End-laps should be staggered 3 feet apart.
  - 8. Unroll the first roll onto the roof substrate, re-roll the adjacent roll.
  - 9. Starting at one end of the sheet, install the mechanical fasteners along the center of the side-lap. Ensure spacing between fasteners in the laps meets specified wind uplift resistance requirements.
  - 10. Do not over-drive fasteners. Install fasteners as necessary to firmly set the fastener and seam plate tight against the sheet. Prevent wrinkles from forming in the sheet as the fasteners are installed.



11. At the end of the sheet where it terminates at roof edges, walls and curbs, fasten the end-laps to the deck 12 inches on-centers or less.
12. When the side-lap is fastened, un-roll the adjacent roll over the fasteners. Maintain the required side-lap width.
13. Ensure the full side-lap width, and all 6-inch end-laps, are sealed water-tight.
14. For heat-welded side-laps, apply heat to the underside of the roll at the side-laps while unrolling the membrane. Apply heat until the bitumen melts to ensure fully adhesion. Ensure a continuous weld is produced across the full side-lap width.
15. For hot-air welded side-laps, insert the hot-air welder shoe within the lap, and adjust the hot-air welder as required to produce a continuous weld across the full lap width.
16. While heat-welding the membrane side-laps, ensure approximately 1/8 to 1/4-inch bleed-out is achieved at laps.
17. Adjust the application of heat to the underside of the membrane and to substrate as required for varying substrates and environmental conditions.
18. For self-adhesive side-laps, remove the release film on the underside of the membrane, while immediately following with a steel roller. Immediately heat-weld all 6-inch end-laps, and fully seal all T-joints.
19. At end-laps, cut a 45-degree dog-ear away from the selvage edge, or otherwise ensure the membrane is fully heat-welded watertight at all end-laps and T-joints.
20. Each day, physically inspect all side and end-laps, and ensure the membrane is sealed watertight. Where necessary, use a torch or hot-air welder and a clean trowel to ensure all laps are fully sealed.
21. Offset cap sheet side and end-laps away from the base ply laps so that cap sheet laps are not located within 18 inches of adjacent ply laps.
22. Install membrane inter-ply and/or cap sheet over completed fastened base ply sheet.
23. Inspect the installation each day to ensure the plies are fully adhered. Repair all un-adhered voids, wrinkles, open laps and all other deficiencies.

### **3.10 FLASHING APPLICATION, HEAT WELDED**

- A. Refer to SBS manufacturer's membrane application instructions, flashing detail drawings, and follow product data sheets and other published requirements for installation instructions. Refer to manufacturer's membrane flashing detail drawings.
- B. The contractor is responsible for project safety. Refer to NRCA CERTA recommendations and building owner requirements for hot work operations.
- C. Where required to seal substrates for fire safety, install specified adhered, self-adhered or fastened backer ply to the substrate. Ensure backer-ply covers and seals all substrates requiring protection from exposure to torch operations.
- D. Ensure all flashing substrates that require primer are primed, and the primer is fully dry.
- E. Unroll the flashing base ply and flashing cap sheet onto the roof surface to their complete length. Once relaxed, cut the membrane to the required working lengths to accommodate the flashing height, cants and the required over-lap onto the horizontal roof surface.
- F. Cut the flashing membrane from the end of the roll in order to always install flashings to the side-lap line or selvage edge line.
- G. Lay out the flashing base ply and flashing Cap Sheet to offset all side-laps a minimum of 12 inches so that side-laps are never aligned on top of the ply beneath. Shingle the flashing ply laps to prevent back-water laps.

- H. Install non-combustible cant strips at transitions where required.
- I. Ensure correct membrane and flashing sequencing to achieve redundant, multi-ply, watertight flashings.
- J. ROOF MEMBRANE BASE PLY:
  - 1. Before installing flashings, install the roof membrane base ply in the horizontal field of the roof, and extend the base ply up to the top of the cant, where present, at roof terminations, transitions and penetrations.
- K. FLASHING BASE PLY:
  - 1. Install the flashing base ply starting at the top leading edge of the vertical flashing substrate, down over the cant and onto the horizontal surface of the roof a minimum of 3 inches beyond the of base of the cant onto the roof. Cut the base ply at corners to form 3-inch side-laps. Install gussets to seal corner transitions.
  - 2. Install one or more flashing base ply(s) at all roof terminations, transitions and penetrations.
- L. ROOF MEMBRANE CAP SHEET:
  - 1. Install the roof membrane cap Sheet in the horizontal field of the roof over the flashing base ply up to the roof termination, transition or penetration, and up to the top of cants where present.
  - 2. Using a chalk line, mark a line on the membrane cap sheet a minimum of 4 inches from the base of the cant onto the roof. Where granules are present, embed the cap sheet granules using a torch and trowel or granule embedder to prepare the surface to receive the flashing cap sheet.
- M. FLASHING CAP SHEET:
  - 1. Install the flashing Cap Sheet starting at the top leading edge on the vertical substrate, over the cant and onto the roof surface 4 inches from the base of the cant onto the roof.
  - 2. Install the flashing Cap Sheet to ensure a minimum two (2) ply flashing system is present at all roof terminations, transitions and penetrations.
- N. During the membrane and flashing installation, ensure all plies are completely adhered into place, with no bridging, voids or openings. Ensure bitumen or flashing cement bleed-out is present at all flashing side and end-laps.
- O. Use a damp sponge float or damp rag to press-in the heat-welded flashing plies during installation.
- P. Where sufficient bitumen bleed-out is not present, and for all self-adhered plies, apply specified gun-grade sealant or mastic to seal the membrane termination along all roof terminations, transitions and penetrations. These include gravel stop edge metal, pipe penetrations, along the top edge of curb and wall flashing, and all other flashing terminations where necessary to seal flashings watertight.
- Q. Fasten the top leading edge of the flashing at 8 inches on-center with appropriate 1-inch metal cap nails or other specified fasteners and plates. Seal fastener penetrations watertight using specified sealant or mastic.
- R. Manufacturer's liquid-applied, reinforced flashing systems shall be installed where conditions are not favorable to install SBS modified bitumen flashings. Such conditions include irregular shapes penetrating roof surfaces (I-beams), confined areas and low flashing heights.

Manufacturer's liquid-applied, reinforced flashing systems are recommended in lieu of pitch pans and lead pipe flashings.

### **3.11 LIQUID-APPLIED, SINGLE-COMPONENT, BITUMEN-URETHANE FLASHING SYSTEM APPLICATION (SOPREMA ALSAN FLASHING)**

- A. Refer to manufacturer's details drawings, product data sheets and published general requirements for application rates and specific installation instructions
- B. Pre-cut SOPREMA ALSAN POLYFLEECE polyester reinforcing fleece to conform to roof terminations, transitions and penetrations being flashed. Ensure a minimum 2-inch overlap of fleece at side and end-laps. Ensure the completed liquid-applied flashing membrane is fully reinforced.
- C. Apply the base coat of SOPREMA ALSAN FLASHING liquid-applied flashing resin onto the substrate using a brush or roller, working the material into the surface for complete coverage and full adhesion at 2.0 gallons per square.
- D. Immediately apply the SOPREMA ALSAN POLYFLEECE reinforcing into the wet base coat of resin. Using a brush or roller, work the SOPREMA ALSAN POLYFLEECE into the wet resin while applying the second coat of SOPREMA ALSAN FLASHING resin to completely encapsulate the fleece at 2.0 gallons per square, and extend the liquid resin 1 inch beyond the fleece.
- E. Allow the liquid membrane to sufficiently cure for 24 to 48 hours then apply the finish coat of SOPREMA ALSAN FLASHING resin at 2.0 gallons per square.
- F. Broadcast mineral granules into the wet finish coat as required to match the adjacent cap sheet.
- G. For SOPREMA Soprastar cap sheets, allow the SOPREMA ALSAN FLASHING system to completely cure for 48 hours or more, then apply the liquid-applied SOPREMA ALSAN FINISH surfacing to match the adjacent Soprastar cap sheet. Refer to SOPREMA ALSAN FINISH product data sheets and installation instructions.

### **3.12 SHEET METAL FLASHING APPLICATION**

- A. Refer to sheet metal flashing detail drawings, and follow product data sheets and published general requirements for installation instructions.
- B. Follow the most recent edition of the SMACNA Architectural Sheet Metal Manual for fabrication and installation requirements.

### **3.13 WALKWAYS**

- A. At areas outlined on the drawings, and around the perimeter of all rooftop equipment and at all door and stair landings, install walkway protection.
- B. Cut walkway from end of rolls. No piece shall be less than 24 inches.
- C. Provide a 2-inch space between sheets for drainage.

### **3.14 CLEAN-UP**

- A. Clean-up and properly dispose of waste and debris resulting from these operations each day as required to prevent damages and disruptions to operations.

**END OF SECTION**

**SECTION 07 62 00**  
**SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings and counterflashings.
- B. Sealants for joints within sheet metal fabrications.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Wood nailers for sheet metal work.
- B. Section 07 52 16 - SBS-Modified Bitumen Membrane Roofing.
- C. Section 07 92 00 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

**1.03 REFERENCE STANDARDS**

- A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
- B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- D. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- E. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- F. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2014.
- G. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- H. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).
- I. CDA A4050 - Copper in Architecture - Handbook; current edition.
- J. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

**1.04 SUBMITTALS**

- A. See Section 01 33 00 - Shop Drawings, Product Data and Samples, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.
- C. Samples: Submit two samples 6 by 6 inch in size illustrating metal finish color.

**1.05 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Maintain one copy of each document on site.
- C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

## **PART 2 PRODUCTS**

### **2.01 SHEET MATERIALS**

- A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gauge, (0.0239) inch thick base metal, shop pre-coated with PVDF coating.
  - 1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
  - 2. Color: As selected by Albert & Robinson Architects from manufacturer's standard colors.
- B. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 20 gage, (0.032 inch) thick; plain finish shop pre-coated with fluoropolymer coating.
  - 1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system.
  - 2. Color: As selected by Albert & Robinson Architects from manufacturer's standard colors.
- C. Stainless Steel: ASTM A666, Type 304 alloy, soft temper, 28 gauge, (0.0156 inch) thick; smooth No. 4 - Brushed finish.

### **2.02 ACCESSORIES**

- A. Fasteners: Stainless steel , with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.
- D. Sealant to be Exposed in Completed Work: Elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.
- E. Plastic Cement: ASTM D4586, Type I.

### **2.03 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

### **2.04 EXTERIOR PENETRATION FLASHING PANELS**

- A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

### **3.02 PREPARATION**

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.

### **3.03 INSTALLATION**

- A. Comply with drawing details.
  - 1. : SMACNA Architectural Sheet Metal Manual, specific details as called out in drawings.

- B. Insert flashings into reglets to form tight fit; secure in place with lead wedges; pack remaining spaces with lead wool; seal flashings into reglets with sealant.
- C. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.
- D. Apply plastic cement compound between metal flashings and felt flashings.
- E. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- F. Seal metal joints watertight. Seal metal joints using proper clear joint sealer specified in Section 07 92 00. Joints shall NOT leak and metal shall not be bent leaving joints as the low spot in gutters.
- G. Slope gutters 1/4 inch per 10 feet, minimum.
- H. Connect downspouts to downspout boots, and seal connection watertight.

#### **3.04 FIELD QUALITY CONTROL**

- A. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

#### **3.05 SCHEDULE**

- A. Cavity Wall Flashing: Included in this section, if metal. See Section 07 65 00 if flexible flashing.
- B. Counterflashings at Roofing Terminations (over roofing base flashings): this section.
- C. Counterflashings at Curb-Mounted Roof Items: included in this section.
- D. Roofing Penetration Flashings, for Pipes, Structural Steel, and Equipment Supports: included in roof system specification.

**END OF SECTION**





## **SECTION 07 72 33**

### **ROOF HATCHES**

#### **PART 1 - GENERAL**

##### **1.1 SUMMARY**

- A. Work Included: Provide factory-fabricated roof hatches for ladder access.

##### **1.2 SUBMITTALS**

- A. Product Data: Submit manufacturer's product data.
- B. Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.
- C. Warranty: Submit executed copy of manufacturer's standard warranty.

##### **1.3 QUALITY ASSURANCE**

- A. Manufacturer: A minimum of 5 years experience manufacturing similar products.
- B. Installer: A minimum of 2 years experience installing similar products.
- C. Manufacturer's Quality System: Registered to ISO 9001 Quality Standards including in-house engineering for product design activities.

07 72 33

ROOF HATCHES

PAGE 1 OF 5

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

#### 1.5 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURER

- A. Basis-of-Design Manufacturer: Type NB Roof Hatch by The BILCO Company, P.O. Box 1203, New Haven, CT 06505, 1-800-366-6530, Fax: 1-203-535-1582, Web: [www.BILCO.com](http://www.BILCO.com).
- B. Substitutions: See Section 01 63 00 – Substitutions and Product Requirements.

#### 2.2 ROOF HATCH

- A. Furnish and install where indicated on plans metal roof hatch Type NB, size width: 30" (762mm) x length: 54" (1372mm). Length denotes hinge side. The roof hatch shall be single leaf. The roof hatch shall be pre-assembled from the manufacturer.
- B. Performance characteristics:

07 72 33

ROOF HATCHES

PAGE 2 OF 5

1. Cover shall be reinforced to support a minimum live load of 40 psf (195kg/m<sup>2</sup>) with a maximum deflection of 1/150th of the span or 20 psf (97kg/m<sup>2</sup>) wind uplift.
  2. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
  3. Operation of the cover shall not be affected by temperature.
  4. Entire hatch shall be weather tight with fully welded corner joints on cover and curb.
- C. Cover: Shall be 11 gauge (2.3mm) aluminum with a 3" beaded flange with formed reinforcing members. Cover shall have a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
- D. Cover insulation: Shall be fiberglass of 1" (25mm) thickness, fully covered and protected by a metal liner 18 gauge (1mm) aluminum.
- E. Curb: Shall be 12" (305mm) in height and of 11 gauge (2.3mm) aluminum. The curb shall be formed with a 3-1/2" (89mm) flange with 7/16" (11mm) holes provided for securing to the roof deck. The curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip<sup>®</sup> flashing system, including stamped tabs, 6" (153mm) on center, to be bent inward to hold single ply roofing membrane securely in place.
- F. Curb insulation: Shall be rigid, high-density fiberboard of 1" (25mm) thickness on outside of curb.
- G. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe [for aluminum construction: welded to the curb assembly; for steel construction: through bolted to the curb assembly].

07 72 33

ROOF HATCHES

PAGE 3 OF 5

## H. Hardware

1. Heavy pintle hinges shall be provided
2. Cover shall be equipped with a spring latch with interior and exterior turn handles
3. Roof hatch shall be equipped with interior and exterior padlock hasps.
4. The latch strike shall be a stamped component bolted to the curb assembly.
5. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" (25mm) diameter red vinyl grip handle to permit easy release for closing.
6. All hardware shall be zinc plated and chromate sealed. [For installation in highly corrosive environments or when prolonged exposure to hot water or steam is anticipated, specify Type 316 stainless steel hardware].
7. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

- I. Finishes: Factory finish shall be mill finish aluminum.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that roof scuttle installation will not disrupt other trades. Verify that the substrate is dry, clean, and free of foreign matter. Report and correct defects prior to any installation.
- B. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

07 72 33

ROOF HATCHES

PAGE 4 OF 5

### 3.2 INSTALLATION

- A. The installer shall check as-built conditions and verify the manufacturer's roof scuttle details for accuracy to fit the application prior to fabrication. The installer shall comply with the roof scuttle Manufacturer's installation instructions.
- B. The installer shall furnish mechanical fasteners consistent with the roof requirements.
- C. Install products in strict accordance with manufacturer's instructions and approved submittals. Locate units level, plumb, and in proper alignment with adjacent work.
  - 1. Test units for proper function and adjust until proper operation is achieved.
  - 2. Repair finishes damaged during installation.
  - 3. Restore finishes so no evidence remains of corrective work.

### 3.3 ADJUSTING AND CLEANING

- A. Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

**END OF SECTION**

07 72 33

ROOF HATCHES

PAGE 5 OF 5



**SECTION 07 84 00  
FIRESTOPPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Firestopping systems.
- B. Firestopping of joints and penetrations in fire-resistance-rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 05 53 - Fire and Smoke Assembly Identification.
- B. Section 09 21 16 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

**1.03 REFERENCE STANDARDS**

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.
- B. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops; 2013a.
- C. ASTM E1966 - Standard Test Method for Fire Resistive Joint Systems; 2007 (Reapproved 2011).
- D. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2015a.
- E. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013.
- F. ITS (DIR) - Directory of Listed Products; Current Edition.
- G. FM (AG) - FM Approval Guide; current edition.
- H. FM P7825 - Approval Guide; Factory Mutual Research Corporation; current edition.
- I. UL 1479 - Standard for Fire Tests of Penetration Firestops; Current Edition, Including All Revisions.
- J. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- K. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.04 SUBMITTALS**

- A. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- B. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. Certificate from authority having jurisdiction indicating approval of materials used.
- E. Manufacturer's qualification statement.
- F. Installer's qualification statement.

**1.05 QUALITY ASSURANCE**

- A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
  - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
  - 2. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.

- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:

#### **1.06 MOCK-UPS**

- A. Install one firestopping assembly representative of each fire rating design required on project.
  - 1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.
  - 2. Where firestopping is intended to fill a linear opening, install at least 1 linear foot of firestopping.
- B. Obtain approval of authorities having jurisdiction (AHJ) before proceeding.
- C. If accepted, mock-up will represent minimum standard for this work.
- D. If accepted, mock-up may remain as part of this work. Remove and replace mock-ups not accepted.

#### **1.07 FIELD CONDITIONS**

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.
- B. Provide ventilation in areas where solvent-cured materials are being installed.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS**

- A. Manufacturers:
  - 1. A/D Fire Protection Systems Inc.: [www.adfire.com](http://www.adfire.com).
  - 2. 3M Fire Protection Products: [www.3m.com/firestop](http://www.3m.com/firestop).
  - 3. Hilti, Inc: [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Firestopping Materials: Any materials meeting requirements.
- C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.
- D. Fire Ratings: Refer to drawings for required systems and ratings.

#### **2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS**

- A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.
- B. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.
- C. Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
- D. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

#### **2.03 FIRESTOPPING SYSTEMS**

- A. Firestopping: Any material meeting requirements.
  - 1. Fire Ratings: Use system that is listed by FM (AG), ITS (DIR), or UL (FRD) and tested in accordance with ASTM E814, ASTM E119, or UL 1479 with F Rating equal to fire rating of penetrated assembly and minimum T Rating Equal to F Rating and in compliance with other specified requirements.



- B. Firestopping at Uninsulated Metallic Pipe and Conduit Penetrations, of diameter 4 inches or less: Any material meeting requirements.
- C. Firestopping at Combustible Pipe and Conduit Penetrations, of diameter 4 inches or less: Any material meeting requirements.
- D. Firestopping at Cable Tray Penetrations: Any material meeting requirements.
- E. Firestopping at Cable Penetrations, not in Conduit or Cable Tray: Any material meeting requirements.
- F. Firestopping at Control Joints (without Penetrations): Any material meeting requirements.
  - 1. Between Top of Fire-Rated Walls and Bottom of Slab Above: UL Design No. \_\_\_\_\_, F Rating 1-1/2 hour.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify openings are ready to receive the work of this section.

#### **3.02 PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.
- C. Install backing materials to prevent liquid material from leakage.

#### **3.03 INSTALLATION**

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- C. Install labeling required by code.

#### **3.04 FIELD QUALITY CONTROL**

- A. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

#### **3.05 CLEANING**

- A. Clean adjacent surfaces of firestopping materials.

#### **3.06 PROTECTION**

- A. Protect adjacent surfaces from damage by material installation.

**END OF SECTION**



**SECTION 07 92 00  
JOINT SEALANTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 27 26 - Fluid-Applied Membrane Air Barriers, Vapor Permeable.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim.
- C. Section 09 21 16 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.

**1.03 REFERENCE STANDARDS**

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2006 (Reapproved 2011).
- B. ASTM C834 - Standard Specification for Latex Sealants; 2014.
- C. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- F. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).
- G. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2014.
- H. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).
- I. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
- J. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.
- K. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.
- L. UL 263 - Standard for Fire Tests of Building Construction and Materials; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
  - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
  - 2. List of backing materials approved for use with the specific product.
  - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
  - 4. Substrates the product should not be used on.
  - 5. Substrates for which use of primer is required.
  - 6. Sample product warranty.
  - 7. Certification by manufacturer indicating that product complies with specification requirements.
- B. Samples for Verification: Where custom sealant color is specified, obtain directions from Albert & Robinson Architects and submit at least two physical samples for verification of color of each required sealant.

## 1.05 WARRANTY

- A. Correct defective work within a five year period after Date of Substantial Completion.
- B. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
  - 1. Bostik Inc: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
  - 2. Dow Chemical Company: [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
  - 3. Hilti, Inc: [www.us.hilti.com/#sle](http://www.us.hilti.com/#sle).
  - 4. Pecora Corporation: [www.pecora.com/#sle](http://www.pecora.com/#sle).
  - 5. Sherwin-Williams Company: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
  - 6. Tremco Commercial Sealants & Waterproofing: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
- B. Self-Leveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
  - 1. Bostik Inc: [www.bostik-us.com/#sle](http://www.bostik-us.com/#sle).
  - 2. Dow Chemical Company: [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
  - 3. Pecora Corporation: [www.pecora.com/#sle](http://www.pecora.com/#sle).
  - 4. Tremco Commercial Sealants & Waterproofing: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).

### 2.02 JOINT SEALANT APPLICATIONS

- A. Scope:
  - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
    - a. Wall expansion and control joints.
    - b. Joints between door, window, and other frames and adjacent construction.
    - c. Joints between different exposed materials.
    - d. Openings below ledge angles in masonry.
    - e. Other joints indicated below.
  - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
    - a. Joints between door, window, and other frames and adjacent construction.
    - b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
    - c. Other joints indicated below.
  - 3. Do not seal the following types of joints.
    - a. Intentional weepholes in masonry.
    - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
    - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
    - d. Joints where installation of sealant is specified in another section.
    - e. Joints between suspended panel ceilings/grid and walls.
- B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
  - 1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.
  - 2. Lap Joints between Manufactured Metal Panels: Butyl rubber, non-curing.

3. Control and Expansion Joints in Concrete Paving: Self-leveling polyurethane "traffic-grade" sealant.
- C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
  1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
  2. Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
  3. Floor Joints in Wet Areas: Non-sag polyurethane "non-traffic-grade" sealant suitable for continuous liquid immersion.
  4. Wall, Ceiling, and Floor Joints Where Tamper-Resistance is Required: Non-sag tamper-resistant silyl-terminated polyurethane sealant.
  5. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
  6. In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
  7. Narrow Control Joints in Interior Concrete Slabs: Self-leveling epoxy sealant.
  8. Other Floor Joints: Self-leveling polyurethane "traffic-grade" sealant.
- D. Interior Wet Areas: Bathrooms and restrooms; fixtures in wet areas include plumbing fixtures, countertops, cabinets, and other similar items.
- E. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".
- F. Areas Where Tamper-Resistance is Required: As indicated on drawings.

### **2.03 JOINT SEALANTS - GENERAL**

- A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
- B. Colors: As indicated on drawings.

### **2.04 NONSAG JOINT SEALANTS**

- A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
  1. Movement Capability: Plus and minus 50 percent, minimum.
  2. Non-Staining to Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
  3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
  4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
  5. Color: Match adjacent finished surfaces.
  6. Cure Type: Single-component, neutral moisture curing.
  7. Service Temperature Range: Minus 20 to 180 degrees F.
- B. Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
  1. Movement Capability: Plus and minus 50 percent, minimum.
  2. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
  3. Color: Match adjacent finished surfaces.
  4. Cure Type: Single-component, neutral moisture curing
  5. Service Temperature Range: Minus 65 to 180 degrees F.
- C. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
  1. Color: White.
- D. Polymer Sealant: ASTM C920; single component, cured sealant is paintable and mold/mildew resistant, low odor and VOC, and ultraviolet (UV) resistant.
  1. Adheres to wet surfaces.
  2. Color: White.

- E. Hybrid Urethane Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
  - 1. Movement Capability: Plus and minus 35 percent, minimum.
  - 2. Hardness Range: 20 to 40, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Match adjacent finished surfaces.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.
- F. Tamper-Resistant, Silyl-Terminated Polyurethane (STPU) Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
  - 1. Movement Capability: Plus and minus 12-1/2 percent, minimum
  - 2. Hardness Range: 25 to 30, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Match adjacent finished surfaces.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.
- G. Hybrid Silane Polyether Sealant: ASTM C920, Grade NS, Uses NT, M, G, A, and O; single component; not expected to withstand continuous water immersion.
  - 1. Movement Capability: Plus and minus 35 percent.
- H. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
  - 1. Movement Capability: Plus and minus 50 percent, minimum.
  - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Match adjacent finished surfaces.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.
- I. Polyurethane Sealant for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion; suitable for traffic exposure when recessed below traffic surface .
  - 1. Movement Capability: Plus and minus 35 percent, minimum.
  - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Match adjacent finished surfaces.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.
- J. Non-Sag "Traffic-Grade" Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion and traffic without the necessity to recess sealant below traffic surface.
  - 1. Movement Capability: Plus and minus 25 percent, minimum.
  - 2. Hardness Range: 40 to 50, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Match adjacent finished surfaces.
- K. Tamper-Resistant Polyurethane Sealant: ASTM C920, Grade NS, Uses M, G, and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
  - 1. Movement Capability: Plus and minus 12-1/2 percent, minimum.
  - 2. Hardness Range: 50 to 60, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Match adjacent finished surfaces.
- L. Epoxy Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
  - 1. Hardness Range: 65 to 75, Shore D, when tested in accordance with ASTM C661.
  - 2. Color: Match adjacent finished surfaces.
  - 3. Service Temperature Range: 40 to 120 degrees F.
- M. Polysulfide Sealant: ASTM C920, Grade NS, Uses M and A; single component; not expected to withstand continuous water immersion or traffic.
  - 1. Movement Capability: Plus and minus 25 percent, minimum.
  - 2. Hardness Range: 20 to 35, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Match adjacent finished surfaces.

- N. Acrylic-Urethane Sealant: ASTM C920, Grade NS, Uses M and A; single component; paintable; not expected to withstand continuous water immersion or traffic.
  - 1. Movement Capability: Plus and minus 12-1/2 percent, minimum.
  - 2. Hardness Range: 15 to 40, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: White.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.
- O. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
  - 1. Color: Standard colors matching finished surfaces, Type OP (opaque).
  - 2. Grade: ASTM C834; Grade 0 Degrees F (Minus 18 Degrees C).
- P. Acrylic Latex Sealant, Water-Based: ASTM C834 Type OP - Opaque and Grade Minus 18 degrees C (0 degrees F); ASTM C920 Class 100/50 for white and colors, and Class 25/25 for clear.
  - 1. Color: Standard colors matching finished surfaces.
- Q. Acrylic Latex Sealant: ASTM C834; for use as acoustical sealant and in firestopping systems for expansion joints and through penetrations.
  - 1. Color: Standard colors matching finished surfaces.
  - 2. Fire Rated System: Complies with UL 263 and ASTM E119 with UL fire resistance classifications.
- R. Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag; not expected to withstand continuous water immersion or traffic.
  - 1. Hardness Range: 10 to 30, Shore A, when tested in accordance with ASTM C661.
  - 2. Color: Match adjacent finished surfaces.
  - 3. Service Temperature Range: Minus 13 to 180 degrees F.
- S. Non-Curing Butyl Sealant: Solvent-based; ASTM C1311; single component, non-sag, non-skinning, non-hardening, non-bleeding; vapor-impermeable; intended for fully concealed applications.

## **2.05 SELF-LEVELING SEALANTS**

- A. Self-Leveling Silicone Sealant: ASTM C920, Grade P, Uses M and A; single or multicomponent, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
  - 1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
  - 2. Hardness Range: 0 to 15, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Gray.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.
- B. Self-Leveling Polyurethane Sealant: ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure; not expected to withstand continuous water immersion .
  - 1. Movement Capability: Plus and minus 25 percent, minimum.
  - 2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Gray.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.
- C. Self-Leveling Polyurethane Sealant for Continuous Water Immersion: Polyurethane; ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
  - 1. Movement Capability: Plus and minus 25 percent, minimum.
  - 2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: Gray.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.
- D. Rigid Self-Leveling Polyurethane Joint Filler: Two part, low viscosity, fast setting; intended for cracks and control joints not subject to significant movement.

1. Hardness Range: Greater than 100, Shore A, and 50 to 80, Shore D, when tested in accordance with ASTM C661.
- E. Flexible Polyurethane Foam: Single-component, gun grade, and low-expanding.
  1. Color: White.
- F. High Quality Latex-Based Sound Sealant: ASTM C834, Type OP an opaque sealant, and Grade 0, 32 degrees F, meets requirements for low-temperature flexibility.
  1. Color: White.
- G. Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
  1. Composition: Multi-component, 100 percent solids by weight.
  2. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.
  3. Joint Width, Minimum: 1/8 inch.

## 2.06 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
  1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
  2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
  3. Open Cell: 40 to 50 percent larger in diameter than joint width.
  4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

### 3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
- E. Concrete Floor Joints That Will Be Exposed in Completed Work: Test joint filler in inconspicuous area to verify that it does not stain or discolor slab.

### 3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.



- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- E. Install bond breaker backing tape where backer rod cannot be used.
- F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- G. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- H. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- I. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

**END OF SECTION**



**SECTION 08 11 13  
HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Non-fire-rated steel frames.
- B. Hollow metal frames for wood doors.
- C. Fire-rated steel doors and frames.
- D. Thermally insulated hollow metal doors with frames.
- E. Sound-rated hollow metal doors and frames. Provide sound rated frames for sound rated wood doors provided in Section 08 14 16.
- F. Accessories, including glazing.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 14 16 - Flush Wood Doors.
- B. Section 08 71 00 - Door Hardware.
- C. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.
- D. Section 09 91 13 - Exterior Painting
- E. Section 09 91 23 - Interior Painting: Field painting.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- C. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; current version.
- D. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- E. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2003 (R2009).
- F. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- G. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- I. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2023, with Editorial Revision.
- J. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2023.
- K. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2012.
- L. ASTM C476 - Standard Specification for Grout for Masonry; 2010.
- M. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.
- N. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- O. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute; 2000 (ANSI/DHI A115 Series).

- P. ITS (DIR) - Directory of Listed Products; Current Edition.
- Q. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- R. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- S. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- T. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2006.
- U. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.
- V. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.
- W. UL (BMD) - Building Materials Directory; current edition.
- X. UL (DIR) - Online Certifications Directory; Current Edition.
- Y. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- Z. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

#### **1.04 SUBMITTALS**

- A. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, head and jamb anchor locations and type, and identifying location of different finishes, if any.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Maintain at project site copies of reference standards relating to installation of products specified.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

### **PART 2 PRODUCTS**

#### **2.01 PERFORMANCE REQUIREMENTS**

- A. Requirements for Hollow Metal Doors and Frames:
  - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
  - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  - 3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
  - 4. Door Edge Profile: Manufacturers standard for application indicated.
  - 5. Typical Door Face Sheets: Flush.
  - 6. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Manufacturer's standard.
  - 7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
  9. Finish: Factory primed, for field finishing.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

## 2.02 HOLLOW METAL DOORS

- A. Exterior Doors: Thermally insulated.
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 1 - Standard-duty.
    - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 20 gage, 0.032 inch, minimum.
  2. Core: Polyurethane with 2.0 density.
  3. Door Thermal Resistance: R-Value of 8.7, minimum, for installed thickness of polyurethane.
  4. Door Thickness: 1-3/4 inches, nominal.
  5. Edge seams are to be fully welded
  6. Reinforced and prepared for 3-point latching.
  7. Top Closures for Outswinging Doors: Flush with top of faces and edges.
  8. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness.
  9. Weatherstripping: Refer to Section 08 71 00.
  10. Door Finish: Factory primed and field finished.
- B. Interior Doors, Non-Fire Rated:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 1 - Standard-duty.
    - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 20 gage, 0.032 inch, minimum.
  2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
  3. Door Thickness: 1-3/4 inches, nominal.
  4. Door Finish: Factory primed and field finished.
  5. Interior doors scheduled in Drawings as separating conditioned and non-conditioned spaces shall be insulated; such doors shall be equipped with weather stripping in accordance with Section 08 71 00 unless door is scheduled to receive acoustical gasketing.
- C. Fire-Rated Doors:
1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 1 - Standard-duty.
    - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 20 gage, 0.032 inch, minimum.
  2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
    - a. Provide units listed and labeled by UL (DIR) or ITS (DIR).
    - b. Attach fire rating label to each fire rated unit.

- c. Smoke and Draft Control Doors (Indicated with letter "S" on Drawings and/or Door Schedule): Self-closing or automatic closing doors in accordance with NFPA 80 and NFPA 105, with fire-resistance-rated wall construction rated the same or greater than the fire-rated doors, and the following:
  - 1) Maximum Air Leakage: 3.0 cfm/sq ft of door opening at 0.10 inch w.g. pressure, when tested in accordance with UL 1784 at both ambient and elevated temperatures.
  - 2) Gasketing: Provide gasketing or edge sealing as necessary to achieve leakage limit.
  - 3) Label: Include the "S" label on fire-rating label of door.
3. Door Core Material: Manufacturers standard core material/construction in compliance with requirements.
4. Door Thickness: 1-3/4 inches, nominal.
5. Door Face Sheets: Flush.
6. Door Finish: Factory primed and field finished.

### **2.03 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. General:
  1. Comply with the requirements of grade specified for corresponding door.
  2. Finish: Factory primed, for field finishing.
  3. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
  4. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
- C. Exterior Door Frames: Full profile/continuously welded type.
  1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
  2. Frame Metal Thickness: 14 gage, 0.067 inch, minimum.
  3. Weatherstripping: Separate, see Section 08 71 00.
- D. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
  1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
- E. Door Frames, Fire-Rated: Full profile/continuously welded type.
  1. Fire Rating: Same as door, labeled.
  2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
- F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.
- G. Mullions for Pairs of Doors: Removable type, with profile similar to jambs.
- H. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- I. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.
- J. Frames Wider than 48 inches: Reinforce with steel channel fitted tightly into frame head, flush with top.
- K. Frames in Precast Architectural Concrete Walls: Frames shall be knock-down type for installation after concrete panels have been set; all other attributes shall be as specified above for fully-welded frames for each application/location type.

### **2.04 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

## **2.05 ACCESSORIES**

- A. Glazing: As specified in Section 08 80 00.
- B. Removable Stops: Formed sheet steel, shape as indicated on drawings, mitered or butted corners; prepared for countersink style tamper proof screws.
- C. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- D. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- E. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

## **2.06 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

### **3.02 PREPARATION**

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.
- B. Coat inside of other frames with bituminous coating to a thickness of 1/16 inch.

### **3.03 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Install door hardware as specified in Section 08 71 00.
- F. Comply with glazing installation requirements of Section 08 80 00.
- G. Coordinate installation of glazing.
- H. Coordinate installation of electrical connections to electrical hardware items.

### **3.04 TOLERANCES**

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

### **3.05 ADJUSTING**

- A. Adjust for smooth and balanced door movement.
- B. Test sound control doors for force to close, latch, and unlatch; adjust as necessary in compliance with requirements.

### **3.06 SCHEDULE - SEE DRAWINGS**

**END OF SECTION**





**SECTION 08 14 16  
FLUSH WOOD DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Flush wood doors; flush and flush glazed configuration; fire-rated, non-rated, and acoustical.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES.
- B. Section 08 71 00 - Door Hardware .
- C. Section 08 80 00 - Glazing.

**1.03 REFERENCE STANDARDS**

- A. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- B. ASTM E413 - Classification for Rating Sound Insulation; 2016.
- C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.
- E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- F. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.
- G. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- B. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- C. Samples: Submit two samples of door construction, 12 by 12 inches in size cut from top corner of door.
- D. Samples: Submit two samples of door veneer, 12 by 12 inches in size illustrating wood grain, stain color, and sheen.
- E. Test Reports: Show compliance with specified requirements for the following:
  - 1. Sound-retardant doors and frames; sealed panel tests are not acceptable.
- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. Specimen warranty.
- H. Warranty, executed in State of Mississippi's name.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

08 14 16

Flush Wood Doors

PAGE 1 OF 3

## **1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

## **PART 2 PRODUCTS**

### **2.01 DOORS AND PANELS**

- A. Doors: See drawings for locations and additional requirements.
  - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
  - 1. Provide solid core doors at each location.
  - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
  - 3. Sound-Rated Doors: Minimum STC 45, calculated in accordance with ASTM E413, tested in accordance with ASTM E90.

### **2.02 DOOR AND PANEL CORES**

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.
- C. Sound-Rated Doors: Equivalent to type, with particleboard core (PC) construction as required to achieve STC rating specified; plies and faces as indicated above.

### **2.03 DOOR FACINGS**

- A. Veneer Facing for Transparent Finish: Cherry, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
  - 1. Vertical Edges: Same species as face veneer.
  - 2. "Running Match" each pair of doors and doors in close proximity to each other.

### **2.04 DOOR CONSTRUCTION**

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
  - 1. Provide solid blocks at lock edge for hardware reinforcement.
  - 2. Provide solid blocking for other throughbolted hardware.
- C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.
- D. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- E. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- G. Provide edge clearances in accordance with the quality standard specified.

## **2.05 FINISHES - WOOD VENEER DOORS**

- A. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:

## **2.06 ACCESSORIES**

- A. Hollow Metal Door Frames: See Section 08 11 13.
- B. Glazing: See Section 08 80 00.
- C. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.
- D. Astragals and Edges for Double Doors: Pairs of doors astragals, and door edge sealing and protection devices.
  - 1. UL listed products in compliance with requirements of authorities having jurisdiction.
  - 2. Astragal Type: Split, two parts, and with automatic locking, cutouts for other door hardware, and sealing gasket.
- E. Door Hardware: See Section 08 71 00.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

### **3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
  - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
  - 2. Install smoke and draft control doors in accordance with NFPA 105 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

### **3.03 TOLERANCES**

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

### **3.04 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

### **3.05 SCHEDULE - SEE DRAWINGS**

**END OF SECTION**



**SECTION 08 14 33  
SOLID WOOD DOORS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wood doors, stile and rail design; non-fire rated.
- B. Panels of wood, glass, louvers, and \_\_\_\_\_.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 20 00 - Finish Carpentry: Wood door frames.
- B. Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES.
- C. Section 08 14 16 - Flush Wood Doors.
- D. Section 08 71 00 - Door Hardware.

**1.03 REFERENCE STANDARDS**

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

**1.04 SUBMITTALS**

- A. Product Data: Indicate stile and rail core materials and construction; veneer species, type and characteristics.
- B. Specimen warranty.
- C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, cutouts for glazing, and cutouts for louvers.
- D. Samples: Submit two samples of door construction, \_\_\_ by \_\_\_ inches in size cut from top corner of door.
- E. Samples: Submit two samples of door veneer, \_\_\_ by \_\_\_ inches in size illustrating wood grain, stain color, and sheen.
- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. Manufacturer's qualification statement.
- H. Warranty, executed in State of Mississippi's name.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package, deliver, and store doors in accordance with quality standard specified.
- B. Accept doors on site in manufacturer's packaging, and inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic; do not store in damp or wet areas or areas where sunlight might bleach veneer; seal top and bottom edges with tinted sealer if stored more than one week, and break seal on site to permit ventilation.

**1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Include coverage for warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Stile and Rail Wood Doors:
  - 1. Eggers Industries; \_\_\_\_: [www.eggersindustries.com/#sle](http://www.eggersindustries.com/#sle).
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 DOORS**

- A. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; solid lumber construction; mortised and tenoned joints Provide wood species as indicated on door and frame schedule in drawings.
- C. Wood veneer facing with factory transparent finish as indicated on drawings.
- D. Design Style/Pattern: As indicated in Drawings.

### **2.03 DOOR AND PANEL FACINGS**

- A. Veneer Facing for Transparent Finish: Cherry, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
- B. Interior Doors: Wood veneer, Cherry species, plain sliced, with book matched grain, for transparent finish.
- C. Adhesive: Type I - Waterproof.

### **2.04 COMPONENTS**

- A. Panel or Glass Retention Molding: Wood of same species as door facing, molded stop applied one-side, mitered corners; prepared for countersink style tamper proof screws.
- B. Door Hardware: As specified in Section 08 71 00.

### **2.05 DOOR CONSTRUCTION**

- A. Astragals for Double Doors: Wood, \_\_\_\_ shaped, overlapping and recessed at face edge, specifically for double doors.
- B. Vertical Exposed Edge of Stiles: Of same species as veneer facing.
- C. Fit door edge trim to edge of stiles after applying veneer facing.
- D. Bond edge banding to cores.
- E. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware.

### **2.06 FINISHES**

- A. Factory finish doors in accordance with AWI Quality Standards Section 1500:
  - 1. Transparent Finish: Transparent catalyzed polyurethane, Custom quality, architect approved sheen.
- B. Seal door top edge with color sealer to match door facing.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out of tolerance for size or alignment.

### **3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standards.

- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Machine cut for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

**3.03 TOLERANCES**

- A. Comply with specified quality standard for fit, clearance, and joinery tolerances.
- B. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over an imaginary 36 x 84 inch surface area.
- C. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over an imaginary 36 x 84 inch surface area.
- D. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over an imaginary 36 by 84 inch surface area.

**3.04 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

**3.05 SCHEDULE - SEE DRAWINGS**

**END OF SECTION**





**SECTION 08 43 13  
ALUMINUM STOREFRONT**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section Includes: Kawneer Architectural Aluminum Storefront Systems, including perimeter trims, stools, accessories, shims and anchors, and perimeter sealing of storefront units.
1. Types of Kawneer Aluminum Storefront Systems include:
    - a. Trifab VersaGlaze 451 Framing System (for exterior installations)
      - 1) 2" x 4-1/2" nominal dimension.
      - 2) Front, Center, Back, Multi-Plane, Structural Silicone or Weatherseal Glazed (Type B).
      - 3) Screw Spline, Shear Block, Stick or Punched Opening Fabrication.
    - b. Trifab 450 Framing System (for interior installations)
      - 1) 2" x 4-1/2" nominal dimension.
      - 2) Non-Thermal.
      - 3) Front Plane.
      - 4) Screw, Spline, Shear Block, Stick or Punched Opening Fabrication.
- B. Related Sections:
1. 07 27 26 - Fluid-Applied Membrane Air Barriers, Vapor Permeable.
  2. 07 92 00 - Joint Sealants.
  3. 08 80 00 - Glazing.

**1.03 DEFINITIONS**

- A. Definitions: For fenestration industry standard terminology and definitions refer to American Architectural Manufacturers Association (AAMA) – AAMA Glossary (AAMA AG).

**1.04 PERFORMANCE REQUIREMENTS**

- A. General Performance:
1. Product to comply with the specified performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction, as determined by testing of glazed aluminum curtain walls representing those indicated for this project.
  2. Aluminum storefront systems shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
  3. Failure includes any of these events:
    - a. Thermal stresses transferring to building structure
    - b. Glass breakage
    - c. Loosening or weakening of fasteners, attachments, and other components
    - d. Failure of operating units
- B. Delegated Design: Design aluminum storefront systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated below. ALL ENGINEERING TO DETERMINE THAT THE SYSTEMS SELECTED WILL MEET THE PERFORMANCE REQUIREMENTS OF THIS SPECIFICATION AND ANY REINFORCEMENT (IF REQUIRED) IS TO BE PROVIDED BY THE STOREFRONT MANUFACTURER USING THE LOCAL PROJECT CODES AND WIND LOADS. THIS ENGINEERING SHALL BE SUBMITTED TO THE ARCHITECT FOR APPROVAL. THE ENGINEERING SHALL BE STAMPED BY AN ENGINEER LICENSED IN THE STATE OF MISSISSIPPI. PRELIMINARY DESIGN LOADING SHALL BE RUN BY THE MANUFACTURER DURING BIDDING TO VERIFY THAT THE SYSTEMS SELECTED WILL

WORK. THE BIDDING CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A STOREFRONT SYSTEM THAT MEETS THE PERFORMANCE REQUIREMENTS OF THIS SPECIFICATION WITHIN THE BID PRICE.

- C. Wind Loads:
1. Provide Curtain Wall system; include anchorage, capable of withstanding wind load design pressures. The design pressures are based on the (IBC) Building Code; **see code review in Drawings for IBC version being utilized for this project.**
- D. Air Leakage:
1. The test specimen shall be tested in accordance with ASTM E 283.
  2. Air infiltration rate shall not exceed 0.06 cfm/ft<sup>2</sup> (0.3 l/s · m<sup>2</sup>) at a static air pressure differential of 6.2 psf (300 Pa).
- E. Water Resistance:
1. The test specimen shall be tested in accordance with ASTM E 331.
  2. There shall be no leakage at a minimum static air pressure differential of 8 psf (383 Pa) as defined in AAMA 501.
- F. Uniform Load:
1. A static air design load of 35 psf (1680 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330.
  2. There shall be no deflection in excess of L/175 of the span of any framing member.
  3. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
- G. Seismic:
1. When tested to AAMA 501.4, system must meet design displacement (elastic) of 0.010 x the story height and ultimate displacement (inelastic) of 1.5 x the design displacement.
- H. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures:
1. Temperature Change (Range): 0 deg F (-18 deg C); 180 deg F (82 deg C).
  2. Test Interior Ambient-Air Temperature: 75 deg F (24 deg C).
  3. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5 for a minimum 3 cycles.
- I. Thermal Transmittance (U-factor):
1. Thermal transmittance test results are based upon 1" (25.4 mm) clear high-performance insulating glass [1/4" (e=0.035, #2), 1/2" warm edge spacer and argon fill gas, 1/4"].
  2. When tested to AAMA Specification 1503, the thermal transmittance (U-factor) shall not be more than:
    - a. Glass to interior .41 (low-e) or 0.56 (clear) or project specific Btu/hr/ft<sup>2</sup>/°F per AAMA 507 or Btu/hr/ft<sup>2</sup>/°F per NFRC 100.
- J. Condensation Resistance Factor (CRF) or Temperature Index (TI):
1. The glass to exterior CRF, when tested to AAMA Specification 1503, shall not be less than
  2. The glass to center CRF, when tested to AAMA Specification 1503, shall not be less than 62frame and 68glass (low-e) or 63frame and 56glass (clear).
  3. The glass to interior CRF, when tested to AAMA Specification 1503, shall not be less than 56frame and 67glass (low-e) or 54frame and 58glass (clear).
- K. Sound Transmission Loss:
1. When tested to ASTM E90 and ASTM E1425, the Sound Transmission Class (STC) and Outdoor/Indoor Transmission Class (OITC) shall not be less than:
    - a. STC 31 or OITC 26 based upon 1" (25.4 mm) insulating glass (1/4", 1/2" AS, 1/4").
    - b. STC 37 or OITC 30 based upon 1" (25.4 mm) laminated glass (1/4" laminated, 1/2" AS, 1/4" laminated).
- L. Environmental Product Declaration (EPD): Shall have a Type III Product-Specific EPD created from a Product Category Rule.

## 1.05 SUBMITTALS

- A. Product Data:
1. For each type of aluminum-framed storefront system indicated, include:
    - a. Construction details
    - b. Material descriptions
    - c. Dimensions of individual components and profiles
    - d. Hardware
    - e. Finishes
    - f. Installation instructions
  2. Recycled Content:
    - a. Provide documentation that aluminum has a minimum of 50% mixed pre- and post-consumer recycled content.
    - b. Provide a sample document illustrating project-specific information that will be provided after product shipment.
    - c. After product has shipped, provide project-specific recycled content information:
      - 1) Indicate recycled content, including the percentage of pre- and post-consumer recycled content per unit of product.
      - 2) Indicate the relative dollar value of recycled content product to the total dollar value of product included in the project.
      - 3) Indicate the location for recovery of recycled content.
      - 4) Indicate the location of the manufacturing facility.
  3. Environmental Product Declaration (EPD):
    - a. Include a Type III Product-Specific EPD created from a Product Category Rule.
  4. Material Ingredient Reporting:
    - a. Include documentation for material reporting that has a complete list of chemical ingredients to at least 100 ppm (0.01%) that covers 100% of the product.
- B. Shop Drawings:
1. Plans
  2. Elevations
  3. Sections
  4. Details
  5. Hardware
  6. Attachments to other work
  7. Operational clearances
  8. Installation details
- C. Samples for Initial Selection:
1. Provide samples for units with factory-applied color finishes.
- D. Samples for Verification:
1. Provide a verification sample for each type of exposed finish required.
- E. Product Test Reports:
1. Provide test reports for glazed aluminum curtain walls.
  2. Test reports must be based on evaluation of comprehensive tests performed by a qualified preconstruction testing agency.
  3. Test reports must indicate compliance with performance requirements.
- F. Warranty: Special warranty specified in this Section.
- G. Fabrication Sample:
1. Provide a fabrication sample of each vertical-to-horizontal intersection of aluminum-framed systems, made from 12" (304.8 mm) lengths of full-size components and showing details of the following:
    - a. Joinery, including concealed welds.
    - b. Anchorage.
    - c. Expansion provisions.

- d. Glazing.
- e. Flashing and drainage.
- H. Engineering Calculations required by Section 1.04 in this specification.
- I. Entrance Door Hardware Schedule:
  - 1. Schedule shall be prepared by or under the supervision of supplier.
  - 2. Schedule shall detail fabrication and assembly of entrance door hardware, including procedures and diagrams.
  - 3. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

#### **1.06 QUALITY ASSURANCE**

- A. Installer Qualifications:
  - 1. Installer must have successfully installed the same or similar units required for the project and other projects of similar size and scope.
- B. Manufacturer Qualifications:
  - 1. Manufacturer must be capable of providing aluminum-framed storefront systems that meet or exceed performance the stated performance requirements.
  - 2. Manufacturer must document this performance by the inclusion of test reports and calculations.
- C. Source Limitations:
  - 1. Obtain aluminum-framed storefront system through one source from a single manufacturer.
- D. Product Options:
  - 1. Information on drawings and in specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
  - 2. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- E. Mockups:
  - 1. Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 2. Build mockup for type(s) of storefront elevation(s) indicated, in location(s) shown on Drawings.
- F. Pre-installation Conference:
  - 1. Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".
- G. Structural-Sealant Glazing: Comply with ASTM C 1401, "Guide for Structural Sealant Glazing" for design and installation of structural-sealant-glazed systems.
- H. Structural-Sealant Joints: Design reviewed and approved by structural-sealant manufacturer.

#### **1.07 PROJECT CONDITIONS**

- A. Field Measurements:
  - 1. Verify actual dimensions of aluminum-framed storefront openings by field measurements before fabrication.
  - 2. Indicate measurements on shop drawings.

#### **1.08 WARRANTY**

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty.
  - 1. Warranty Period: Two (2) years from Date of Substantial Completion of the project.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Basis-of-Design Product:
  - 1. Kawneer Company Inc.
  - 2. Trifab VersaGlaze 451T (for exterior installations) Framing System (Thermal)
    - a. Type SF-A.
    - b. System Dimensions: 2" x 4-1/2" nominal dimension.
    - c. Glazing Plane:
      - 1) Structural Silicone
  - 3. Trifab 450 (for interior installations) Framing System (Non-Thermal)
    - a. Type SF-B.
    - b. System Dimensions: 2" x 4-1/2" nominal dimension.
    - c. Glazing Plane: Front.
- B. Substitutions: Per Section 01 63 00.

### **2.02 MATERIALS**

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.8 mm) wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.
- B. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum framing members, trim hardware, anchors, and other components.
- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.
- E. Sealant: For sealants required within fabricated storefront system, provide permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.
- F. Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

### **2.03 STOREFRONT FRAMING SYSTEM**

- A. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- B. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials. Where exposes shall be stainless steel.
- C. Perimeter Anchors: When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
- D. Packing, Shipping, Handling and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- E. Storage and Protection: Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

### **2.04 GLAZING SYSTEMS**

- A. Glazing: As specified in Division 08 Section "Glazing".

- B. Glazing Gaskets: Manufacturer's standard compression types; replaceable, extruded EPDM rubber.
- C. Spacers and Setting Blocks: Manufacturer's standard elastomeric type.
- D. Bond-Breaker Tape: Manufacturer's standard TFE-fluorocarbon or polyethylene material to which sealants will not develop adhesion.
- E. Glazing Sealants: For structural-sealant-glazed systems, as recommended by manufacturer for joint type, and as follows:
  - 1. Structural Sealant: ASTM C 1184, single-component neutral-curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by a structural-sealant manufacturer for use in aluminum-framed systems indicated.
    - a. Color: Black
  - 2. Weatherseal Sealant: ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and O; single-component neutral-curing formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural-sealant, weatherseal-sealant, and aluminum-framed-system manufacturers for this use.
    - a. Color: Matching structural sealant.

## 2.05 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: 350 Series Doors, unless noted otherwise in drawings; finish to match system.
- B. Door Hardware, unless noted otherwise in drawings:
  - 1. Pull: Provided in Section 08 71 00.
  - 2. Door Closer: Provided in Section 08 71 00.
  - 3. Pivots: Single acting offset pivots.
  - 4. Locks: Provided in Section 08 71 00.
  - 5. Threshold: 1/2" x 6-3/4" aluminum mill finish.
  - 6. Weathering: Sealair Weathering System by Kawneer; provide sweeps at all exterior doors.

## 2.06 ACCESSORY MATERIALS

- A. Joint Sealants: For installation at perimeter of aluminum-framed systems, as specified in Division 07 Section "Joint Sealants".
- B. Bituminous Paint: Cold-applied, asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos; formulated for 30 mil (0.762 mm) thickness per coat.

## 2.07 FABRICATION

- A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fit joints; make joints flush, hairline and weatherproof.
  - 3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
  - 4. Physical and thermal isolation of glazing from framing members.
  - 5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 6. Provisions for field replacement of glazing.
  - 7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- B. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- C. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

- D. Storefront Framing: Fabricate components for assembly using manufacturer's standard installation instructions.
- E. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

## **2.08 ALUMINUM FINISHES**

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Factory Finishing:
  - 1. Kawneer Permanodic AA-M10C21A41 / AA-M45C22A41, AAMA 611, Architectural Class I Clear Anodic Coating.
    - a. Color: #14 Clear.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. With installer present, examine openings, substrates, structural support, anchorage, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work:
  - 1. Verify rough opening dimensions.
  - 2. Verify levelness of sill plate.
  - 3. Verify operational clearances.
  - 4. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components for proper water management.
  - 5. Masonry Surfaces:
    - a. Masonry surfaces must be visibly dry and free of excess mortar, sand, and other construction debris.
  - 6. Wood Frame Walls:
    - a. Wood frame walls must be dry, clean, sound, well nailed, free of voids, and without offsets at joints.
    - b. Ensure that nail heads are driven flush with surfaces in opening and within 3" (76.2 mm) of opening.
  - 7. Metal Surfaces:
    - a. Metal surfaces must be dry and clean (free of grease, oil, dirt, rust, corrosion, and welding slag).
    - b. Ensure that metal surfaces are without sharp edges or offsets at joints.
- B. Proceed with installation only after correcting unsatisfactory conditions.

### **3.02 INSTALLATION**

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing aluminum-framed storefront system, accessories, and other components.
- B. Install aluminum-framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weather tight construction.
- D. Install aluminum framed storefront system and components to drain condensation, water penetrating joints, and moisture migrating within aluminum-framed storefront system to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

### **3.03 FIELD QUALITY CONTROL**

- A. Field Tests:
  - 1. Architect shall select storefront units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured.

08 43 13

ALUMINUM STOREFRONT

PAGE 7 OF 8

2. Conduct tests for air infiltration and water penetration with manufacturer's representative present.
  3. Tests that do not meet the specified performance requirements and units that have deficiencies shall be corrected as part of the contract amount.
  4. Testing shall be performed per AAMA 503 by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements.
  5. Air Infiltration Tests:
    - a. Conduct tests in accordance with ASTM E 783.
    - b. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft<sup>2</sup>, whichever is greater.
  6. Water Infiltration Tests:
    - a. Conduct tests in accordance with ASTM E 1105.
    - b. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 6.2 psf (300 Pa).
- B. Manufacturer's Field Services:
1. Upon owner's written request, provide periodic site visit by manufacturer's field service representative.

### **3.04 ADJUSTING, CLEANING, AND PROTECTION**

- A. Adjusting: Not applicable.
- B. Protection:
1. Protect installed product's finish surfaces from damage during construction.
- C. Cleaning:
1. Clean glass immediately after installation.
    - a. Comply with glass manufacturer's written recommendations for final cleaning and maintenance.
    - b. Remove non-permanent labels and clean surfaces.
  2. Clean aluminum surfaces.
  3. Avoid damaging protective coatings and finishes.
  4. Remove excess sealants, glazing materials, dirt, and other substances.
  5. Repair or replace damaged installed products.
  6. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during the construction period.
  7. Remove construction debris from project site and legally dispose of debris.

**END OF SECTION**



**SECTION 08 45 13**  
**STRUCTURED-POLYCARBONATE-PANEL ASSEMBLIES**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Section includes requirements for translucent polycarbonate cladding systems as shown and specified herein.

**1.02 WORK INCLUDED**

- A. Design, engineer, manufacture, and installation of unitized, glazed translucent canopy system.
- B. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, weatherability, and water-tightness performance requirements. All flashing up to but not penetrating adjoining work are also required as part of the system and shall be included.
- C. Trained and factory authorized labor and supervision to complete the entire panel installation.

**1.03 QUALITY ASSURANCE**

- A. The glazing panels must be evaluated and listed by recognized building code evaluation organization: International Council Evaluation Service Inc (ICC-ES).
- B. Materials and products shall be manufactured by a company continuously and regularly employed in the manufacturing, engineering, and designing, stocking and building of unitized canopy assemblies for a period of at least ten (10) years.
- C. Erection shall be by a factory-approved installer who has been in the business of erecting similar material for at least five (5) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.
- D. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system, in accordance with the requirements of this specification.

**1.04 SUBMITTALS**

- A. Submit Shop drawings and color samples.
- B. Manufacturer shall submit written guarantee accompanied by substantiating data, stating that the products to be furnished are in accordance with or exceed these specifications.
- C. Manufacturer shall submit full warranty terms and conditions for verification of compliance with the requirements of this specification.
- D. Submittal: Include analysis data signed and sealed by a professional engineer licensed in the state of the project's location.
- E. The manufacturer shall submit certified test reports made by an independent organization. Reports shall verify that the material will meet all performance requirements of this specification. Previously completed reports will be acceptable if they are indicative of the products used on this project. Test reports required are:
  1. Self-Ignition Temperature (ASTM 1929).
  2. Burning Extent (ASTM D-635).
  3. Smoke Density (ASTM E-84).
  4. Interior Flame Spread (ASTM E-84).
  5. Color Difference (ASTM D-2244-85).
  6. Load Bearing Ability (ASTM E-330).
  7. Haze for glare measurement (ASTM D-1003).
  8. ICC Evaluation Service Report (ICC-ESR) for compliance with IBC Building Code.
  9. Environmental Product Declaration (EPD) for submitted product with Life Cycle Assessment (LCA), Product Category Rule ISO 21930, Independent verification (external) ISO 14025

### 1.05 MAINTENANCE DATA

- A. The manufacturer shall provide recommended maintenance procedures, schedule of maintenance and materials required or recommended for maintenance.
- B. Submit installer certificate signed by installer, certifying compliance with project qualification requirements.

### 1.06 WARRANTY

- A. Provide a single source curtain wall/canopy system manufacturer warranty against defective materials and fabrication. Submit manufacturer's written warranty agreeing to repair failures in materials within one (1) year from date of Substantial Completion.
- B. Provide the following single source curtain wall manufacturer glazing warranties. Third party warranties shall not be acceptable. All warranties shall be maintained without any system maintenance requirements of the owner's responsibility. Neither the expected humidity of the enclosed space nor the roof construction classification per ASTM E-108 shall affect warranty length.
  - 1. Provide a lifetime warranty for both interior and exterior glazing covering:
    - a. Delamination of the glazing from the internal structure.
    - b. Fiberbloom; development of a rough exterior surface.
  - 2. Provide a ten (10) warranty on the interior glazing covering:
    - a. Change in light transmission of no more than 6% per ASTM D-1003.
    - b. Color stability: interior glazing shall not change color more than 6 CIE Units DELTA E by ASTM D-2244.
  - 3. Provide a ten (10) year warranty on the exterior glazing covering:
    - a. Change in light transmission of no more than 6% per ASTM D-1003.
    - b. Color stability: exterior glazing shall not change color more than 6 CIE Units DELTA E by ASTM D-2244.
- C. In addition, submit installer's written warranty agreeing to repair installation workmanship, defects and leaks within one year from date of Substantial Completion.

## PART 2 – PRODUCTS

### 2.01 MANUFACTURER

- A. Basis of design
  - 1. The design and performance criteria of this job are based on:
    - a. The U-Lite™ Monolithic Polycarbonate Canopy System as manufactured by Kingspan Light + Air | Architectural Daylighting
      - 1) Website: <https://www.kingspan.com/us/en/products/canopies-and-walkways/u-lite-canopy-system/>
    - b. Address: 28662 N Ballard Dr Lake Forest, IL 60045
    - c. Phone: (800) 759-6985;
    - d. Email: [info@kingspanlightandair.us](mailto:info@kingspanlightandair.us).
- B. Approved Manufacturers
  - 1. Other manufacturers may bid this project provided they comply with all requirements of the specification and submit evidence of compliance with all performance criteria specified herein. This evidence must include proof of conformance and test reports per section 1.5. Any exceptions taken from this specification must be noted on the approval request. If no exceptions are noted and approval is given, product performance will be as specified.
  - 2. Listing manufacturers names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.

### 2.02 TRANSLUCENT CURTAIN WALL PERFORMANCE AND APPEARANCE

- A. Glazing construction for weatherability and resistance to buckling and pressure
  - 1. Standing seam monolithic polycarbonate panel assembly:
    - a. Appearance

- 1) Panel thickness shall be a minimum 0.15" (4mm) single panel with exposed interlocking Aluminum U battens.
- 2) Panel Width: Shall not exceed 2' to ensure best performance for wind uplift, vibration, oil canning and visual appearance. Panels over 2' wide will not be approved.
- b. Joint System
  - 1) Panel shall be extruded in one single formable length. Maximum panel width shall not exceed 2'. Transverse connections are not acceptable.
  - 2) The panels should be manufactured with up stands that are integral to the unit.
  - 3) The up stands shall be 90 degrees to the panel face (standing seam dry glazed concept). Welding or gluing of upstands or standing seam is not acceptable.
  - 4) The aluminum U battens shall have a screw down clamping mechanism to ensure the designed uplift capability.
  - 5) Free movement of the panels shall be allowed to occur without damage to the weather tightness of the completed system.
2. Glazing must be manufactured with a permanent, co-extruded ultra-violet protective layer. Post-applied coatings or films of dissimilar materials that need to be maintained are unacceptable.
3. The light transmission shall not decrease more than 6% as measured by ASTM D-1003 over 10 years, or after exposure to temperature of 300° for 25 minutes (thermal aging performance standard).
4. The weathering performance should be justified by successful testing of the glazing's performance after exposure to actual Florida weather conditions for approximately 10 years in comparison to a new glazing assembly. This performance must be demonstrated by providing independent lab test reports for the exposed and a new panel assembly for the following tests; test results must show that there is no deterioration in performance for the 10 year's exposed panels versus new:
  - a. Uniform static air pressure per ASTM E-330 at negative load of -105 PSF and positive load of up to +/- 130 psf.
  - b. Impact loading up to of 600 lbf load ft<sup>2</sup> area
5. Thermal aging – the interior and exterior glazing shall not change color in excess of 0.75 Delta E per ASTM D-2244 and shall not darken more than 0.3 units Delta L per ASTM D-2244 and shall allow no cracking or crazing when exposed to 300°F for 25 minutes.
- B. Translucent glazing assemblies –
  1. Design, engineer, manufacture, and installation of unitized, glazed translucent canopy system. An assembly of independent glazing panes in one integrated assembly, incorporated into a complete aluminum frame system that has been tested and warranted by the manufacturer as a single source system. Design shall provide for the replacement of the glazing, compromising the weather tightness or interfering with the normal working functions of the building.
  2. Panel width shall not exceed 2' to ensure the best performance for wind uplift. Vibration, oil canning and visual appearance. Panels over 2' wide will not be approved.
  3. Haze measurement minimum of 90% per ASTM D-1003.
  4. Standard exterior glazing color:
    - a. Blue Danpalon.
  5. Standard interior glazing color:
    - a. Blue Danpalon.
- C. Translucent Glazing Joint System
  1. Free movement of the glazing shall be allowed to occur without damage to the weather tightness of the completed system.
  2. The glazing joint shall comply with the deflection limitation of IBC Table 1604.3 for exterior walls with flexible finishes – L/120 per ASTM E-330.
- D. Flammability
  1. Glazing

- a. Class A fire rating classification per ASTM E84.
- b. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.
- c. Minimum self-ignition temperature of > 650F° per ASTM 1929.

### **2.03 METAL FRAME STRUCTURE**

- A. Design criteria shall be per ASCE-7 requirements.

### **2.04 METAL MATERIALS**

- A. Extruded aluminum shall be ANSI/ASTM B-221; 6063-T6 or 6005-T5.
  1. overlap at least 6in to 8in, set in a full bed of sealant and riveted if required.
- B. All fasteners for aluminum framing to be stainless steel or cadmium plated steel, excluding the final fasteners to the building.
- C. All exposed Aluminum shall be finished:
  1. Clear anodized finish.

## **PART 3 – EXECUTION**

### **3.01 EXAMINATION**

- A. General contractor to verify when structural support is ready to receive all work in the section and to convene a pre-installation conference at least one week prior to commencing work of this section. Attendance required of the general contractor, curtain wall installer and all parties affecting and effected by the work of this section.
- B. All submitted opening sizes, dimensions and tolerances are to be field verified by the general contractor unless otherwise stipulated.
- C. Installer shall examine area of installation to verify readiness of site conditions. Notify the general contractor about any defects requiring correction. Do not work until conditions are satisfactory.

### **3.02 INSTALLATION**

- A. Install components in strict accordance with manufacturer's instructions on approved shop drawings. Use proper fasteners, caulking and hardware for material attachments as specified.
- B. Use methods of attachment to structure allowing sufficient adjustment to accommodate tolerances.
- C. Remove all protective coverings on panels immediately after installation.

### **3.03 CLEANING**

- A. Follow manufacturer's instructions when washing down exposed panel surfaces using a solution of mild detergent in warm water that is applied with soft, cleaning wiping cloths. Always test a small area before applying to an entire area.
- B. Follow strict panel manufacturer guidelines when removing foreign substances from panel surfaces requiring mineral spirits or any solvents that are acceptable for use. Always test a small sample to validate compliance before applying to the entire glazing surface.
- C. Installer shall leave glazing system clean at completion of installation. Final cleaning is by others upon completion of project, following manufacturer's cleaning instructions.

**END OF SECTION**

**SECTION 08 71 00  
DOOR HARDWARE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hardware for wood and hollow metal doors.
- B. Hardware for fire-rated doors.
- C. Electrically operated and controlled hardware.
- D. Lock cylinders for doors that hardware is specified in other sections.
- E. Thresholds.
- F. Weatherstripping and gasketing.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES.
- B. Section 08 14 16 - Flush Wood Doors.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. BHMA A156.1 - American National Standard for Butts and Hinges; 2013.
- C. BHMA A156.3 - American National Standard for Exit Devices; 2014.
- D. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.
- E. BHMA A156.6 - American National Standard for Architectural Door Trim; 2010.
- F. BHMA A156.7 - American National Standard for Template Hinge Dimensions; 2014.
- G. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; 2010.
- H. BHMA A156.13 - American National Standard for Mortise Locks & Latches Series 1000; 2012.
- I. BHMA A156.16 - American National Standard for Auxiliary Hardware; 2013.
- J. BHMA A156.17 - American National Standard for Self Closing Hinges & Pivots; 2014.
- K. BHMA A156.18 - American National Standard for Materials and Finishes; 2012.
- L. BHMA A156.21 - American National Standard for Thresholds; 2014.
- M. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association; 2012.
- N. BHMA A156.23 - American National Standard for Electromagnetic Locks; 2010.
- O. BHMA A156.26 - American National Standard for Continuous Hinges; 2012.
- P. BHMA A156.28 - American National Standard for Recommended Practices for Mechanical Keying Systems; 2013.
- Q. BHMA A156.30 - High Security Cylinders; 2020.
- R. BHMA A156.31 - American National Standard for Electric Strikes and Frame Mounted Actuators; 2013.
- S. BHMA A156.36 - Auxiliary Locks; 2020.
- T. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.
- U. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.
- V. DHI (H&S) - Sequence and Format for the Hardware Schedule; 1996.
- W. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; 2004.

- X. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; 1993; also in WDHS-1/WDHS-5 Series, 1996.
- Y. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- Z. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- AA. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- BB. NFPA 101 - Life Safety Code; 2015.
- CC. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- DD. UL (DIR) - Online Certifications Directory; Current Edition.
- EE. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- FF. UL 437 - Standard for Key Locks; Current Edition, Including All Revisions.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.
- B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.
- C. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; attendance is required by affected installers and the following:
  - 1. Albert & Robinson Architects.
  - 2. Installer's Architectural Hardware Consultant (AHC).
  - 3. Hardware Installer.
  - 4. Owner's Security Consultant.
- D. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- E. Keying Requirements Meeting:
  - 1. Schedule meeting at project site prior to General Contractor occupancy.
  - 2. Attendance Required:
    - a. General Contractor.
    - b. State of Mississippi.
    - c. Installer's Architectural Hardware Consultant (AHC).
  - 3. Agenda:
    - a. Establish keying requirements.
    - b. Verify locksets and locking hardware are functionally correct for project requirements.
    - c. Verify that keying and programming complies with project requirements.
    - d. Establish keying submittal schedule and update requirements.
  - 4. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system including, but not limited to, the following:
    - a. Access control requirements.
    - b. Key control system requirements.
    - c. Schematic diagram of preliminary key system.
    - d. Flow of traffic and extent of security required.
  - 5. Record minutes and distribute copies within two days after meeting to participants, with two copies to Albert & Robinson Architects, State of Mississippi, participants, and those affected by decisions made.
  - 6. Deliver established keying requirements to manufacturers.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.
- C. Shop Drawings - Door Hardware Schedule: Submit detailed listing that includes each item of hardware to be installed on each door. Use door numbering scheme as included in Contract Documents.
  - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
  - 2. Comply with DHI (H&S) using door numbers and hardware set numbers as indicated in construction documents.
  - 3. List groups and suffixes in proper sequence.
  - 4. Provide complete description for each door listed.
- D. Shop Drawings - Electrified Door Hardware: Submit diagrams for power, signal, and control wiring for electrified door hardware that include details of interface with building safety and security systems. Provide elevations and diagrams for each electrified door opening as follows:
  - 1. Prepared by or under supervision of Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC).
  - 2. Elevations: Submit front and back elevations of each door opening showing electrified devices with connections installed and an operations narrative describing how opening operates from either side at any given time.
  - 3. Diagrams: Submit point-to-point wiring diagram that shows each device in door opening system with related colored wire connections to each device.
- E. Samples for Verification:
  - 1. Submit minimum size of 2 by 4 inch for sheet samples, and minimum length of 4 inch for other products.
  - 2. Submit one (1) sample of hinge, latchset, lockset, and closer illustrating style, color, and finish.
  - 3. Return full-size samples to Contractor.
  - 4. Submit product description with samples.
- F. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- G. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
- H. Keying Schedule:
  - 1. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.
- I. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in State of Mississippi's name and registered with manufacturer.
- J. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
- K. Maintenance Materials and Tools: Furnish the following for State of Mississippi's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Lock Cylinders: Ten for each master keyed group.
  - 3. Tools: One set of each special wrench or tool applicable for each different or special hardware component, whether supplied by hardware component manufacturer or not.

#### **1.06 QUALITY ASSURANCE**

- A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Albert & Robinson Architects and General Contractor.
- B. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC) to assist in work of this section.

### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

### 1.08 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion.
  - 1. Closers: Five years, minimum.
  - 2. Exit Devices: Three years, minimum.
  - 3. Locksets and Cylinders: Three years, minimum.
  - 4. Other Hardware: Two years, minimum.

## PART 2 PRODUCTS

### 2.01 DESIGN AND PERFORMANCE CRITERIA

- A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.
- B. Provide individual items of single type, of same model, and by same manufacturer.
- C. Provide door hardware products that comply with the following requirements:
  - 1. Applicable provisions of federal, state, and local codes.
  - 2. Accessibility: ADA Standards and ICC A117.1.
  - 3. Applicable provisions of NFPA 101.
  - 4. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
  - 5. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
  - 6. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
  - 7. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified.
- D. Electrically Operated and/or Controlled Hardware: Provide necessary power supplies, power transfer hinges, relays, and interfaces as required for proper operation; provide wiring between hardware and control components and to building power connection in compliance with NFPA 70.
  - 1. Refer to Section 28 10 00 for additional access control system requirements.
- E. Lock Function: Provide lock and latch function numbers and descriptions of manufacturer's series. Refer to Shop Drawing submittal of Door Hardware Schedule.
- F. Fasteners:
  - 1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
    - a. Aluminum fasteners are not permitted.
    - b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
  - 2. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
  - 3. Fire-Rated Applications: Comply with NFPA 80.
    - a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
    - b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.
  - 4. Concealed Fasteners: Do not use through or sex bolt type fasteners on door panel sides indicated as concealed fastener locations, unless otherwise indicated.



- G. Where indicated door hardware is generic in nature, see section Hardware Schedule in Part 3 for Basis of Design hardware selections.

## 2.02 LOCKS AND LATCHES

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
1. If no hardware set is indicated for a swinging door provide an office lockset.
  2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
  3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders: Manufacturer's standard tumbler type, seven-pin interchangeable core.
1. Provide cams and/or tailpieces as required for locking devices required.
- C. Keying: Per Owner Requirements.
- D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

## 2.03 HINGES

- A. Hinges: Comply with BHMA A156.1, Grade 1.
1. Self Closing Hinges: Comply with BHMA A156.17.
  2. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.
    - a. Provide hinge width required to clear surrounding trim.
  3. Continuous Hinges: Comply with BHMA A156.26.
  4. Provide hinges on every swinging door.
  5. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
  6. Provide ball-bearing hinges at each door with closer.
  7. Provide non-removable pins on exterior outswinging doors.
  8. Provide following quantity of butt hinges for each door:
    - a. Doors up to 60 inches High: Two hinges.
    - b. Doors From 60 inches High up to 90 inches High: Three hinges.
    - c. Doors 90 inches High up to 120 inches High: Four hinges.
    - d. Doors over 120 inches High: One additional hinge per each additional 30 inches in height.

## 2.04 EXIT DEVICES

- A. Exit Devices: Comply with BHMA A156.3, Grade 1.
1. Lever design to match lockset trim.
  2. Provide cylinder with cylinder dogging or locking trim.
  3. Provide exit devices properly sized for door width and height.
  4. Provide strike as recommended by manufacturer for application indicated.
  5. Provide UL (DIR) listed exit device assemblies for fire-rated doors and panic device assemblies for non-fire-rated doors.

## 2.05 ELECTRIC STRIKES

- A. Electric Strikes: Comply with BHMA A156.31, Grade 1.
1. Provide UL (DIR) listed burglary-resistant electric strike; style to suit locks.
  2. Provide non-handed 24 VDC electric strike suitable for door frame material and scheduled lock configuration.
  3. Connect electric strikes into fire alarm where non-rated doors are scheduled to release with fire or sprinkler alarm condition.

## 2.06 ELECTROMAGNETIC LOCKS

- A. Electromagnetic Locks: Comply with BHMA A156.23, Grade 1.
1. Holding Force: 600 lbs, minimum.
  2. Voltage: 12 VDC, and provide power supplies by same manufacturer as locks.

3. Mounting: Surface mounted to door and frame on secure side, with fasteners, brackets, and spacer bars as required for application.

## **2.07 LOCK CYLINDERS**

- A. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
1. Provide high security mechanical type cylinders, Grade 1, with seven-pin core in compliance with BHMA A156.30 or UL 437 at locations indicated.
  2. Provide cylinders from same manufacturer as locking device.
  3. Provide cams and/or tailpieces as required for locking devices.

## **2.08 MORTISE LOCKS**

- A. Mortise Locks: Comply with BHMA A156.13, Grade 1, Security, 1000 Series.
1. Latchbolt Throw: 3/4 inch, minimum.
  2. Deadbolt Throw: 1 inch, minimum.
  3. Backset: 2-3/4 inch unless otherwise indicated.
  4. Strikes: Provide manufacturer's standard strike for each latchset or lockset with strike box and curved lip extending to protect frame in compliance with indicated requirements.
    - a. Finish: To match lock or latch.

## **2.09 AUXILIARY LOCKS (DEADLOCKS)**

- A. Auxiliary Locks (Deadlocks): Comply with BHMA A156.36, Grade 1.
1. Type: Bored (cylindrical).
  2. Application: Bored.
  3. Backset: 2-3/4 inch, unless otherwise indicated.
  4. Bolt Throw: 1/2 inch, with latch made of hardened steel.
  5. Provide strike that matches frame.

## **2.10 DOOR PULLS AND PUSH PLATES**

- A. Door Pulls and Push Plates: Comply with BHMA A156.6.
1. Pull Type: Straight, unless otherwise indicated.
  2. Push Plate Type: Flat, with square corners, unless otherwise indicated.
    - a. Edges: Beveled, unless otherwise indicated.
  3. Material: Aluminum, unless otherwise indicated.
  4. Provide door pulls and push plates on doors without a lockset, latchset, exit device, or auxiliary lock unless otherwise indicated.
  5. On solid doors, provide matching door pull and push plate on opposite faces.
  6. On glazed storefront doors, provide matching door pulls/push plates on both faces unless otherwise indicated.

## **2.11 CLOSERS**

- A. Closers: Comply with BHMA A156.4, Grade 1.
1. Type: Surface mounted to door.
  2. Provide door closer on each exterior door.
  3. Provide door closer on each fire-rated and smoke-rated door.
    - a. Spring hinges are not an acceptable self-closing device, unless otherwise indicated.
  4. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order.
  5. At corridor entry doors, mount closer on room side of door.
  6. At outswinging exterior doors, mount closer on interior side of door.

## **2.12 OVERHEAD STOPS AND HOLDERS**

- A. Overhead Stops and Holders (Door Checks): Comply with BHMA A156.8, Grade 1.
1. Provide stop for every swinging door, unless otherwise indicated.

## **2.13 PROTECTION PLATES**

- A. Protection Plates: Comply with BHMA A156.6.

- B. Metal Properties: Aluminum.
  - 1. Metal, Standard Duty: Thickness 0.05 inch, minimum.
- C. Edges: Beveled, on four sides unless otherwise indicated.
- D. Fasteners: Countersunk screw fasteners.
- E. Drip Guard: Provide at head of exterior doors unless covered by roof or canopy.

#### **2.14 KICK PLATES**

- A. Kick Plates: Provide along bottom edge of push side of every door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
  - 1. Size: 8 inch high by 2 inch less door width (LDW) on push side of door.

#### **2.15 FLOOR STOPS**

- A. Floor Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
  - 1. Provide floor stops when wall surface is not available; be cautious not to create a tripping hazard.
  - 2. Type: Manual hold-open, with dome floor stop.
  - 3. Material: Brass housing with rubber insert.

#### **2.16 WALL STOPS**

- A. Wall Stops: Comply with BHMA A156.16, Grade 1 and Resilient Material Retention Test as described in this standard.
  - 1. Provide wall stops to prevent damage to wall surface upon opening door.
  - 2. Type: Bumper, concave, wall stop.
  - 3. Material: Brass housing with rubber insert.

#### **2.17 THRESHOLDS**

- A. Thresholds: Comply with BHMA A156.21.
  - 1. Provide threshold at interior doors for transition between two different floor types, and over building expansion joints, unless otherwise indicated.
  - 2. Provide threshold at each exterior door, unless otherwise indicated.
  - 3. Type: Flat surface.
  - 4. Material: Aluminum.
  - 5. Threshold Surface: Fluted horizontal grooves across full width.
  - 6. Field cut threshold to profile of frame and width of door sill for tight fit.
  - 7. Provide non-corroding fasteners at exterior locations.
  - 8. Set all thresholds in a continuous bed of sealant.

#### **2.18 WEATHERSTRIPPING AND GASKETING**

- A. Weatherstripping and Gasketing: Comply with BHMA A156.22.
  - 1. Head and Jamb Type: Adjustable.
  - 2. Door Sweep Type: Encased in retainer.
  - 3. Material: Aluminum, with brush weatherstripping.
  - 4. Provide weatherstripping on each exterior door at head, jambs, and meeting stiles of door pairs, unless otherwise indicated; .

#### **2.19 SILENCERS**

- A. Silencers: Provide at equal locations on door frame to mute sound of door's impact upon closing.
  - 1. Single Door: Provide three on strike jamb of frame.
  - 2. Pair of Doors: Provide two on head of frame, one for each door at latch side.
  - 3. Material: Rubber, gray color.

#### **2.20 KEY CABINET**

- A. Key Cabinet: Sheet steel construction, piano hinged door with key lock; BHMA A156.28.
  - 1. Mounting: Wall-mounted.

2. Capacity: Actual quantity of keys, plus 25 percent additional capacity.
3. Size key hooks to hold 6 keys each.
4. Finish: Baked enamel, manufacturer's standard color.
5. Key cabinet lock to building keying system.

## 2.21 FIRE DEPARTMENT LOCK BOX

- A. Manufacturers:
  1. Knox Company; Knox-Box Rapid Entry System, \_\_\_\_\_: [www.knoxbox.com/#sle](http://www.knoxbox.com/#sle).
  2. Substitutions: Per Section 01 63 00.
- B. Fire Department Lock Box:
  1. Heavy-duty, surface mounted, solid stainless-steel box with hinged door and interior gasket seal; single drill resistant lock with dust covers and tamper alarm.
  2. Capacity: Holds 10 keys.
  3. Finish: Manufacturer's standard silver.

## 2.22 FINISHES

- A. Finishes: Provide door hardware of same finish, unless otherwise indicated.
  1. Primary Finish: 626; satin chromium plated over nickel, with brass or bronze base material (former US equivalent US26D); BHMA A156.18.
  2. Secondary Finish: 626; satin chromium plated over nickel, with brass or bronze base material (former US equivalent US26D); BHMA A156.18.
    - a. Use secondary finish in kitchens, bathrooms, and other spaces containing chrome or stainless steel finished appliances, fittings, and equipment; provide primary finish on one side of door and secondary finish on other side if necessary.
  3. Exceptions:
    - a. Where base material metal is specified to be different, provide finish that is an equivalent appearance in accordance with BHMA A156.18.
    - b. Hinges for Fire-Rated Doors: Steel base material with painted finish, in compliance with NFPA 80.
    - c. Door Closer Covers and Arms: Color as selected by Albert & Robinson Architects from manufacturer's standard colors unless otherwise indicated.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of correct characteristics.

### 3.02 INSTALLATION

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.
- C. Use templates provided by hardware item manufacturer.
- D. Do not install surface mounted items until application of finishes to substrate are fully completed.
- E. Door Hardware Mounting Heights: Distance from finished floor to center line of hardware item. As indicated in following list, unless noted otherwise on drawings.
  1. For Steel Doors and Frames: Install in compliance with DHI (LOCS) recommendations.
  2. For Wood Doors: Install in compliance with DHI WDHS.3 recommendations.
  3. Mounting heights in compliance with ADA Standards:
    - a. Locksets: 40-5/16 inch.
    - b. Push Plates/Pull Bars: 42 inch.
    - c. Deadlocks (Deadbolts): 48 inch.
    - d. Exit Devices: 40-5/16 inch.

e. Door Viewer: 43 inch; standard height 60 inch.

- F. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

### **3.03 ADJUSTING**

- A. Adjust work under provisions of Section 01 70 00 - Execution and Closeout Requirements.  
B. Adjust hardware for smooth operation.  
C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

### **3.04 CLEANING**

- A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.  
B. Clean adjacent surfaces soiled by hardware installation.  
C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

### **3.05 PROTECTION**

- A. Protect finished Work under provisions of Section 01 70 00 - Execution and Closeout Requirements.  
B. Do not permit adjacent work to damage hardware or finish.

### **3.06 HARDWARE SCHEDULE**

- A. See door hardware schedule on the following pages:

**END OF SECTION**



### **Hardware Set 1**

Doors: 101a, 101b

Each to Receive:

2	EA	Continuous Hinge	HD1100A 95"	National Guard
1	EA	Mullion	KR822 MCS 689	Stanley Security
1	EA	Rim Exit Device	2401 CD No Trim 630	Stanley Security
1	EA	Rim Exit Device	2403 CD No Trim 630	Stanley Security
2	EA	Rim Cylinder	12E-72 S2 RP 626 Patented	Stanley Security
2	EA	Mortise Cylinder	1E-74 C4 RP3 626 Patented	Stanley Security
2	EA	Door Pull	RM3311-36 Mtg-Type 1 30" US32D	Rockwood
2	EA	Surface Closer	HD8016 AF80J PC SNDTPK80 BP80 689	Stanley Security
1	EA	Threshold	896V x 72"	National Guard
2	EA	Gasketing	160V x 36" x 96"	National Guard
2	EA	Sweep	101VA x 36"	National Guard

### **Hardware Set 2**

Doors: 102

Each to Receive:

6	EA	Hinge	FBB191 NRP 4-1/2" x 4-1-2" 32D	Stanley Commercial
2	EA	Flush Bolt	555 US26D	Rockwood
1	EA	Mortise Lock	45H7TD 15H 626 Patented	Stanley Security
2	EA	Surface Closer	HD8016 DST PC SNDTPK80 689	Stanley Security
2	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Threshold	896V x 72"	National Guard
1	EA	Gasketing	160V x 72" x 84"	National Guard
1	EA	Drip Strip	16A x 76"	National Guard
2	EA	Sweep	101VA x 36"	National Guard

### **Hardware Set 3**

Doors: 107

Each to Receive:

1	EA	Continuous Hinge	HD1100A 119"	National Guard
1	EA	Mortise Deadlock	MS1850S 1-1/2" BS 628	Adams Rite
1	EA	Mortise Cylinder	1E-74 C181 RP3 626 Patented	Stanley Security
1	EA	Cylinder	4066-01 130	Adams Rite
2	EA	Door Pull	RM3311-36 Mtg-Type 16 30" US32D	Rockwood
1	EA	Surface Closer	HD8016 AF80J PC SNDTPK80 BP80 689	Stanley Security
1	EA	Threshold	896V x 36"	National Guard
1	EA	Drip Strip	16A x 40"	National Guard
1	EA	Gasketing	160V x 36" x 108"	National Guard
1	EA	Sweep	101VA x 36"	National Guard

#### **Hardware Set 4**

Doors: 108a, 112a, 116a, 117c

Each to Receive:

1	EA	Continuous Hinge	HD1100A 119"	National Guard
1	EA	Rim Exit Device	2403 No Trim 630	Stanley Security
1	EA	Rim Cylinder	12E-72 S2 RP 626 Patented	Stanley Security
1	EA	Electric Strike	9400 630	HES
1	EA	SMART Pac Bridge Rectifier	2005M3	HES
1	EA	Door Pull	RM3311-36 Mtg-Type 1 30" US32D	Rockwood
1	EA	Surface Closer	HD8016 AF80J PC SNDTPK80 BP80 689	Stanley Security
1	EA	Threshold	896V x 36"	National Guard
1	EA	Drip Strip	16A x 40"	National Guard
1	EA	Gasketing	160V x 36" x 108"	National Guard
1	EA	Sweep	101VA x 36"	National Guard
1	EA	Prox Reader	Signo 40 Black	HID

Wiring & all connections to be included by bidder of this section.

Installation, programming, & training to be included by the bidder of this section.

#### **Hardware Set 5**

Doors: 113a

Each to Receive:

2	EA	Continuous Hinge	HD1100A 119"	National Guard
1	EA	Flush Bolt	555 US26D	Rockwood
1	EA	Flush Bolt	555-36 US26D	Rockwood
1	EA	Mortise Deadlock	MS1850S 1-1/2" BS 628	Adams Rite
1	EA	Mortise Cylinder	1E-74 C181 RP3 626 Patented	Stanley Security
1	EA	Cylinder	4066-01 130	Adams Rite
4	EA	Door Pull	RM3311-36 Mtg-Type 16 30" US32D	Rockwood
		BTB Mount		
2	EA	Surface Closer	HD8016 AF80J PC SNDTPK80 BP80 689	Stanley Security
1	EA	Threshold	896V x 72"	National Guard
1	EA	Drip Strip	16A x 76"	National Guard
1	EA	Gasketing	160V x 72" x 108"	National Guard
2	EA	Sweep	101VA x 36"	National Guard

#### **Hardware Set 6**

Doors: 103, 106, 215

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Cylindrical Lock	9K37D 15D S3 626 Patented	Stanley Security
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood



### **Hardware Set 7**

Doors: 104, 105, 204, 205

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Push Plate	70C-RKW US32D	Rockwood
1	EA	Pull Plate	110x70C US32D	Rockwood
1	EA	Surface Closer	HD8016 AF80P PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Mop Plate	K1050 4" x 35" US32D BEV CSK	Rockwood
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 8**

Doors: 108b

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Rim Exit Device	FL 2108 4908A 630	Stanley Security
1	EA	Surface Closer	HD8016 AF80P PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 9**

Doors: 109, 208, 212

Each to Receive:

6	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
2	EA	Flush Bolt	555 US26D	Rockwood
1	EA	Cylindrical Lock	9K37D 15D S3 626 Patented	Stanley Security
1	EA	Wall Stop	409 US32D	Rockwood
1	EA	Door Stop	441H US26D	Rockwood
2	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 10**

Doors: 110, 115, 209, 214

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Rim Exit Device	2103 4903A 630	Stanley Security
1	EA	Rim Cylinder	12E-72 S2 RP 626 Patented	Stanley Security
1	EA	Surface Closer	HD8016 DST PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 11**

Doors: 111, 114, 131, 203, 206, 207a, 210, 213

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Cylindrical Lock	9K37D 15D S3 626 Patented	Stanley Security
1	EA	Surface Overhead Stop	4423 US32D	Architectural Builders
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 12**

Doors: 112b

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Rim Exit Device	2103 4903A 630	Stanley Security
1	EA	Rim Cylinder	12E-72 S2 RP 626 Patented	Stanley Security
1	EA	Electric Strike	9400 630	HES
1	EA	SMART Pac Bridge Rectifier	2005M3	HES
1	EA	Surface Closer	HD8016 AF80P PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood
1	EA	Prox Reader	Signo 40 Black	HID

Wiring & all connections to be included by bidder of this section.

Installation, programming, & training to be included by the bidder of this section.

### **Hardware Set 13**

Doors: 113b

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Cylindrical Lock	9K37D 15D S3 626 Patented	Stanley Security
1	EA	Surface Closer	HD8016 AF80P PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Door Stop	441H US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 14**

Doors: 116b, 117a, 117b

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Rim Exit Device	2103 CD No Trim 630	Stanley Security
1	EA	Rim Cylinder	12E-72 S2 RP 626 Patented	Stanley Security
1	EA	Mortise Cylinder	1E-74 C4 RP3 626 Patented	Stanley Security
1	EA	Door Pull	RM3311-36 Mtg-Type 1 30" US32D	Rockwood
1	EA	Surface Closer	HD8016 AF80P PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Door Stop	441H US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 15**

Doors: 118

Each to Receive:

2	EA	Continuous Hinge	HD1100A 95"	National Guard
4	EA	Door Pull	RM3311-36 Mtg-Type 16 30" US32D	Rockwood
		BTB Mount		
2	EA	Surface Closer	HD8016 AF80J PC SNDTPK80 BP80 689	Stanley Security
2	EA	Door Stop	441H US26D	Rockwood

### **Hardware Set 16**

Doors: 119, 120, 122, 123, 124, 125, 126, 127, 135, 220, 221, 222, 225, 226, 234, 235b, 260

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Cylindrical Lock	9K37AB 15D S3 626 Patented	Stanley Security
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 17**

Doors: 121, 276, C203, C205a

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Rim Exit Device	2103 No Trim 630	Stanley Security
1	EA	Rim Cylinder	12E-72 S2 RP 626 Patented	Stanley Security
1	EA	Electric Strike	9400 630	HES
1	EA	SMART Pac Bridge Rectifier	2005M3	HES
1	EA	Door Pull	RM3311-36 Mtg-Type 1 30" US32D	Rockwood
1	EA	Surface Closer	HD8016 AF80P PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Door Stop	441H US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood
1	EA	Prox Reader	Signo 40 Black	HID

Wiring & all connections to be included by bidder of this section.

Installation, programming, & training to be included by the bidder of this section.

### **Hardware Set 18**

Doors: 128, 292b, 294, 297

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Cylindrical Lock	9K30N 15D S3 626	Stanley Security
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 19**

Doors: 129, 250, 258, C201

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Rim Exit Device	2103 4903A 630	Stanley Security
1	EA	Rim Cylinder	12E-72 S2 RP 626 Patented	Stanley Security
1	EA	Electric Strike	9400 630	HES
1	EA	SMART Pac Bridge Rectifier	2005M3	HES
1	EA	Surface Closer	HD8016 AF80P PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood
1	EA	Prox Reader	Signo 40 Black	HID

Wiring & all connections to be included by bidder of this section.

Installation, programming, & training to be included by the bidder of this section.

### **Hardware Set 20**

Doors: 132, 133

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Cylindrical Lock	9K30N 15D S3 626	Stanley Security
1	EA	Deadbolt	3216 US26D	Hager
1	EA	Surface Closer	HD8016 AF80P PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 21**

Doors: 134a

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Cylindrical Lock	9K37AB 15D S3 626 Patented	Stanley Security
1	EA	Surface Closer	HD8016 AF80P PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 22**

Doors: 134b, 218, 259a, 293c

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Cylindrical Lock	9K37D 15D S3 626 Patented	Stanley Security
1	EA	SMART Pac Bridge Rectifier	2005M3	HES
1	EA	Electric Strike	1006CLB 630	HES
1	EA	Surface Closer	HD8016 AF80P PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood
1	EA	Prox Reader	Signo 40 Black	HID

Wiring & all connections to be included by bidder of this section.

Installation, programming, & training to be included by the bidder of this section.

Architect to verify the amperage of room 218. If over 800 amps, an exit device is required.

### **Hardware Set 23**

Doors: 207, 211

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Rim Exit Device	FL 2103 4903A 630	Stanley Security
1	EA	Rim Cylinder	12E-72 S2 RP 626 Patented	Stanley Security
1	EA	SMART Pac Bridge Rectifier	2005M3	HES
1	EA	Electric Strike	9500 630	HES
1	EA	Surface Closer	HD8016 AF80P PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood
1	EA	Prox Reader	Signo 40 Black	HID

Wiring & all connections to be included by bidder of this section.

Installation, programming, & training to be included by the bidder of this section.

### **Hardware Set 24**

Doors: 216, 217

Each to Receive:

6	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Electric Power Transfer	EPT-12C	Stanley Security
2	EA	Flush Bolt	555 US26D	Rockwood
1	EA	Cylindrical Lock	9K37D 15D S3 626 Patented	Stanley Security
1	EA	SMART Pac Bridge Rectifier	2005M3	HES
1	EA	Electric Strike	1006CLB 630	HES
1	EA	Surface Closer Active Leaf Only	HD8016 DST PC SNDTPK80 689	Stanley Security
2	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
2	EA	Silencer	608-RKW	Rockwood
1	EA	Prox Reader	Signo 40 Black	HID

Wiring & all connections to be included by bidder of this section.

Installation, programming, & training to be included by the bidder of this section.

### **Hardware Set 25**

Doors: 219

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Cylindrical Lock	9K37AB 15D S3 626 Patented	Stanley Security
1	EA	Surface Overhead Stop	4423 US32D	Architectural Builders
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 26**

Doors: 223, 224

Each to Receive:

6	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
2	EA	Flush Bolt	555 US26D	Rockwood
1	EA	Cylindrical Lock	9K37AB 15D S3 626 Patented	Stanley Security
2	EA	Surface Overhead Stop	4423 US32D	Architectural Builders
2	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 27**

Doors: 226a

Each to Receive:

6	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
2	EA	Magnetic Lock	M32	Securitron
1	EA	Surface Vert Rod Exit	2201 CD LBR No Trim 630	Stanley Security
1	EA	Surface Vert Rod Exit	2203 CD LBR No Trim 630	Stanley Security
1	EA	Rim Cylinder	12E-72 S2 RP 626 Patented	Stanley Security
2	EA	Mortise Cylinder	1E-74 C4 RP3 626 Patented	Stanley Security
2	EA	Door Pull	RM3311-36 Mtg-Type 1 30" US32D	Rockwood
2	EA	Surface Closer	HD8016 DS PC SNDTPK80 689	Stanley Security
2	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
2	EA	Silencer	608-RKW	Rockwood
1	EA	Prox Reader	Signo 40 Black	HID

Wiring & all connections to be included by bidder of this section.

Installation, programming, & training to be included by the bidder of this section.

### **Hardware Set 28**

Doors: 229, 230, 231, 232, 233, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 251, 252, 253, 254, 255, 256, 257, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 272, 273, 274, 275, 275a, 275b, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289

Each to Receive:

4	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Cylindrical Lock	9K37AB 15D S3 626 Patented	Stanley Security
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 29**

Doors: 235a

Each to Receive:

6	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
2	EA	Flush Bolt	555 US26D	Rockwood
1	EA	Cylindrical Lock	9K37AB 15D S3 626 Patented	Stanley Security
1	EA	Door Stop	441H US26D	Rockwood
1	EA	Wall Stop	409 US32D	Rockwood
2	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 30**

Doors: 271, 278, 290a, 291, 292a

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Cylindrical Lock	9K37AB 15D S3 626 Patented	Stanley Security
1	EA	Door Stop	441H US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 31**

Doors: 293a, 293b

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Roller Latch	592 US26D	Rockwood
1	EA	Mortise Deadlock	48H7K 626 Patented	Stanley Security
2	EA	Door Pull	RM3311-36 Mtg-Type 16 30" US32D	Rockwood
		BTB Mount		
1	EA	Door Stop	441H US26D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 32**

Doors: 295, 296

Each to Receive:

3	EA	Hinge	FBB179 4-1/2" x 4-1-2" 26D	Stanley Commercial
1	EA	Cylindrical Lock	9K37AB 15D S3 626 Patented	Stanley Security
1	EA	Surface Closer	HD8016 AF80P PC SNDTPK80 689	Stanley Security
1	EA	Kick Plate	K1050 8" x 34" US32D BEV CSK	Rockwood
1	EA	Wall Stop	409 US32D	Rockwood
3	EA	Silencer	608-RKW	Rockwood

### **Hardware Set 33**

Doors: Elevator

Each to Receive:

1	EA	Prox Reader	Signo 40 Black	HID
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Elevator electronic locking system to be provided by the elevator supplier.

## **Hardware Set 34 Access Control System**

Doors: Access

Each to Receive:

1	EA	Enclosure	Altronix Trove 2M2	Access Control Systems
1	EA	Backplane	Altronix TMV2	Access Control Systems
8	EA	Access Cable	Plenum 500FT Shielded Yellow	Access Control Systems
1	EA	Controller	Mercury LP-1502	Access Control Systems
11	EA	Sub-Controller	Mercury MR-52	Access Control Systems
12	EA	Software License	Acre Security DNAFusion	Access Control Systems
2	EA	Power Supply	Altronix AL600ULACM	Access Control Systems
2	EA	Power Controller Board	Altronix ACM8	Access Control Systems
2	EA	Power Distribution Boards	Altronix PD8	Access Control Systems
1	EA	Battery Backup	APC 750VA UPS	Access Control Systems

Wiring & all connections to be included by bidder of this section.

Installation, programming, & training to be included by the bidder of this section.





**SECTION 08 80 00  
GLAZING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Insulating glass units.
- B. Glazing Units:
  - 1. Insulated Glazing Units for Aluminum Curtainwall and/or Storefront Systems.
  - 2. Glass for Hollow Metal Doors and Frames.
  - 3. Glass for Aluminum Storefront Entrance Doors.
- C. Glass Types:
  - 1. Annealed Float Glass.
  - 2. Fully Tempered Float Glass.
  - 3. Heat-Strengthened Float Glass.
  - 4. Laminated Safety Glass.
- D. Glazing compounds.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 25 00 - Weather Barriers.
- B. Section 07 92 00 - Joint Sealants: Sealants for other than glazing purposes.
- C. Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES: Glazed lites in doors and borrowed lites.
- D. Section 08 14 16 - Flush Wood Doors: Glazed lites in doors.
- E. Section 08 14 33 - SOLID WOOD DOORS: Glazed lites in doors.
- F. Section 08 43 13 - ALUMINUM STOREFRONT & DOORS: Glazing provided as part of storefront assembly.

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- E. ASTM C1036 - Standard Specification for Flat Glass; 2021.
- F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- G. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2019.
- H. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- I. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2021a.
- J. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- K. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2019.
- L. GANA (GM) - GANA Glazing Manual; 2008.
- M. GANA (SM) - GANA Sealant Manual; 2008.
- N. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.
- O. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2020.

- P. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2020.
- Q. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2020.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data on Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit two samples 12 by 12 inch in size of glass units.
- E. Certificate: Certify that products of this section meet or exceed specified requirements.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in State of Mississippi's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Perform Work in accordance with GANA (GM), GANA (SM), and GANA (LGRM) for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

#### **1.07 MOCK-UPS**

- A. Provide on-site glazing mock-up with the specified glazing components. See Section 01 45 00 where applicable.
- B. Locate where directed by Architect..

#### **1.08 FIELD CONDITIONS**

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

#### **1.09 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
- C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Glass Fabricators:
  - 1. Viracon, Inc: [www.viracon.com/#sle](http://www.viracon.com/#sle).
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Float Glass Manufacturers:
  - 1. Vitro Architectural Glass (formerly PPG Glass); \_\_\_\_\_: [www.vitroglazings.com/#sle](http://www.vitroglazings.com/#sle).
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Laminated Glass Manufacturers:

1. Viracon, Architectural Glass segment of Apogee Enterprises, Inc; \_\_\_\_\_:  
www.viracon.com/#sle.
2. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
  1. Design Pressure: Calculated in accordance with applicable codes.
  2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
  3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
  4. Glass thicknesses listed are minimum.
- B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
  1. In conjunction with weather barrier related materials described in other sections, as follows:
    - a. Water-Resistive Barriers: See Section 07 25 00.
  2. To utilize inner pane of multiple pane insulating glass units for continuity of vapor retarder and/or air barrier seal.
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
  1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
  2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
  3. Solar Optical Properties: Comply with NFRC 300 test method.

## 2.03 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
  1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality - Q3.
  2. Kind HS - Heat-Strengthened Type: Complies with ASTM C1048.
  3. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
  4. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
- B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
  1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class A or 16 CFR 1201 - Category II impact test requirements.
  2. Polyvinyl Butyral (PVB) Interlayer: 0.060 inch thick, minimum.

## 2.04 INSULATING GLASS UNITS

- A. Manufacturers:
  1. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
  2. Substitutions: See Section 01 63 00.
- B. Insulating Glass Units: Types as indicated.
  1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
  2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
  3. Metal-Edge Spacers: Aluminum, bent and soldered corners.
  4. Spacer Color: Black.
  5. Edge Seal:

- a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
6. Color: Black.
7. Purge interpane space with dry air, hermetically sealed.
- C. Type IG-1 - Insulating Glass Units: Vision glass, double glazed, Low-E coating.
  1. Applications: Exterior glazing unless otherwise indicated.
  2. Space between lites filled with air.
  3. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
    - a. Tint: **Blue**.
    - b. Coating: Low-E (passive type), on #2 surface.
  4. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum.
    - a. Tint: Clear.
  5. Total Thickness: 1 inch.
  6. Thermal Transmittance (U-Value), Winter - Center of Glass: .29, nominal.
  7. Visible Light Transmittance (VLT): 45 percent, nominal.
  8. Solar Heat Gain Coefficient (SHGC): .28, nominal.
  9. Visible Light Reflectance, Outside: 7 percent, nominal.
  10. Visible Light Reflectance, Inside: 11 percent, nominal.
  11. Light to Solar Gain (LSG): 1.61, nominal.
  12. Glazing Method: Dry glazing method, gasket glazing.

## 2.05 GLAZING UNITS

- A. Type G2 - Single Vision Glazing:
  1. Applications: As scheduled.
  2. Glass Type: Fully tempered float glass.
  3. Tint: Clear.
  4. Thickness: 1/2 inch, nominal.
- B. Type G-3 - Laminated Safety Glazing: Non-fire-rated.
  1. Applications: Interior glazing unless otherwise indicated.
  2. Glass Type: Laminated safety glass as specified.
  3. Tint: Clear.
  4. Thickness: 5/16 inch, nominal. Two layers of 1/8 inch glazing with 0.060 inch polyvinyl butyral (PVB) interlayer.
  5. Glazing Method: Dry glazing method, tape and gasket spline.

## 2.06 GLAZING COMPOUNDS

- A. Type GC-1 - Glazing Putty: Polymer modified latex recommended by manufacturer for outdoor use, knife grade consistency; gray color.
- B. Type GC-2 - Butyl Sealant: Single component; ASTM C920 Grade NS Class 12-1/2 Uses M and A, Shore A hardness of 10 to 20; black color.
- C. Type GC-3 - Polysulfide Sealant: Two component; chemical curing, nonsagging type; ASTM C920 Type M, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.
- D. Type GC-4 - Polyurethane Sealant: Single component, chemical curing, nonstaining, nonbleeding; ASTM C920 Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 20 to 35; color as selected.
- E. Type GC-5 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

## 2.07 ACCESSORIES

- A. Setting Blocks: Neoprene, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet

08 80 00

Glazing

PAGE 4 OF 7

- space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
  - C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
    - 1. Width: As required for application.
    - 2. Thickness: As required for application.
    - 3. Spacer Rod Diameter: As required for application.
  - D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
  - E. Glazing Clips: Manufacturer's standard type.

### **PART 3 EXECUTION**

#### **3.01 VERIFICATION OF CONDITIONS**

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D. Verify that sealing between joints of glass framing members has been completed effectively.
- E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

#### **3.02 PREPARATION**

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

#### **3.03 INSTALLATION, GENERAL**

- A. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- B. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.
- C. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

#### **3.04 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)**

- A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

#### **3.05 INSTALLATION - DRY GLAZING METHOD (TAPE AND GASKET SPLINE GLAZING)**

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

- B. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- E. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- F. Carefully trim protruding tape with knife.

**3.06 INSTALLATION - DRY GLAZING METHOD (TAPE AND TAPE)**

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- E. Place glazing tape on free perimeter of glazing in same manner described above.
- F. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- G. Carefully trim protruding tape with knife.

**3.07 INSTALLATION - WET GLAZING METHOD (COMPOUND AND COMPOUND)**

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 24 inch centers, kept 1/4 inch below sight line.
- C. Locate and secure glazing pane using glazers' clips.
- D. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

**3.08 INSTALLATION - WET/DRY GLAZING METHOD (TAPE AND SEALANT)**

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- E. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.
- F. Fill gaps between pane and applied stop with butyl type sealant to depth equal to bite on glazing, to uniform and level line.
- G. Carefully trim protruding tape with knife.

**3.09 INSTALLATION - BUTT JOINT GLAZING METHOD (SEALANT ONLY)**

- A. Application - Exterior Glazed: Set glazing infills from exterior side of building.
- B. Temporarily brace glass in position for duration of glazing process; mask edges of glass at adjoining glass edges and between glass edges and framing members.
- C. Temporarily secure a small diameter nonadhering foamed rod on back side of joint.
- D. Apply sealant to open side of joint in continuous operation; thoroughly fill joint without displacing foam rod, and then tool sealant surface smooth to concave profile.

- E. Permit sealant to cure then remove foam backer rod, and then apply sealant to opposite side, tool smooth to concave profile.
- F. Remove masking tape.

### **3.10 INSTALLATION - STRUCTURAL SILICONE GLAZING**

- A. Application - Factory (Shop) Glazed: Follow basic guidelines of structural silicone glazing for glazing application.
- B. Provide design review of the glazing system and project details, adhesion testing, proper surface preparation, training and a quality service program.
- C. Provide only structural silicone sealant, tested and manufactured for structural glazing.

### **3.11 CLEANING**

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

### **3.12 PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

**END OF SECTION**





**SECTION 08 87 00  
WINDOW FILMS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Architectural Window Film:
  - 1. 3M FASARA Glass Finishes Film.

**1.02 RELATED SECTIONS**

- A. Section 08800 - Glazing; general glazing applications to receive architectural window film.

**1.03 REFERENCES**

- A. ASHRAE - American Society for Heating, Refrigeration, and Air Conditioning Engineers; Handbook of Fundamentals.
- B. ASTM International (ASTM):
  - 1. ASTM E 84 - Standard Method of Test for Surface Burning Characteristics of Building Materials.
  - 2. ASTM E 308 - Standard Recommended Practice for Spectrophotometry and Description of Color in CIE 1931 System.
  - 3. ASTM E 903 - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.
- C. NFRC 100/200 (Formerly ASTM E903) - Standard Methods of Test for Solar Absorbance, Reflectance and Transmittance of Materials Using Integrating Spheres.
- D. Window 6.3 - A Computer Tool for Analyzing Window Thermal Performance; Lawrence Berkeley Laboratory.

**1.04 DEFINITIONS**

- A. Light to Solar Gain Ratio: The ratio of visible light transmission to Solar Heat Gain Coefficient.

**1.05 PERFORMANCE REQUIREMENTS**

- A. Flammability: Surface burning characteristics when tested in accordance ASTM E 84, demonstrating film applied to glass rated Class A for Interior Use:
  - 1. Flame Spread Index: no greater than 25.
  - 2. Smoke Developed Index: no greater than 55.

**1.06 SUBMITTALS**

- A. Submit under provisions of Section 01 30 00.
- B. Product Data: Manufacturer's current technical literature on each product to be used, including:
  - 1. Manufacturer's Data Sheets.
  - 2. Preparation instructions and recommendations.
  - 3. Storage and handling requirements and recommendations.
  - 4. Installation methods.
- C. Verification Samples: For each film specified, two samples representing actual film color and pattern.
- D. Performance Submittals: Provide laboratory data of emissivity and calculated window U-Factors for various outdoor temperatures based upon established calculation procedure defined by the ASHRAE Handbook of Fundamentals, Chapter 29, or Lawrence Berkeley Laboratory Window 5.2 Computer Program.

**1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years' experience.
  - 1. Provide documentation that the adhesive used on the specified films is a Pressure Sensitive Adhesive (PSA).

- B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five years demonstrated experience in installing products of the same type and scope as specified.
  - 1. Provide documentation that the installer is authorized by the Manufacturer to perform Work specified in this section.
  - 2. Provide a commercial building reference list of 5 properties where the installer has applied window film. This list will include the following information:
    - a. Name of building.
    - b. The name and telephone number of a management contact.
    - c. Type of glass.
    - d. Type of film and/or film attachment system.
    - e. Amount of film and/or film attachment system installed.
    - f. Date of completion.
  - 3. Provide an EFilm application analysis to determine available energy cost reduction and savings.
- C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Finish areas designated by Architect.
  - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
  - 3. Refinish mock-up area as required to produce acceptable work.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Follow Manufacturer's instructions for storage and handling.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

#### **1.09 PROJECT CONDITIONS**

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

#### **1.10 WARRANTY**

- A. At project closeout, provide to Owner or Owners Representative an executed current copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.
  - 1. Warranty period shall be five years from the date of Substantial Completion.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Basis of Design: 3M Commercial Solutions, which is located at: 3M Center Bldg. 220-12-E-04; St. Paul, MN 55144-1000; Toll Free Tel: 888-650-3497; Tel: 651-737-1081; Fax: 651 737 8241.
- B. Substitutions: Per Section 01 63 00 - Substitutions and Product Options.

#### **2.02 ARCHITECTURAL FINISH FILMS**

- A. Architectural Finish Films: 3M FASARA Glass Finishes Film as manufactured by 3M Company - Commercial Solutions.
- B. Material Properties:
  - 1. General: Glass and plastic finishes field-applied application to glass or plastic material as visual opaque or decorative film.
  - 2. Film: Polyester.
  - 3. Decorative Pattern: Printed.
  - 4. Adhesive: Acrylic, Pressure Sensitive, Permanent.

5. Liner: Silicone-coated Polyester.
6. Thickness (Average): 3.2 mils (80 microns).
7. Fire Performance: Surface burning characteristics when tested in accordance with ASTM E84: Class A:
  - a. Flame Spread: 25 maximum.
  - b. Smoke Developed: 450 maximum.
8. See Finish Codes in Drawings for Schedule of Glass Finishes Film.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Film Examination:
  1. If preparation of glass surfaces is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.
    - a. Glass surfaces receiving new film should first be examined to verify that they are free from defects and imperfections, which will affect the final appearance.
  2. Do not proceed with installation until glass surfaces have been properly prepared and deviations from manufacturer's recommended tolerances are corrected. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result under the project conditions.
  3. Commencement of installation constitutes acceptance of conditions.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Refer to Manufacturer's installation instructions for methods of preparation for Impact Protection Adhesive or Impact Protection Profile film attachment systems.

#### **3.03 INSTALLATION**

- A. Film Installation, General:
  1. Install in accordance with manufacturer's instructions.
  2. Cut film edges neatly and square at a uniform distance of 1/8 inch (3 mm) to 1/16 inch (1.5 mm) of window sealant. Use new blade tips after 3 to 4 cuts.
  3. Spray the slip solution, composed of one capful of baby shampoo or dishwashing liquid to 1 gallon of water, on window glass and adhesive to facilitate proper positioning of film.
  4. Apply film to glass and lightly spray film with slip solution.
  5. Squeegee from top to bottom of window. Spray slip solution to film and squeegee a second time.
  6. Bump film edge with lint-free towel wrapped around edge of a 5-way tool.
  7. Upon completion of film application, allow 30 days for moisture from film installation to dry thoroughly, and to allow film to dry flat with no moisture dimples when viewed under normal viewing conditions.
  8. If completing an exterior application, check with the manufacturer as to whether edge sealing is required.

#### **3.04 CLEANING AND PROTECTION**

- A. Remove left over material and debris from Work area. Use necessary means to protect film before, during, and after installation.
- B. Touch-up, repair or replace damaged products before Substantial Completion.
- C. After application of film, wash film using common window cleaning solutions, including ammonia solutions, 30 days after application. Do not use abrasive type cleaning agents and bristle brushes to avoid scratching film. Use synthetic sponges or soft cloths.

#### **END OF SECTION**



**SECTION 09 05 61**  
**COMMON WORK RESULTS FOR FLOORING PREPARATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. This section applies to floors identified in Contract Documents that are receiving the following types of floor coverings:
  - 1. Resilient tile and sheet.
  - 2. Carpet tile.
  - 3. Thin-set ceramic tile and stone tile.
- B. Removal of existing floor coverings.
- C. Preparation of new and existing concrete floor slabs for installation of floor coverings.
- D. Testing of concrete floor slabs for moisture and alkalinity (pH).
- E. Smoothing Compound, Leveling Compound, Patching Compound.
- F. Remedial floor coatings.
- G. Remedial floor sheet membrane.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Moisture emission reducing curing and sealing compound for slabs to receive adhered flooring, to prevent moisture content-related flooring failures; to remain in place, not to be removed.

**1.03 REFERENCE STANDARDS**

- A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens); 2013.
- B. ASTM C472 - Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete; 1999 (Reapproved 2014).
- C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- D. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2011.
- E. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- F. RFCI (RWP) - Recommended Work Practices for Removal of Resilient Floor Coverings; Resilient Floor Covering Institute; October 2011.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

**1.05 SUBMITTALS**

- A. Visual Observation Report: For existing floor coverings to be removed.
- B. Smoothing Compound, Leveling Compound, Patching Compound, Adhesive, and Floor Covering Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
  - 1. Manufacturer's required moisture limits and test methods.
  - 2. Manufacturer's required alkalinity (pH) limits and test methods.
  - 3. Manufacturer's required substrate surface absorption/porosity test methods.
  - 4. Manufacturer's required concrete surface profile.
  - 5. Manufacturer's required bond/compatibility test procedure.
- C. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation.

1. Manufacturer's qualification statement.
  2. Certificate: Manufacturer's certification of compatibility with types of flooring applied over remedial product.
  3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
  4. Manufacturer's installation instructions.
  5. Specimen Warranty: Copy of warranty to be issued by coating manufacturer and certificate of underwriter's coverage of warranty.
- D. Testing Agency's Report:
1. Description of areas tested; include floor plans and photographs if helpful.
  2. Summary of conditions encountered.
  3. Moisture and alkalinity (pH) test reports.
  4. Copies of specified test methods.
  5. Recommendations for remediation of unsatisfactory surfaces.
  6. Product data for recommended remedial coating.
  7. Certificate: Include certification of accuracy by authorized official of testing agency.
  8. Submit report to Albert & Robinson Architects.
  9. Submit report to Contractor.
  10. Submit report not more than two business days after conclusion of testing.
- E. Adhesive Bond and Compatibility Test Report.
- F. Copy of RFCI (RWP).

#### **1.06 QUALITY ASSURANCE**

- A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by General Contractor.
- B. General Contractor may perform adhesive and bond test with General Contractor's own personnel or hire a testing agency.
- C. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
- D. General Contractor's Responsibility Relating to Independent Agency Testing:
1. Coordinate scheduling of all cleaning to allow adequate slab drying prior to any testing or installation.
  2. Coordinate scheduling of all testing to allow adequate slab hydration and acclimatization prior to any testing or installation.
  3. Provide access for and cooperate with testing agency.
  4. Confirm date of start of testing at least 10 days prior to actual start.
  5. Allow at least 4 business days on site for testing agency activities.
  6. Achieve and maintain specified ambient conditions.
  7. Notify Albert & Robinson Architects when specified ambient conditions have been achieved and when testing will start.
- E. Remedial Coating Installer Qualifications: Company specializing in performing work of the type specified in this section, trained by or employed by coating manufacturer, and able to provide at least 3 project references showing at least 3 years' experience installing moisture emission coatings.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

## 1.08 FIELD CONDITIONS

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

## 1.09 WARRANTY

- A. Manufacturer's Warranty: Provide manufacturer's standard limited warranty.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Smoothing Compound, Leveling Compound, Patching Compound: Floor covering manufacturer's recommended product, suitable for conditions, and compatible with adhesive and floor covering. In the absence of any recommendation from flooring manufacturer, provide a product with the following characteristics:
  - 1. Cementitious moisture-, mildew-, and alkali-resistant compound, compatible with floor, floor covering, and floor covering adhesive, and capable of being feathered to nothing at edges.
  - 2. Latex or polyvinyl acetate additions are permitted; gypsum content is prohibited.
  - 3. Compressive Strength: 3000 psi, minimum, after 28 days, when tested in accordance with ASTM C109/C109M or ASTM C472, whichever is appropriate.
  - 4. Compound suitable for substrate conditions, and compatible with adhesive and floor covering
  - 5. Products:
    - a. TEC, an H.B. Fuller Construction Products Brand; TEC Feather Edge Skim Coat: [www.tecspecialty.com/#sle](http://www.tecspecialty.com/#sle).
    - b. Substitutions: See Section 01 63 00.
- B. Alternate Flooring Adhesive: Floor covering manufacturer's recommended product, suitable for the moisture and pH conditions present; low-VOC. In the absence of any recommendation from flooring manufacturer, provide a product recommended by adhesive manufacturer as suitable for substrate and floor covering and for conditions present.
- C. Remedial Floor Coating: Single- or multi-layer coating or coating/overlay combination intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
  - 1. Thickness: As required for application and in accordance with manufacturer's installation instructions. **ADA compliance must be maintained at flooring transitions.**
  - 2. Provide resistance to up to 100 percent relative humidity per ASTM F2170 and 25 pounds moisture vapor transmission per ASTM F1869.
  - 3. Provide resistant to alkalinity level of pH 14.
  - 4. Use product recommended by testing agency.
- D. Remedial Floor Sheet Membrane: Pre-formed multi-ply sheet membrane installed over concrete subfloor and intended by its manufacturer to resist water vapor transmission to degree sufficient to meet flooring manufacturer's emission limits, resistant to the level of alkalinity (pH) found, and suitable for adhesion of flooring without further treatment.
  - 1. Thickness: 28 mil (0.028 inch).
  - 2. Tape: Types recommended by underlayment manufacturer to install membrane and cover seams.
  - 3. Products:
    - a. GCP Applied Technologies; Kovara MBX: [www.gcpat.com/#sle](http://www.gcpat.com/#sle).
    - b. Substitutions: See Section 01 63 00.

## **PART 3 EXECUTION**

### **3.01 CONCRETE SLAB PREPARATION**

- A. Perform following operations in the order indicated:
  - 1. Existing concrete slabs (on-grade and elevated) with existing floor coverings:
    - a. Visual observation of existing floor covering, for adhesion, water damage, alkaline deposits, and other defects.
    - b. Removal of existing floor covering.
  - 2. Preliminary cleaning.
  - 3. Moisture vapor emission tests; 3 tests in the first 1000 square feet and one test in each additional 1000 square feet, unless otherwise indicated or required by flooring manufacturer.
  - 4. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
  - 5. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
  - 6. Specified remediation, if required.
  - 7. Patching, smoothing, and leveling, as required.
  - 8. Other preparation specified.
  - 9. Adhesive bond and compatibility test.
  - 10. Protection.
- B. Remediations:
  - 1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct this condition before doing any other remediation; re-test after correction.
  - 2. Excessive Moisture Emission or Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating or remedial sheet membrane over entire suspect floor area.
  - 3. Excessive Alkalinity (pH): If remedial floor coating is necessary to address excessive moisture, no additional remediation is required; if not, if an adhesive that is resistant to the level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

### **3.02 REMOVAL OF EXISTING FLOOR COVERINGS**

- A. Comply with local, State, and federal regulations and recommendations of RFCI (RWP), as applicable to floor covering being removed.
- B. Dispose of removed materials in accordance with local, State, and federal regulations and as specified.

### **3.03 PRELIMINARY CLEANING**

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond.
- B. Do not use solvents or other chemicals for cleaning.

### **3.04 MOISTURE VAPOR EMISSION TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F1869 and as follows.
- D. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.



- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet per 24 hours.
- F. Report: Report the information required by the test method.

### **3.05 INTERNAL RELATIVE HUMIDITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. Where this specification conflicts with the referenced test method, comply with the requirements of this section.
- C. Test in accordance with ASTM F2170 Procedure A and as follows.
- D. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.
- E. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.
- F. Report: Report the information required by the test method.

### **3.06 ALKALINITY TESTING**

- A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.
- B. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if alkalinity (pH) test value is over 10.

### **3.07 SUBSTRATE SURFACE ABSORPTION (POROSITY) TESTING**

- A. Test in accordance with ASTM F3191.
- B. Follow the appropriate installation instructions for the substrate surface porosity conditions. If the selected material is not compatible with the substrate surface profile, select a different material compatible with substrate surface porosity conditions and flooring material.

### **3.08 PREPARATION**

- A. See individual floor covering section(s) for additional requirements.
- B. Comply with recommendations of testing agency.
- C. Comply with requirements and recommendations of floor covering manufacturer.
- D. Verify appropriate concrete surface profile is present for material to be installed.
- E. Verify appropriate floor flatness is present based on recommendations of floor covering manufacturer.
- F. Unless otherwise indicated by product manufacturer, do not install any material unless the following conditions are present:
  - 1. Substrate surface is clean.
  - 2. Substrate surface is dry.
  - 3. Substrate temperature is not less than 65 degrees F (18 degrees C) and no greater than 85 degrees F (29 degrees C) during and after installation.
  - 4. Substrate surface is at least 5 degrees F (2.8 degrees C) above dew point.
  - 5. Issues with moisture and alkalinity have been addressed.
- G. Fill and smooth surface cracks, grooves, depressions, control joints and other non-moving joints, and other irregularities with patching compound.
- H. Do not fill expansion joints, isolation joints, or other moving joints.

**3.09 ADHESIVE BOND AND COMPATIBILITY TESTING**

- A. Comply with requirements and recommendations of floor covering manufacturer.

**3.10 APPLICATION OF REMEDIAL FLOOR COATING**

- A. Comply with requirements and recommendations of coating manufacturer.

**3.11 INSTALLATION OF REMEDIAL FLOOR SHEET MEMBRANE**

- A. Install in accordance with sheet membrane manufacturer's instructions.

**3.12 PROTECTION**

- A. Cover prepared floors with building paper or other durable covering.

**END OF SECTION**

**SECTION 09 21 16  
GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. This section is included for conditions that require new gypsum board assemblies in order to accomplish the requirements of the contract documents as required and determined solely by the Contractor's means and methods.
- B. Performance criteria for gypsum board assemblies.
- C. Metal stud wall framing.
- D. Metal channel ceiling framing.
- E. Resilient sound isolation clips.
- F. Fire rated area separation walls.
- G. Acoustic insulation.
- H. Gypsum sheathing.
- I. Cementitious backing board.
- J. Gypsum wallboard.
- K. Joint treatment and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.
- C. Section 07 92 00 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

**1.03 REFERENCE STANDARDS**

- A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2018).
- B. ANSI A108.11 - American National Standard Specifications for Interior Installation of Cementitious Backer Units; 2010 (Reaffirmed 2016).
- C. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 1999 (Reaffirmed 2016).
- D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- E. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)
- F. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).; 2013.1.
- G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- H. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members; 2015.
- I. ASTM C 36/C 36M - Standard Specification for Gypsum Wallboard; 1999.
- J. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- K. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.
- L. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.
- M. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.

- N. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.
- O. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.
- P. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- Q. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
- R. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2013.
- S. ASTM C1280 - Standard Specification for Application of Gypsum Sheathing Board; 2013.
- T. ASTM C1288 - Standard Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets; 2014.
- U. ASTM C1325 - Standard Specification for Fiber-Mat Reinforced Cementitious Backer Units; 2021.
- V. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- W. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- X. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- Y. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).
- Z. ASTM E413 - Classification for Rating Sound Insulation; 2016.
- AA. GA-216 - Application and Finishing of Gypsum Board; 2013.
- BB. GA-226 - Application of Gypsum Board to Form Curved Surfaces; Gypsum Association; 2008.
- CC. GA-600 - Fire Resistance Design Manual; 2015.
- DD. UL (FRD) - Fire Resistance Directory; Current Edition.
- EE. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- FF. UL (FRD) - Fire Resistance Directory; Current Edition.

#### **1.04 SYSTEM DESCRIPTION**

- A. Acoustic Attenuation for Interior Partitions Indicated as Acoustic: STC of 45-49 calculated in accordance with ASTM E 413, based on tests conducted in accordance with ASTM E 90.

#### **1.05 SUBMITTALS**

- A. Product Data: Provide data on gypsum board, glass mat faced gypsum board, accessories, and joint finishing system.
- B. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- C. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

#### **1.06 QUALITY ASSURANCE**

- A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.
  - 1. Maintain one copy of standards at project site.

- B. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 5 years of documented experience.

### 1.07 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire rated assemblies as indicated on drawings.  
1. Fire Rated Partitions: Listed assembly by UL, No. U419 & U420; 1 & 2 hour rating.

## PART 2 PRODUCTS

### 2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.  
1. See PART 3 EXECUTION for finishing requirements.
- B. Interior Partitions: Provide completed assemblies with the following characteristics:  
1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.
- C. Fire-Resistance-Rated Assemblies: Provide completed assemblies with the following characteristics:  
1. Fire-Resistance-Rated Partitions: UL listed assembly No. U419 & U420; 1 & 2 hour rating.  
2. Fire-Resistance-Rated Ceilings and Soffits: One (1) hour fire rating. UL Assemblies listed on the Life Safety Plans.  
3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).
- D. Schedule for Product Use as defined in Paragraph 2.03 below:  
1. Where installed for normal exposed conditions for finishing: **Mold-Resistant Gypsum Board.**  
2. Where installed on walls above ceilings, ceilings or walls in non-conditioned areas, fire rated wall or surfaces in non-conditioned areas and/or as defined in the drawings: **Glass Mat Faced Gypsum Board.**  
3. Where installed behind tile installations in showers or other wet areas: **Backing Board for Wet Areas.**  
4. Where installed behind tile installations in normal or dry areas: **Backing Board for Non-Wet Areas.**  
5. Where installed on non-rated exposed ceiling installations for normal conditioned areas: **Ceiling Board.**  
6. Where installed on fire-rated walls or ceilings in normally conditioned areas: **Fire Resistant Board.**  
7. Where installed on exterior walls as sheathing materials as part of the air/vapor barrier system and not exposed as a finish: **Exterior Sheathing Board.**

### 2.02 METAL FRAMING MATERIALS

- A. Manufacturers - Metal Framing, Connectors, and Accessories:  
1. ClarkDietrich; \_\_\_\_: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).  
2. Dietrich Metal Framing: [www.dietrichindustries.com](http://www.dietrichindustries.com).  
3. Substitutions: See Section 01 63 00 - Substitutions and Product Options
- B. Non-structural Steel Framing for Application of Gypsum Board: See Section 09 21 16.
- C. Structural Steel Framing for Application of Gypsum Board: See Section 05 41 00.
- D. Non-Loadbearing Framing System Components: ASTM C 645; galvanized sheet steel, of size and properties necessary to comply with ASTM C 754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.  
1. Exception: The minimum metal thickness and section properties requirements of ASTM C645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E72 using assemblies specified by ASTM C754.

2. Where supporting plaster and stucco finishes, and not superseded by Section 05 41 00 Cold-formed Exterior Stud Framing, maximum deflection of exterior and interior steel studs shall be L/360.
  3. **Exception: Maximum deflection of wall framing when supporting adhered masonry veneer shall be L/360 at 5 psf.**
  4. Studs: C-shaped with knurled or embossed faces.
  5. Paired Studs for Sound-Rated Assemblies: Engineered single-piece assemblies comprised of paired studs coupled by sound isolators, designed to replace conventional side-by-side, parallel, double-wall partition framing.
    - a. Widths: As indicated on drawings.
  6. Runners: U shaped, sized to match studs.
  7. Ceiling Channels: C shaped.
  8. Furring: Hat-shaped sections, minimum depth of 7/8 inch and 1-1/2 inches as shown on drawings.
  9. Resilient Furring Channels: Single or double leg configuration; 1/2 inch channel depth.
  10. Resilient Sound Isolation Clips: Steel resilient clips with molded rubber isolators, attaches to framing; improves noise isolation performance of wall and floor-ceiling assemblies.
- E. Exterior Non-Loadbearing Studs and Furring for Application of Gypsum Board: As specified in Section 05 41 00 where required.
- F. Area Separation Wall Studs and Accessories: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with specified performance requirements.
- G. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection and prevent rotation of studs while maintaining structural performance of partition.
  1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI S100.
  2. Material: ASTM A653/A653M steel sheet, SS Grade 50/340, with G60/Z180 hot-dipped galvanized coating.
  3. Provide components UL-listed for use in UL-listed fire-resistance-rated head of partition joint systems indicated on drawings.
- H. Non-structural Framing Accessories:
  1. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.
  2. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.
    - a. Materials: ASTM A36/A36M formed sheet steel support member with factory-welded ASTM A1003/A1003M steel plate base.
- I. Grid Suspension Systems: Steel grid system of main tees and support bars connected to structure using hanging wire.

### 2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
1. Georgia-Pacific Gypsum: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  2. National Gypsum Company; \_\_\_\_: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
  3. USG Corporation: [www.usg.com/#sle](http://www.usg.com/#sle).
- B. Gypsum Wallboard: Glass Mat faced gypsum panels as defined in ASTM C1396/C1396M or ASTM C1658/C1658M; sizes to minimize joints in place; ends square cut.
1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  2. Use glass mat faced gypsum panels on walls above ceiling and/or as called out in the drawings in the partition types.
  3. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
    - a. Mold-resistant board is required whenever board is being installed before the building is enclosed and conditioned.

4. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  5. Thickness:
    - a. Vertical Surfaces: 5/8 inch.
    - b. Ceilings: 1/2 inch.
  6. Mold Resistant Gypsum Board:
    - a. Georgia-Pacific Gypsum; ToughRock Mold-Guard: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - b. Georgia-Pacific Gypsum; ToughRock Fireguard X Mold-Guard: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
  7. Glass Mat Faced Gypsum Board:
    - a. Georgia-Pacific Gypsum; DensArmor Plus: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
    - b. Georgia-Pacific Gypsum; DensArmor Plus Fireguard C: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
- C. Cementitious Backer Board: Non-gypsum-based, aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
1. Application: Surfaces behind adhered masonry veneer in dry or wet locations.
  2. Basis of Design: PermaBASE Cement Board manufactured by PermaBASE Building Products LLC provided by National Gypsum Company, Charlotte, NC.
    - a. Substitutions: See Section 01 63 00.
  3. Shear Bond Strength: Greater than or equal to 200 psi when tested in accordance with ANSI 118.4.
  4. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  5. Moisture Absorption of less than 8 percent when tested in accordance with ASTM C473.
  6. Thickness: 1/2 inch.
- D. Backing Board For Wet Areas:
1. Application: Surfaces behind tile in wet areas including tub and shower surrounds and shower ceilings.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  3. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9 or ASTM C1325.
    - a. Thickness: 5/8 inch.
  4. ASTM Cement-Based Board: Non-gypsum-based, cementitious board complying with ASTM C1288.
    - a. Thickness: 1/2 inch.
  5. Glass Mat Faced Board: Coated glass mat water-resistant gypsum backing panel as defined in ASTM C1178/C1178M.
    - a. Regular Type: Thickness 1/2 inch.
    - b. Fire-Resistance-Rated Type: Type X core, thickness 5/8 inch.
    - c. Products:
      - 1) Georgia-Pacific Gypsum; DensShield Tile Backer: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
- E. Backing Board For Non-Wet Areas: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
1. Application: Vertical surfaces behind thinset tile, except in wet areas.
  2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  3. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  4. Type: Regular and Type X, in locations indicated.
  5. Type X Thickness: 5/8 inch.
  6. Regular Board Thickness: 1/2 inch.
  7. Edges: Tapered.
  8. Products:
    - a. Georgia-Pacific Gypsum; ToughRock Mold-Guard Gypsum Board: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).

- F. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Ceilings, unless otherwise indicated.
  - 2. Thickness: 1/2 inch.
  - 3. Edges: Tapered.
  - 4. Products:
    - a. Georgia-Pacific Gypsum; ToughRock Span 24 Ceiling Board: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).
- G. Fire Resistant Board: Complying with Type X requirements; UL or WH rated.
  - 1. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X.
  - 2. Application: Where required for fire-rated assemblies, unless otherwise indicated.
    - a. Thickness: 1/2 inch and 5/8 inch, as indicated.
  - 3. Ceiling Board: Special sag-resistant type.
- H. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
  - 1. Application: Exterior sheathing, unless otherwise indicated.
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
  - 3. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
  - 4. At Assemblies Indicated with Fire-Resistance Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  - 5. Core Type: Regular.
  - 6. Type X Thickness: 5/8 inch.
  - 7. Regular Board Thickness: 1/2 inch.
  - 8. Edges: Square.
  - 9. Glass Mat Faced Products:
    - a. Georgia-Pacific Gypsum; DensGlass Sheathing: [www.gpgypsum.com/#sle](http://www.gpgypsum.com/#sle).

#### **2.04 GYPSUM BOARD ACCESSORIES**

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Locate in walls as indicated in Drawings. Thickness to match wall thickness in all cases.
- B. Acoustic Sealant: As specified in Section 07 92 00.
- C. Beads, Joint Accessories, and Other Trim: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
  - 1. Corner Beads: Low profile, for 90 degree outside corners.
  - 2. Architectural Reveal Beads:
    - a. Shapes: As indicated on drawings.
  - 3. Expansion Joints:
    - a. Fire-Resistance Rated: 1 hour when joint system tested in accordance with UL 2079.
    - b. Type: V-shaped metal with factory-installed protective tape.
- D. Corner Beads: Galvanized steel.
- E. J-moldings: Sizes as shown on drawings by Fry Reglet or equal.
- F. Edge Trim: Bead type(s) as detailed.
- G. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
  - 1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
  - 2. Joint Compound: Setting type, field-mixed.
- H. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.



- I. Glass-Fiber-Reinforced Gypsum Access Panels: Wall- and ceiling-mounted; natural white color, smooth finish, square corners.
  - 1. Material: Glass-fiber-reinforced gypsum cement.
  - 2. Exposed fasteners: Stainless steel.
  - 3. Class A flame spread rating in accordance with ASTM E84.
- J. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
- K. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion-resistant.
- L. Screws: ASTM C 1002; self-piercing tapping type; cadmium-plated for exterior locations.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.

#### **3.02 FRAMING INSTALLATION**

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
  - 1. Level ceiling system to a tolerance of 1/1200.
  - 2. Laterally brace entire suspension system.
  - 3. Install bracing as required at exterior locations to resist wind uplift.
- C. Studs: Space studs at 16 inches on center.
  - 1. Extend partition framing to structure in all locations.
  - 2. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Standard Wall Furring: Install at masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
  - 1. Orientation: Horizontal.
  - 2. Spacing: As indicated.
- F. Acoustic Furring: Install resilient channels at maximum 24 inches on center. Locate joints over framing members.
- G. Resilient Sound Isolation Clips: Install resilient sound isolation clips, and where applicable, associated furring sections and channels, in accordance with clip manufacturer's written instructions.
- H. Furring for Fire-Resistance Ratings: Install as required for fire-resistance ratings indicated.
- I. Blocking: Install blocking for support of door frames, wall mounted door hardware, wall mounted accessories, and wall or ceiling mounted A/V equipment.
- J. Blocking: Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, wood frame openings, toilet accessories, and hardware. Bolt or screw steel channels to studs.

#### **3.03 ACOUSTIC ACCESSORIES INSTALLATION**

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.

1. Place one bead continuously on substrate before installation of perimeter framing members.
2. Place continuous bead at perimeter of each layer of gypsum board.
3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

### **3.04 BOARD INSTALLATION**

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
  1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Double-Layer, Nonrated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- D. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- E. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- F. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
  1. Seal joints, cut edges, and holes with water-resistant sealant.
- G. Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.
- H. Cementitious Backing Board: Install over steel framing members where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.
- I. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.
- J. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

### **3.05 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as follows:
  1. Not more than 30 feet apart on walls and ceilings over 50 feet long. Request Architect's approval for all control joint location before installation.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

### **3.06 JOINT TREATMENT**

- A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
  1. Level 0: Temporary partitions or surfaces indicated to be finished in a later stage of the project.
  2. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.
  3. Level 2: In utility areas, behind cabinetry and other millwork, and on backing board to receive tile finish.
  4. Level 3: Walls to receive textured wall finish.
  5. Level 4: Walls and ceilings to receive flat or eggshell paint finish or wall coverings, unless otherwise indicated.

6. Level 5: Walls and ceilings to receive semi-gloss or gloss paint finish, where severe lighting conditions exist, and at other areas specifically indicated.
- C. Levels of gypsum board finish (ASTM C840):
1. Level 0: No taping, finishing, or accessories required.
  2. Level 1: All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable.
  3. Level 2: All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
  4. Level 3: All joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. One additional coat of joint compound shall be applied over all joints and interior angles. Fastener heads and accessories shall be covered with two separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges.
  5. Level 4: All joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Two separate coats of joint compound shall be applied over all flat joints and one separate coat of joint compound shall be applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges.
  6. Level 5: All joints and interior angles shall have tape embedded in joint compound and shall be immediately wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Two separate coats of joint compound shall be applied over all flat joints and one separate coat of joint compound shall be applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. A thin skim coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, applied to the entire surface. The surface shall be smooth and free of tool marks and ridges.
- D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch.
  2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
  3. Taping, filling, and sanding are not required at base layer of double-layer applications.
- E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.
- F. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

### 3.07 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

**END OF SECTION**



**SECTION 09 22 36  
LATH**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Metal lath for cement plaster.
- B. Furring for metal lath.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 24 00 - Portland Cement Plastering.
- B. Section 09 21 16 - Gypsum Board Assemblies: Sheathing on exterior walls.

**1.03 REFERENCE STANDARDS**

- A. ASTM C841 - Standard Specification for Installation of Interior Lathing and Furring; 2003 (Reapproved 2013).
- B. ASTM C847 - Standard Specification for Metal Lath; 2014a.
- C. ASTM C1063 - Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster; 2015a.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on furring and lathing components, structural characteristics, material limitations, and finish.

**1.05 QUALITY ASSURANCE**

- A. Maintain one copy of each installation standard referenced on site throughout the duration of lathing and plastering work.

**PART 2 PRODUCTS**

**2.01 FRAMING AND LATH ASSEMBLIES**

- A. Provide completed assemblies with the following characteristics:
  - 1. Maximum Deflection of Vertical Assemblies: 1:360 under lateral point load of 100 lbs.
  - 2. Maximum Deflection of Horizontal Assemblies: 1:360 deflection under dead loads and wind uplift.

**2.02 FRAMING MATERIALS**

- A. Furring Channels: Formed steel, minimum 0.020 inch thick, 3/8 inch deep by 7/8 inch high, splicing permitted; galvanized.
- B. Lateral Bracing: Formed steel, minimum 0.060 inch thick, size and length as required; galvanized.

**2.03 LATH**

- A. Diamond Mesh Metal Lath: ASTM C847, galvanized; self-furring.
  - 1. Weight: To suit application comply with deflection criteria and as specified in ASTM C841 or ASTM C1063 for framing spacing.
- B. Beads, Screeds, Joint Accessories, and Other Trim: Depth governed by plaster thickness, and maximum possible lengths.
  - 1. Material: Formed galvanized sheet steel, expanded metal flanges.

**2.04 ACCESSORIES**

- A. Anchorage: Tie wire, nails, and other metal supports, of type and size to suit application; to rigidly secure materials in place, galvanized.
- B. Tie Wire: Annealed galvanized steel.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that substrates are ready to receive work and conditions are suitable for application.
- C. For exterior plaster and stucco on stud walls, verify that water-resistive barrier has been installed over sheathing substrate completely and correctly.
- D. Do not begin until unacceptable conditions have been corrected.
- E. If substrate preparation is the responsibility of another installer, notify Albert & Robinson Architects of unsatisfactory preparation before proceeding.

### **3.02 INSTALLATION - GENERAL**

- A. Install interior lath and furring for gypsum plaster in accordance with ASTM C841.
- B. Install metal lath and furring for Portland cement plaster in accordance with ASTM C1063.

### **3.03 CONTROL AND EXPANSION JOINT INSTALLATION**

- A. Locate joints as indicated on drawings and comply with ASTM C1063. Where joint locations are not indicated on Drawings, provide as follows:
  - 1. Area of plaster panel not to exceed 144 sq ft for vertical surfaces.
  - 2. Area of plaster panel not to exceed 100 sq ft for horizontal, curved or angled surfaces.
  - 3. Spacing between control joints not to exceed 18 ft in each direction.
  - 4. Area bounded by control joints not to exceed a length-to-width ratio of 2-1/2 to 1.
  - 5. Submit dimensioned shop drawings showing all joint locations to Architect for approval.
- B. Construct control joints of back-to-back casing beads set 1/4 inch apart. Set both beads over 6 inch wide strip of polyethylene sheet.

### **3.04 ACCESS PANELS INSTALLATION**

- A. Install access panels and rigidly secure in place.
- B. Install frames plumb and level in opening. Secure rigidly in place.
- C. Position to provide convenient access to concealed work requiring access.

### **3.05 LATH INSTALLATION**

- A. Apply lath taut, with long dimension perpendicular to supports.
- B. Secure end laps with tie wire where they occur between supports.
- C. Lap ends minimum 1 inch. Secure end laps with tie wire where they occur between supports.
- D. Lap sides of diamond mesh lath minimum 1-1/2 inches.
- E. Attach metal lath to metal supports using tie wire at maximum 6 inches on center.
- F. Lath must be attached to structural members. Attachment only to sheathing is not acceptable as it does not offer enough holding strength to adequately support the metal lath and stucco assembly.
- G. Continuously reinforce internal angles with corner mesh, except where the metal lath returns 3 inches from corner to form the angle reinforcement; fasten at perimeter edges only.
- H. Place corner bead at external wall corners; fasten at outer edges of lath only.
- I. Place base screeds at termination of plaster areas; secure rigidly in place.
- J. Place lath vertically above each top corner and each side of door frames to 6 inches above ceiling line.
- K. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.
- L. Place additional strip mesh diagonally at corners of lathed openings. Secure rigidly in place.

**3.06 TOLERANCES**

- A. Maximum Variation from True Lines and Levels: 1/8 inch in 10 feet.
- B. Maximum Variation from True Position: 1/8 inch.

**END OF SECTION**





**SECTION 09 24 00  
CEMENT PLASTERING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cement plastering.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 21 16 - Gypsum Board Assemblies: Metal stud framing and furring for plaster.
- B. Section 09 22 36 - Lath: Lath, furring, beads, screeds, and joint accessories for plaster base.
- C. Section 09 91 13 - Exterior Painting.

**1.03 REFERENCE STANDARDS**

- A. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.
- B. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.
- C. ASTM C206 - Standard Specification for Finishing Hydrated Lime; 2014.
- D. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).
- E. ASTM C897 - Standard Specification for Aggregate for Job-Mixed Portland Cement-Based Plasters; 2015.
- F. ASTM C926 - Standard Specification for Application of Portland Cement-Based Plaster; 2015b.
- G. ASTM C932 - Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering; 2006 (Reapproved 2013).
- H. ASTM C1328/C1328M - Standard Specification for Plastic (Stucco) Cement; 2012.
- I. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2020.
- J. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.04 SUBMITTALS**

- A. Product Data: Provide data on plaster materials and trim accessories.
- B. Samples:
  - 1. Submit two samples of each type trim accessory.
- C. Installer's Qualification Statement.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

**1.06 MOCK-UP**

- A. Mock-Up Panel: Construct a 4 foot wide by 4 foot high sample panel of plaster work at the jobsite demonstrating installation procedures, finish texture, and color. Show each phase of installation including framing and reinforcement. This can be part of the requirements of Section 01 45 00 where applicable.

**1.07 FIELD CONDITIONS**

- A. Exterior Plaster Work: Do not apply plaster when substrate or ambient air temperature is 40 degrees F or lower, or when temperature is expected to drop below 40 degrees F within 48 hours of application.
- B. Interior Plaster Work: Maintain minimum ambient temperature of 50 degrees F during installation of plaster and until fully cured.

## **PART 2 PRODUCTS**

### **2.01 CEMENT PLASTER APPLICATIONS**

- A. Lathe Plaster Base: Metal lath.
  - 1. Plaster Type: Factory prepared plaster mix.
  - 2. Vertical Wall Surfaces:
    - a. Number of Coats: Three
    - b. Scratch Coat: Apply to a nominal thickness of 3/8 inch.
    - c. Brown Coat: Apply to a nominal thickness of 3/8 inch.
    - d. Finish Coat: Apply to a nominal thickness of 1/8 inch.
    - e. Total Thickness: Apply to a nominal thickness of 7/8 inch.
  - 3. Horizontal Ceiling Surfaces:
    - a. Number of Coats: Three
    - b. Scratch Coat: Apply to a nominal thickness of 1/4 inch.
    - c. Brown Coat: Apply to a nominal thickness of 1/4 inch.
    - d. Finish Coat: Apply to a nominal thickness of 1/8 inch.
    - e. Total Thickness: Apply to a nominal thickness of 5/8 inch.
- B. Solid Plaster Base: Concrete Masonry.
  - 1. Plaster Type: Factory prepared plaster mix.
  - 2. Vertical Wall Surfaces:
    - a. Number of Coats: Two
    - b. Scratch Coat: Apply to a nominal thickness of 3/8 inch.
    - c. Finish Coat: Apply to a nominal thickness of 1/8 inch.
    - d. Total Thickness: Apply to a nominal thickness of 1/2 inch.

### **2.02 FACTORY PREPARED CEMENT PLASTER**

- A. Exterior Portland cement plaster system made of scratch and brown base coat, leveling coat with reinforcing mesh, and acrylic finish coat; install in accordance with ASTM C926.
  - 1. Manufacturers:
    - a. Sto Corp; Sto Powerwall: [www.stocorp.com/#sle](http://www.stocorp.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Premixed Textured Coating: Polymer modified acrylic coating, integrally colored, and trowel applied to substrates prepared in accordance with manufacturer's written installation instructions.
  - 1. Color: As selected by Architect from manufacturer's custom colors.
  - 2. Manufacturers:
    - a. Sto Corp; Powerwall Fine: [www.stocorp.com/#sle](http://www.stocorp.com/#sle).

### **2.03 ACCESSORIES**

- A. Lath: As specified in Section 09 22 36.
- B. Beads, Screeds, and Joint Accessories: As specified in Section 09 22 36.
- C. Bonding Compound: Provide type recommended for bonding plaster to solid surfaces, complying with ASTM C932.
- D. Reinforcing Mesh: 4.5 oz/sq yd alkali-resistant mesh.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions are acceptable prior to starting this work.
- B. Verify masonry joints are flush and surfaces are ready to receive work of this section, and that there are no existing bituminous or water repellent coatings on masonry surfaces.
- C. Verify concrete surfaces are flat, honeycombs are filled flush, and surfaces are ready to receive work of this section, and that there are no existing bituminous, water repellent, or form release agent coatings on concrete surfaces that may be detrimental to plaster bond.

- D. Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are properly in place.
- E. Verify mechanical and electrical equipment and services located within areas to receive this work have been properly tested and approved.

### **3.02 PREPARATION**

- A. Dampen masonry surfaces to reduce excessive suction.
- B. Clean concrete surfaces of foreign matter using approved acid solutions, solvents, or detergents, and then rinse surfaces thoroughly with clean water.
- C. Roughen smooth concrete surfaces and apply bonding compound in accordance with manufacturer's written installation instructions.

### **3.03 MIXING**

- A. Mix only as much plaster as can be used prior to initial set.
- B. Mix materials dry, to uniform color and consistency, before adding water.
- C. Add air entrainment admixtures to each coat to provide 5 to 7 percent air entrainment as required for best product to resist freeze-thaw cycles.
- D. Do not retemper mixes after initial set has occurred.
- E. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

### **3.04 APPLICATION**

- A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.
- B. Base Coats:
  - 1. Follow guidelines in ASTM C926 and manufacturer's written installation instructions for moist curing base coats and application of subsequent coats.
- C. Leveling Coat:
  - 1. Apply leveling coat to specified thickness.
  - 2. Fully embed reinforcing mesh in leveling coat.
- D. Finish Coats:
  - 1. Cement Plaster:
    - a. Apply with sufficient material and pressure to ensure complete coverage of base to specified thickness.
    - b. Apply desired surface texture while mix is still workable.
    - c. Apply to a consistent finish.

### **3.05 TOLERANCES**

- A. Maximum Variation from True Flatness: 1/4 inch in 10 feet.

### **3.06 REPAIR**

- A. Patching: Remove loose, damaged or defective plaster and replace with plaster of same composition; finish to match surrounding area.

**END OF SECTION**



**SECTION 09 30 00  
TILING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Ceramic accessories.
- D. Ceramic trim.
- E. Non-ceramic trim.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants.
- B. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- C. Section 09 21 16 - Gypsum Board Assemblies: Tile backer board.

**1.03 REFERENCE STANDARDS**

- A. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium).; 2013.1.
  - 1. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2014.
  - 2. ANSI A108.1b - American National Standard Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
  - 3. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement; 1999 (Reaffirmed 2010).
  - 4. ANSI A108.2 - American National Standard General Requirements: Materials, Environmental and Workmanship; 2019.
  - 5. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2009 (Revised).
  - 6. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
  - 7. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy; 1999 (Reaffirmed 2010).
  - 8. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2010).
  - 9. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2010).
  - 10. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (Reaffirmed 2010).
  - 11. ANSI A108.12 - American National Standard for Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
  - 12. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2010).
  - 13. ANSI A108.19 - American National Standard Specifications for Interior Installation of Gauged Porcelain Tiles and Gauged Porcelain Tile Panels/Slabs by the Thin-Bed Method Bonded with Modified Dry-Set Cement Mortar or Improved Modified Dry-Set Cement Mortar; 2017.

14. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2013 (Revised).
  15. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).
  16. ANSI A118.7 - American National Standard Specifications for High Performance Cement Grouts for Tile Installation; 2010 (Revised).
  17. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes For Thin-Set Ceramic Tile And Dimension Stone Installation; 2014.
- B. ANSI A118.12 - American National Standard Specifications for Crack Isolation Membranes for Thin-set Ceramic Tile and Dimension Stone Installation; 2014.
  - C. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2012.
  - D. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2015.

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by affected installers.

#### **1.05 SUBMITTALS**

- A. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- B. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.
- C. Product Data: Provide instructions for using grouts .
- D. Samples: Provide sample tiles as requested by Architect for color selection from standard color line.
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.
- G. Maintenance Materials: Furnish the following for State of Mississippi's use in maintenance of project.
  1. Extra Tile: 40 square feet of each size, color, and surface finish combination.

#### **1.06 QUALITY ASSURANCE**

- A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum five years of documented experience.
- C. Installer Qualifications: Company specializing in performing tile installation, with minimum of five years of documented experience.

#### **1.07 MOCK-UPS**

- A. Construct a dry layout of all tile for Architect's approval before installation.
- B. Minimum size of mock-up is indicated on drawings.
- C. Approved mock-up may remain as part of work.

#### **1.08 PRE-INSTALLATION MEETING**

- A. Convene one week before starting work of this section.

#### **1.09 DELIVERY, STORAGE, AND HANDLING**

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

### 1.10 FIELD CONDITIONS

- A. Maintain ambient and substrate temperature above 50 degrees F and below 100 degrees F during installation and curing of setting materials.

### 1.11 EXTRA MATERIALS

- A. Provide 40 sq. ft of each size, color, and surface finish of tile specified.

## PART 2 PRODUCTS

### 2.01 TILE

- A. Manufacturers: Various manufacturers as specified in the finish schedule.
  - 1. Substitutions: See Section 01 63 00 - Substitutions and Product Options.
- B. Wall Tile : ANSI A137.1, and as follows:
  - 1. Size and Shape: Various, as shown in the drawings.
  - 2. Edges: Various, as shown in the drawings.
  - 3. Surface Finish: Various, as shown in the drawings.
  - 4. Colors: Various, as shown in the drawings.
  - 5. Pattern: Various, as shown in the drawings.
  - 6. Trim Units: Matching bullnose, cove, base, and curb shapes in sizes coordinated with field tile. Use these shapes only as directed in the drawings.
- C. Floor Tile: ANSI A137.1, and as follows:
  - 1. Manufacturer and product as selected in drawings.
  - 2. Size and Shape: as shown in drawings.
  - 3. Edges: Various as selected in the drawings.
  - 4. Surface Finish: Various, as selected in the drawings.
  - 5. Colors: As scheduled in drawings.
  - 6. Pattern: Various, as shown in drawings.
  - 7. Trim Units: Matching various shapes in sizes coordinated with field tile. Trim units, if they exist, are specified or shown in the drawings.

### 2.02 TRIM AND ACCESSORIES

- A. Tile Accessories: See drawings for selected finish, same color and finish as adjacent field tile; same manufacturer as tile.
- B. Tile Trim: Matching bullnose, cove base, and cove shapes in sizes coordinated with field tile.
  - 1. Applications:
    - a. Open Edges: Bullnose. Use only where shown in the drawings.
    - b. Inside Corners: Coved. Use only where shown in the drawings.
    - c. Floor to Wall Joints: Cove base. Use only where shown in the drawings.
  - 2. Manufacturers: Same as for tile.
- C. Non-Ceramic Trim: As indicated in the Drawings., style and dimensions to suit application, for setting using tile mortar or adhesive.
  - 1. Applications:
    - a. Open edges of floor tile: Use "RENO-U" floor trim by Schluter Systems (800)-472-4588 or equal. H=1/2 inch and W=7/8 inch and L=(length as shown in drawings).
    - b. On all outside corners of wall tile: Use "QUADEC" trim by Schluter Systems (800)-472-4588 or equal. H=1/2 inch and W=1/2 inch and L=(full-length of outside corners of wall-tiled walls as shown in drawings).
    - c. Transition between floor finishes of different heights.
    - d. Borders and other trim as indicated on drawings.
  - 2. Manufacturers:
    - a. Schluter-Systems: [www.schluter.com/#sle](http://www.schluter.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

### 2.03 SETTING MATERIALS

- A. Provide setting and grout materials from same manufacturer.
- B. Provide setting materials made by the same manufacturer as grout.
- C. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4 or ANSI A118.15.
  - 1. Applications: Use this type of bond coat where indicated and where no other type of bond coat is indicated.
  - 2. Products:
    - a. LATICRETE International, Inc; LATICRETE 254 Platinum: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - b. Substitutions: See Section 01 63 00.
- D. Mortar Bed Materials: Pre-packaged mix of Portland cement, sand, latex additive, and water.
  - 1. Products:
    - a. LATICRETE International, Inc; LATICRETE 3701 Fortified Mortar Bed: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - b. Substitutions: See Section 01 63 00.

### 2.04 GROUTS

- A. Provide setting and grout materials from same manufacturer.
- B. High Performance Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
  - 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
  - 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
  - 3. Color(s): As selected by Albert & Robinson Architects from manufacturer's full line.
  - 4. Products:
    - a. LATICRETE International, Inc; LATICRETE PERMACOLOR Grout: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - b. Substitutions: See Section 01 63 00.

### 2.05 MAINTENANCE MATERIALS

- A. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
  - 1. Composition: Water-based colorless silicone.

### 2.06 ACCESSORY MATERIALS

- A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
  - 1. Crack Resistance: No failure at 1/16 inch gap, minimum.
  - 2. Fluid or Trowel Applied Type:
    - a. Thickness: 20 mils, maximum.
    - b. Products:
      - 1) LATICRETE International, Inc; LATICRETE Blue 92 Anti-Fracture Membrane: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
      - 2) Substitutions: See Section 01 63 00.
- B. Waterproofing Membrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
  - 1. Crack Resistance: No failure at 1/16 inch gap, minimum; comply with ANSI A118.12.
  - 2. Fluid or Trowel Applied Type:
    - a. Thickness: 25 mils, minimum, dry film thickness.
    - b. Products:
      - 1) LATICRETE International, Inc; LATICRETE HYDRO BAN: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
      - 2) Substitutions: See Section 01 63 00.
- C. Backer Board: As specified in Section 09 21 16 Gypsum Board Assemblies.

09 30 00

Tiling



- D. Thresholds: As shown in the drawings .
- E. Joint Control System: Provide joint control system for tile installations as indicated in floor and wall installation methods (3.04 and 3.05).

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that subfloor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that subfloor surfaces are dust free and free of substances that could impair bonding of setting materials to subfloor surfaces.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for tiling installation by testing for moisture and alkalinity (pH).
  - 1. Test in accordance with Section 09 05 61.
- E. Verify that required floor-mounted utilities are in correct location.

#### **3.02 PREPARATION**

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

#### **3.03 INSTALLATION - GENERAL**

- A. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.
- B. Place thresholds at exposed tile edges.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles bullnosed.
- F. Install tile accessories rigidly in prepared openings.
- G. Install non-ceramic trim in accordance with manufacturer's instructions.
- H. Sound tile after setting. Replace hollow sounding units.
- I. Keep control and expansion joints free of mortar, grout, and adhesive.
- J. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
- K. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- L. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- M. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.
- N. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

#### **3.04 INSTALLATION - FLOORS - THIN-SET METHODS**

- A. Floor tiles shall be installed with 1/16" joints as made possible by using tile joint control system by Raimondi (Raimondi Lippage or Leveling System or equal).
- B. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.
- C. Where waterproofing membrane is indicated, install in accordance with TCNA (HB) Method F122, with latex-Portland cement grout.

09 30 00

Tiling

PAGE 5 OF 6

**3.05 INSTALLATION - WALL TILE**

- A. Wall tiles shall be installed with 1/32" joints as made possible by using tile joint control system by Raimondi (Raimondi Lippage or Leveling System or equal).
- B. Over gypsum wallboard/tile baccker, as specified in Section 09 21 16 - Gypsum Board Assemblies, on wood or metal studs install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.
  - 1. Where cementitious backer board is indicated, install in accordance with TCNA Method W244.

**3.06 CLEANING**

- A. Clean tile and grout surfaces.

**3.07 PROTECTION**

- A. Do not permit traffic over finished floor surface for 4 days after installation.

**END OF SECTION**

**SECTION 09 51 00  
ACOUSTICAL CEILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Suspended Lay-In Acoustical Ceiling Tiles.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants.

**1.03 REFERENCE STANDARDS**

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- B. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

**1.05 SUBMITTALS**

- A. Shop Drawings: Indicate grid layout and related dimensioning.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Samples: Submit two samples 6 by 6 inch in size illustrating material and finish of acoustical units.
- D. Samples: Submit two samples each, 6 inches long, of suspension system main runner.
- E. Maintenance Materials: Furnish the following for State of Mississippi's use in maintenance of project.
  - 1. See Section 01 33 00, for additional provisions.
  - 2. Extra Acoustical Units: Quantity equal to 5 percent of total installed of each type of ceiling tile installed.

**1.06 QUALITY ASSURANCE**

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**1.07 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

**1.08 PROJECT CONDITIONS**

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Install acoustical units after interior wet work is dry.

**1.09 EXTRA MATERIALS**

- A. See Section 01 6000 - Product Requirements, for additional provisions.

- B. Provide 5% percent of total acoustical unit area of each type of acoustical unit for the Owner's use in maintenance of project.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Acoustic Tiles/Panels:
  - 1. Armstrong World Industries, Inc: [www.armstrong.com](http://www.armstrong.com).
  - 2. Substitutions: See Section 01 63 00.
- B. Suspension Systems:
  - 1. Armstrong World Industries, Inc: [www.armstrong.com](http://www.armstrong.com).
  - 2. Substitutions: See Section 01 63 00.

### **2.02 ACOUSTICAL UNITS**

- A. Acoustic Tile Type LAT-1:
  - 1. Product as indicated in Drawings on the Finish Schedule and Finish Codes.
  - 2. Sizes: As indicated in Drawings.
  - 3. Edge Profile: Beveled Tegular.
  - 4. Suspension System Type: A.

### **2.03 SUSPENSION SYSTEM(S)**

- A. Manufacturers:
  - 1. Armstrong World Industries, Inc: [www.armstrong.com](http://www.armstrong.com).
  - 2. Substitutions: See Section 01 63 00.
- B. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
- C. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
  - 1. Materials:
    - a. Steel Grid: ASTM A653/A653M, G30 coating, unless otherwise indicated.
- D. Exposed Steel Suspension System Type A: Formed steel, commercial quality cold rolled; Intermediate-duty.
  - 1. Profile: Tee; 9/16 inch wide face.
  - 2. Construction: Double web.
  - 3. Finish: White painted.

### **2.04 ACCESSORIES**

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

### **3.02 PREPARATION**

- A. Install after major above-ceiling work is complete.
- B. Coordinate the location of hangers with other work.

### **3.03 INSTALLATION - SUSPENSION SYSTEM**

- A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.

- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- I. Do not eccentrically load system or induce rotation of runners.
- J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Use longest practical lengths.
  - 2. Miter corners.

### **3.04 INSTALLATION - TILES**

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
  - 1. Cut to fit irregular grid and perimeter edge trim.
  - 2. Make field cut edges of same profile as factory edges.
- G. Oversized tiles shall be used where ceiling tiles measure to be 6 inches or less at intersections with walls.
- H. Install hold-down clips on panels within 20 ft of an exterior door.

### **3.05 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

### **3.06 SCHEDULE**

- A. See Finish Schedule in Drawings.

**END OF SECTION**



**SECTION 09 51 26**  
**SUSPENDED WOOD PLANK CEILING**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

**1.02 SUMMARY**

- A. Section Includes:
1. WoodWorks Linear Veneered Closed
  2. Exposed grid suspension system.
  3. Wire hangers, fasteners, main runners, cross tees, wall angle moldings and accessories.

**1.03 REFERENCES**

- A. American Society for Testing and Materials (ASTM):
1. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
  2. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
  3. ASTM A 1008 Standard Specification for Steel, Sheet, and Cold Rolled Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
  4. ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
  5. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
  6. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  7. ASTM E 580 Application of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Requiring Seismic Restraint.
  8. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  9. ASTM E 1264 Classification for Acoustical Ceiling Products.
  10. Hardwood Plywood & Veneer Association (HPVA)
  11. International Building Code
  12. ASHRAE Standard 62.1-2004 Ventilation for Acceptable Indoor Air Quality
  13. NFPA 70 National Electrical Code
  14. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures
  15. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components
  16. International Code Council-Evaluation Services Report - Seismic Engineer Report
    - a. ESR 1308 - Armstrong T-Bar or Dimensional Suspension
  17. California Air Resources Board (CARB) compliant
  18. LEED - Leadership in Energy and Environmental Design is a set of rating systems for the design, construction, operation, and maintenance of green buildings

**1.04 SUBMITTALS**

- A. Shop Drawings: Layout and details of ceilings. Show locations of items that are to be coordinated with or supported by the ceilings.
- B. Installation Instructions: Submit manufacturer's installation instructions as referenced in Part three, Installation.
- C. Product Data: Submit manufacturer's technical data for each type of ceiling unit and suspension system required.

- D. Samples: Real Wood Veneer on fire rated particle board – Semi-gloss tinted topcoat – Clear Finish
- E. Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.
- F. Non-Conformance: All products not conforming to the requirements of this specification and or the manufacturer's published values are to be disposed. The Contractor performing the work will replace with approved product at their expense.

#### **1.05 QUALITY ASSURANCE**

- A. Single-Source Responsibility: Provide ceiling panel units and grid components by a single manufacturer.
- B. Fire Performance Characteristics: Identify ceiling components with appropriate markings of applicable testing and inspecting organization.
  - 1. Surface Burning Characteristics: As follows, tested per ASTM E-84 and complying with ASTM E 1264 for Class A products.
  - 2. HPVA (Hardwood Plywood and Veneer Association) certification and audit program per ASTM E-84 tunnel test.
- C. Woodworking Standards: Manufacturer must comply with specified provisions of Architectural Woodworking Institute quality standards.
- D. Coordination of Work: Coordinate ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store ceiling components in a dry interior location in their cartons prior to installation to avoid damage. Store cartons in a flat, horizontal position. The protectors between the panels should not be removed until installation.
- B. Do not store in unconditioned spaces with humidity greater than 55 percent or lower than 25 percent relative humidity and temperatures lower than 50 degrees F or greater than 86 degrees F. Panels must not be exposed to extreme temperatures, for example, close to a heating source or near a window with direct sunlight.
- C. Handle ceiling units carefully to avoid chipped edges or damage to units in any way.

#### **1.07 PROJECT CONDITIONS**

- A. Wood ceiling materials should be permitted to reach room temperature and have a stabilized moisture content for a minimum of 72 hours before installation. (Remove plastic wrap to allow panels to climatize).
- B. The wood panels should not be installed in spaces where the temperature or humidity conditions vary from the temperatures and conditions that will be normal in the occupied space.
- C. As interior finish products, the veneered panels are designed for installation in temperature conditions between 50 degrees F and 86 degrees F, in spaces where the building is enclosed, and HVAC systems are functioning and will be in continuous operation. Relative humidity should not fall below 25 percent or exceed 55 percent.

#### **1.08 WARRANTY**

- A. Veneered Wood Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to:
  - 1. Veneered Wood Panels: Defects in materials or factory workmanship.
  - 2. Grid System: Rusting and manufacturing defects.
- B. Warranty Period:
  - 1. Veneered Wood panels: One (1) year from date of installation.
  - 2. Grid: Ten years from date of installation.



- C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

## **1.09 9 MAINTENANCE**

- A. Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
  - 1. Ceiling Units: Furnish quality of full-size units equal to 2.0 percent of amount installed.
  - 2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 1.0 percent of amount installed.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Basis of Design WoodWorks Linear Veneered Open:
  - 1. Armstrong World Industries, Inc.
- B. Suspension Systems:
  - 1. Armstrong World Industries, Inc.
- C. Substitutions: Per Section 01 60 00.

### **2.02 WOOD CEILING UNITS**

- A. Ceiling Panels Type AP-1:
  - 1. Surface Texture: Smooth
  - 2. Composition: Real wood veneer on fire rated particle board
  - 3. Finish: Real Wood Veneer
    - a. Plain Slice Cherry (NPC)
  - 4. Panel Width Size(s): With 3/4" reveal Plank to Plank @ Width
    - a. 4-inch (O.C.): 3-3/4-inch Plank Width (Actual)
  - 5. Panel Length Size(s): With no reveal @ Length
    - a. 96-inch (Actual)
  - 6. Flame Spread:
    - a. Class A: ASTM E84 surface burning characteristics. Flame Spread Index 25 or less. Smoke Developed Index 50 or less.
- B. Accessories:
  - 1. Mounting Clip – Item 5389
  - 2. Spring Border Clips- Item 7870
  - 3. Adjustable Trim Clip - Item 7239
  - 4. Replacement Trim Clip – Item 5925
  - 5. Heavy-duty Wall Anchor (seismic) – Item 7100

### **2.03 SUSPENSION SYSTEMS**

- A. Components: All main beams and cross tees shall be commercial quality hot dipped galvanized steel as per ASTM A653. Main beams and cross tees are double-web steel construction with 15/16-inch type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
  - 1. Structural Classification: ASTM C635 (Heavy Duty)
  - 2. Color: Tech Black.
  - 3. Acceptable Product: 12' HD Linear Carriers Prelude XL 7301 , Prelude XL 2' Cross Tee XL8320 BL as manufactured by Armstrong World Industries, Inc.
  - 4. 12-Gauge Hanger Wire – Item 7891
- B. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

- C. Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least times-three design load, but not less than 12 gauge.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out.
- B. Proper designs for both supply air and return air, maintenance of the HVAC filters and building interior space are essential to minimize soiling. Before starting the HVAC system, make sure supply air is properly filtered and the building interior is free of construction dust.

#### **3.02 PREPARATION**

- A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.
- B. WoodWorks ceiling materials should be permitted to reach room temperature and have a stabilized moisture content for a minimum of 72 hours before installation. (Remove plastic wrap to allow panels to climatize).

#### **3.03 INSTALLATION**

- A. Interior WoodWorks products, the veneered wood panels are designed for installation in temperature conditions between 50 degrees F and 86 degrees F, in spaces where the building is enclosed, and HVAC systems are functioning and will be in continuous operation. Relative humidity should not fall below 25 percent or exceed 55 percent.
- B. Install suspension system and panels in compliance with ASTM C636, ASTM E580, with the approval of the authorities having jurisdiction, and in accordance with the manufacturer's WoodWorks Linear Veneered Panels Installation Instructions.

#### **3.04 ADJUSTING AND CLEANING**

- A. Replace damaged and broken panels.
- B. Clean exposed surfaces of ceilings panels, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.

**END OF SECTION**

**SECTION 09 65 00  
RESILIENT FLOORING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Resilient tile flooring (Luxury Vinyl Tile).
- B. Resilient base.
- C. Resilient stair treads and landings.
- D. Installation accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.
- B. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.
- C. Section 26 05 26 - Grounding and Bonding for Electrical Systems: Grounding and bonding of static control flooring to building grounding system.

**1.03 REFERENCE STANDARDS**

- A. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2014c.
- B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- C. ASTM F1700 - Standard Specification for Solid Vinyl Tile; 2013a.
- D. ASTM F1859 - Standard Specification for Rubber Sheet Floor Covering Without Backing; 2014.
- E. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008 (Reapproved 2012).
- F. ASTM F2169 - Standard Specification for Resilient Stair Treads; 2015.
- G. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2015.

**1.04 SUBMITTALS**

- A. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- B. Selection Samples: Submit manufacturer's complete set of color samples for Albert & Robinson Architects's initial selection.
- C. Verification Samples: Submit two samples, 12 by 12 inch in size illustrating color and pattern for each resilient flooring product specified.
- D. Manufacturer's Qualification Statement.
- E. Installer's Qualification Statement.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

- D. Protect roll materials from damage by storing on end.
- E. Do not double stack pallets.

#### **1.07 FIELD CONDITIONS**

- A. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

#### **1.08 EXTRA MATERIALS**

- A. Provide 5% of flooring, 5% lineal feet of base, of each type and color specified.

#### **1.09 WARRANTY**

- A. Manufacturer's Materials Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
  - 1. Warranty: 1 year limited warranty commencing on Date of Substantial Completion covering both materials and labor.

### **PART 2 PRODUCTS**

#### **2.01 SHEET FLOORING**

- A. Rubber Sheet Flooring - Type \_\_\_\_: 100 percent rubber composition, color and pattern through total thickness.
  - 1. Rubber sheet flooring to match rubber stair treads as specified below.
  - 2. Manufacturers:
    - a. Single-Source Responsibility: Rubber flooring and stair treads shall be from a single supplier.
    - b. Substitutions: See Section 01 60 00 - Product Requirements.
  - 3. Minimum Requirements: Comply with ASTM F1859, Type 1, without backing.
  - 4. Thickness: 0.125 inch minimum.

#### **2.02 TILE FLOORING**

- A. Luxury Vinyl Tile: Product Specified in Drawings.
  - 1. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
  - 2. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648, NFPA 253, ASTM E 648, or NFPA 253.
  - 3. Slip Resistance: ASTM C 1028; ADA Compliant; Dry 0.68; Wet 0.66.
  - 4. Wear Layer Thickness: 03 inch. (30 mil)
  - 5. Total Thickness: 0.125 inch.
  - 6. Size: As indicated on drawings.
  - 7. Color: As indicated on drawings.
  - 8. Manufacturers:
    - a. As indicated on drawings.
    - b. Substitutions: See Section 01 63 00.

#### **2.03 STAIR COVERING**

- A. Stair Treads: Rubber; full width and depth of stair tread in one piece; tapered thickness.
  - 1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648, NFPA 253, ASTM E 648, or NFPA 253.
  - 2. Nosing: Square.
  - 3. Striping: 2 inch wide contrasting color strips.
  - 4. Texture: As indicated on drawings..
  - 5. Color: To be selected by Albert & Robinson Architects from manufacturer's solid color range.

6. Provide corresponding landing tile matching material, color, and texture.
7. Manufacturers:
  - a. Flexco Corporation: [www.flexcofloors.com](http://www.flexcofloors.com): Product: 1776 Heavy-Duty Radial II one-piece tread with riser.
  - b. Substitutions: See Section 01 63 00.
- B. Stair Risers: Full height and width of tread in one piece, matching treads in material and color.
  1. Manufacturers:
    - a. Single-Source Responsibility: Stair treads and risers shall be from a single supplier.
- C. Stair Landings: Full width in one piece and in maximum available lengths, matching treads in material and color.
  1. Manufacturers:
    - a. Single-Source Responsibility: Stair treads, risers and landings shall be from a single supplier.

#### **2.04 RESILIENT BASE**

- A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set ; style as indicated in Drawings.
  1. Critical Radiant Flux (CRF): Minimum 0.45 watt per square centimeter, when tested in accordance with ASTM E 648, NFPA 253, ASTM E 648, or NFPA 253.
  2. Height: 6 inch.
  3. Thickness: 0.125 inch.
  4. Finish: Satin.
  5. Length: Roll.
  6. Color: As indicated on Drawings. If no color is indicated, color to be selected by Albert & Robinson Architects from manufacturer's full range.
  7. Accessories: Premolded external corners and internal corners.
  8. Manufacturers:
    - a. As indicated in Drawings.
    - b. Substitutions: See Section 01 63 00.

#### **2.05 ACCESSORIES**

- A. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
  1. Single-Source Responsibility: Resilient products and primers/adhesives shall be from a single supplier.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive resilient flooring.
- C. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- D. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
  1. Test in accordance with Section 09 05 61.
  2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- E. Verify that sub-floor surfaces are dust-free and free of substances which would impair bonding of adhesive materials to sub-floor surfaces.
- F. Verify that required floor-mounted utilities are in correct location.

### **3.02 PREPARATION**

- A. Prepare floor substrates for installation of flooring in accordance with Section 09 05 61.
- B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate.

### **3.03 INSTALLATION - GENERAL**

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
  - 1. Spread only enough adhesive to permit installation of materials before initial set.
  - 2. Place copper grounding strip in conductive adhesive and apply additional adhesive to top side of strip before installing static control flooring. Allow strip to extend beyond flooring in accordance with static control flooring manufacturer's instructions. Refer to Section 26 05 26 for grounding and bonding to building grounding system.
  - 3. Fit joints and butt seams tightly.
  - 4. Set flooring in place, press with heavy roller to attain full adhesion.
- D. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- E. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- F. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.

### **3.04 INSTALLATION - TILE FLOORING**

- A. Install in accordance with manufacturer's instructions.
- B. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Set flooring in place, press with heavy roller to attain full adhesion.
- E. Lay flooring with joints and seams parallel to building lines to produce symmetrical pattern.
- F. Install tiles with grain direction rotating 90 degrees every other tile. Verify installation lay-out method before installing.
- G. Where floor finishes are different on opposite sides of door, terminate flooring under centerline of door.
- H. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- I. Install feature strips and floor markings where indicated. Fit joints tightly.

### **3.05 INSTALLATION - RESILIENT BASE**

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints.
- B. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions.

**3.06 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

**3.07 PROTECTION**

- A. Protect installed products and finish surfaces from damage throughout the duration of construction.

**END OF SECTION**





## SECTION 09 66 13.16

### EPOXY-RESIN TERRAZZO FLOORING

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section includes.
1. Thin-set epoxy terrazzo.
  2. Precast, 2" thick, epoxy terrazzo stair treads.
  3. Cast stair nosing with stair treads and risers.
  4. Related accessories.
  5. REFER TO DRAWINGS FOR ADDITIONAL SPECIFICATION, CONSTRUCTION AND FINISH REQUIREMENTS.
- B. Related Requirements:
1. Section 03 30 00, Cast In Place Concrete.
  2. Section 07 13 00, Under-slab Vapor Retarder/Barrier.
  3. Section 07 90 00, Joint Protection.

##### 1.2 REFERENCES

- A. American Concrete Institute (ACI):
1. ACI Committee No. 403 Bulletin Title No. 59-43.
- B. American Society for Testing and Materials (ASTM):
1. ASTM C131 "Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine."
  2. ASTM C140 "Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units."
  3. ASTM C373 "Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products."
  4. ASTM C1021 Standard Practice for Laboratories Engaged in the Testing of Building Sealants."
  5. ASTM C1093 Standard Practice for Accreditation of Testing Agencies for Masonry."
  6. ASTM D412 "Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension."
  7. ASTM D638 "Standard Test Method for Tensile Properties of Plastics."
  8. ASTM D695 "Standard Test Method for Compressive Properties of Rigid Plastics."
  9. ASTM D696 "Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer."
  10. ASTM D1308 "Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes."
  11. ASTM D2240 "Standard Test Method for Rubber Property—Durometer Hardness."
  12. ASTM D2370 "Standard Test Method for Tensile Properties of Organic Coatings."
  13. ASTM E96 "Standard Test Methods for Water Vapor Transmission of Materials."

14. ASTM F1869 "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride."
  15. ASTM F2170 "Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes."
- C. The International Accreditation Service (IAS)
1. IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC Standard 17025.
- D. International Concrete Repair Institute (ICRI):
1. "Technical Guidelines 03732: Guide for Selecting and Specifying Surface Preparation for Sealers, Coatings, and Membranes."
- E. The International Laboratory Accreditation Cooperation (ILAC).
1. IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC Standard 17025.
- F. [International Masonry Institute \(IMI\)](#).
- G. International Organization for Standardization (ISO):
1. ISO 17025 "General Requirements for the Competence of Testing and Calibration Laboratories."
- H. The National Terrazzo & Mosaic Association Inc. (NTMA):
1. "Terrazzo Specifications and Design Guide"
  2. "Guide Specification for Epoxy Terrazzo".
  3. Technical Bulletin #111.

### 1.3 DEFINITIONS

- A. Recycled Content: Recycled content is defined in accordance with the International Organization of Standards document, ISO 14021 — Environmental labels and declarations — Self-declared environmental claims (Type II environmental labeling).
1. Preconsumer Recycled Material: Material diverted from the waste stream during the manufacturing process. Reutilization of materials (i.e., rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it) is excluded.
  2. Postconsumer Recycled Material: Waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose.
- B. VOC: Volatile Organic Chemical

### 1.4 COORDINATION

- A. Coordinate the types of traffic allowed on terrazzo between the following events:
1. Completion of pouring and before coarse grinding.

2. Completion of grouting and before polishing.

B. Coordinate the preparation for terrazzo work with the installation of plumbing, electrical, communications, and data work in the floor area to receive terrazzo.

1. Verify that fixtures, equipment, and outlets will be located properly and at the correct elevation.

## 1.5 PRE-INSTALLATION MEETINGS

A. Pre-installation Conference: Prior to installation of concrete substrates, conduct conference at Project site to comply with requirements in Section 01 21 00 Project Meetings. Review methods and procedures related to terrazzo including, but not limited to, the following:

1. Inspect and discuss installation procedures, joint details, jobsite conditions, substrate specification, vapor barrier details and coordination with other trades.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
3. Review special terrazzo designs and patterns.
4. Review dust control procedures.
5. Review plans for concrete curing and site drying to enable timely achievement of suitable slab moisture conditions.
6. Review concrete substrate tolerance requirements for acceptable terrazzo installation.

## 1.6 SUBMITTALS

A. Product Data: Manufacturer's product data for each type of terrazzo and accessory including the following information:

1. Physical properties.
2. Performance properties.
3. Independent Lab Testing for Moisture Mitigation System and Bond Strength Testing
4. For tests not listed in published data, supply missing data according to standard referenced.

B. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details and attachments to other work. Show layout of the following:

1. Divider strips.
2. Control- and expansion-joint strips.
3. Base and border strips.
4. Abrasive strips.
5. Stair treads, risers and landings.
6. Precast terrazzo-jointing and edge configurations including anchorage details.
7. Terrazzo patterns.
8. Layout of special graphic patterns.
9. Large scale details of terrazzo patterns and metal or other material inserts.

C. Samples for Verification: For each type, material, color and pattern of terrazzo and accessory required showing the full range of color, texture and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color and aggregate types, sizes and proportions. Prepare samples of same thickness and from same material to be used for the Work in size indicated below:

1. Epoxy Terrazzo: minimum 6" x 6" sample of each color and type of terrazzo.

2. Precast Epoxy Terrazzo: minimum 6" x 6" sample of each color and type of terrazzo.
  3. Accessories: 6" length of each kind of divider strip, stop strip and control joint strip required.
  4. Stair Treads: 12" length wide sample precast units including cast-in nosing.
- D. Qualification Data: For Installer and the Manufacturer.
- E. Material Test Reports: For moisture and/or relative humidity of substrate, by a qualified testing agency.
- F. Precast Terrazzo Flooring Test Reports: Provide test reports for precast terrazzo flooring, for the following tests performed by manufacturer and witnessed by a qualified testing agency:
1. Compressive Strength: ASTM D695.
  2. Water Absorption: ASTM C373/ASTM C140.
  3. Flexural Strength: ASTM D638.
  4. Tensile Strength: ASTM D638.
- G. Sample Warranties: For manufacturer's special warranties.

## 1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: NTMA maintenance recommendations and manufacturer's instructions to include in maintenance manuals.
- B. Repair Procedures: Provide written procedures for the following:
1. Epoxy Terrazzo Flooring: Removal and replacing damaged portions of flooring.
  2. Precast Terrazzo Flooring: Removing individual precast units and replacing them.

## 1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Engage a terrazzo manufacturer with minimum 5 years documented manufacturing experience producing epoxy binder, and flexible crack isolation membranes; including the following:
1. Proof of NTMA membership.
  2. Furnish documentation for at least 5 epoxy terrazzo projects of the same scope and complexity; installed in the past 5 years using material being submitted for this project.
  3. For each epoxy terrazzo project submitted, provide the following information:
    - 1) Project name.
    - 2) Square footage of terrazzo installed.
    - 3) Address of facility with contact name and phone number.
    - 4) Contact name, address and phone number of prime contractor or construction manager.
    - 5) Field experience resumes of key project personnel including lead supervisor and field technicians to be used on this project.
- B. Installer Qualifications: Submit proof of Contractor's membership in NTMA or IMI with a letter recognizing that they are a qualified installer in good standing and is acceptable to epoxy terrazzo manufacturer.

1. Furnish documentation for at least 3 epoxy terrazzo projects of the same scope and complexity; installed in the past 5 years using material being submitted for this project.
  2. For each epoxy terrazzo project submitted, provide the following information:
    - 1) Project name.
    - 2) Square footage of terrazzo installed.
    - 3) Address of facility with contact name and phone number.
    - 4) Contact name, address and phone number of prime contractor or construction manager.
    - 5) Field experience resumes of key project personnel including lead supervisor and field technicians to be used on this project.
  3. For each epoxy terrazzo project submitted, provide the following information:
- C. Precast Terrazzo Flooring Fabricator Qualifications: Shop that employs skilled workers who custom fabricate precast terrazzo flooring products similar to those required for this Project and whose products have a record of successful in-service performance .
1. Furnish a list of at least five (5) precast terrazzo flooring projects using material being submitted for this project installed during the last five (5) years of the same scope, complexity and at least 50 percent of the square footage.
- D. Testing Agency Qualifications: Qualified according to [ASTM C1021] [ASTM C1093] for testing indicated[ and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC Standard 17025].
- E. Mockups: Build mockups to verify selections made under sample submittals; to demonstrate aesthetic effects; and to set quality standards for materials and execution.
1. Build mockup of typical terrazzo flooring installation [as shown on Drawings] [where indicated on the Drawings] [in location directed by Architect] <insert location>.
    - 1) Size: Minimum 100 sq. ft. of typical poured-in-place flooring condition for each color and pattern in locations directed by Architect.
  2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

## 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's undamaged, unopened containers with a label on each container clearly marked with the following information:
1. Product name
  2. Manufacturer's name
  3. Component designation (A or B, etc.)
  4. Ratio of component mixture
  5. CHEMTREC Emergency Response Information
- B. Handle materials by methods which prevent damage.

- C. Inspect direct jobsite deliveries to assure quantities are correct; materials comply with requirements; and materials are not damaged.
- D. Immediately return materials found to be defective in manufacturing and materials damaged in transit, handling or storage.
  - 1. Replace defective materials at no cost to Owner.
- E. Store materials per manufacturer's instructions and as follows:
  - 1. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures and humidity.
  - 2. Maintain storage temperatures between 60° F and 90° F.
  - 3. Maintain seals and labels intact and legible.
  - 4. Do not use materials which have been stored for a longer period of time than the manufacturer's maximum recommended shelf life.
- F. Precast Terrazzo Protective Wrapping: Wrap precast units individually in a non-staining protective cover and mark each unit for proper identification of installation location.

#### 1.10 FIELD CONDITIONS

- A. Temperature:
  - 1. Maintain the ambient room and substrate temperature at 55° F or above during stripping and pouring.
    - a. Maintain this temperature at least 48 hours after completion of pouring.
  - 2. After terrazzo has been poured, maintain substrate temperature at 40° F or above until substantial completion.
  - 3. Each day of installation, before beginning work, verify that the dew point is at least 5° F less than the slab and air temperature.
- B. Verify that adequate ventilation is provided.
- C. Maintain a minimum uniform level of 50-60 foot candles (538.2 Lux – 645.8 Lux) in areas where terrazzo system is being installed.
- D. Field Measurements, Precast Terrazzo: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.
- E. Acceptable Substrate Conditions:
  - 1. Flatness Tolerance: Maximum variation from flatness of 1/4 inch in 10 feet.
  - 2. Concrete floor Finish: Steel trowel finish.
  - 3. Allow concrete to receive epoxy terrazzo to cure for at least 30 days before beginning installation process.
    - a. Allow no curing agents to be used in areas to receive terrazzo.
  - 4. Test concrete substrate to determine acceptable moisture levels prior to terrazzo installation.

5. Saw cutting of control joints must be done between 12 and 24 hours after placement of the structural concrete and at a frequency compatible to ACI recommendations.
- F. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.
- G. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.
- H. Provide protection from other trades prior to final acceptance by owner.
- I. Dust Control: Control and collect dust produced by grinding operations. Comply with requirements of Section 01 50 00 Temporary Facilities and Controls.

## 1.11 WARRANTY

- A. Special Warranty: Manufacturer and installer, jointly, agree to provide labor and material to repair (and if necessary to replace) components of epoxy terrazzo flooring system that fail in materials or workmanship within specified warranty period.
  1. Failures include, but are not limited to, loss of bond and damage due to normal wear and tear.
  2. Failures do not include the following:
    - 1) Damage due to bubbling or loss of adhesion due to moisture penetration through the substrate.
    - 2) Acts of God or other elements beyond scope of protection of this system.
    - 3) Reflective cracks from substrate.
  3. Warranty Period: [One] year from date of Substantial Completion.
  4. Limitations:
    - 1) In case of warranty claim, Owner will provide written notice to terrazzo manufacturer and installer within 30 days of problem's discovery.
    - 2) Owner will provide free access to area during normal working hours.
    - 3) Owner assumes responsibility for protection and maintenance of epoxy terrazzo flooring from date of Substantial Completion on.
    - 4) Remedies provided by epoxy terrazzo flooring manufacturer and installer are limited to direct repair of Epoxy Terrazzo Flooring System.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Products: Subject to compliance with requirements, provide products by Master Terrazzo Technologies, Levittown, PA ([www.masterterrazzo.com](http://www.masterterrazzo.com)) indicated in Part 2 Articles below.
  1. Crossfield Dex-O-Tex.
  2. General Polymers (a subsidiary of Sherwin Williams).
  3. Other substitutions permitted by Section 01 63 00.

- B. Source Limitations: Obtain primary Epoxy Terrazzo Flooring System materials including membranes, primers, resins, and hardening agents from a single manufacturer.
1. Obtain aggregates, solvents, divider strips, sealers and cleaners from source recommended by primary materials manufacturer.

## 2.2 PERFORMANCE REQUIREMENTS

- A. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

## 2.3 EPOXY TERRAZZO FLOORING SYSTEM

A. Materials:

1. Epoxy Resin: Manufacturer's standard recommended for use indicated and in color required for mix indicated.
  - a. Physical Properties without Aggregates:
    - 1) Hardness: ASTM D2240 70-85 Shore D
    - 2) Minimum Tensile Strength: 4,800 psi per ASTM D638 for a 2-inch specimen made using a "C" die per ASTM D412.
    - 3) Minimum Compressive Strength: 12,000 psi per ASTM D695, Specimen B cylinder.
    - 4) Chemical Resistance: No deleterious effects by contaminants listed below after 7-day immersion at room temperature per ASTM D1308.
      - a) Distilled water
      - b) Mineral water
      - c) Isopropanol
      - d) Ethanol
      - e) 0.025 percent detergent solution
      - f) 1 percent soap solution
      - g) 10 percent sodium hydroxide
      - h) 10 percent hydrochloric acid
      - i) 5 percent acetic acid
  - b. Physical Properties with Aggregates: For resin blended with Georgia White marble, ground, grouted, and cured per requirements in NTMA's "Guide Specification for Epoxy Terrazzo," comply with the following:
    - 1) Flammability: Self-extinguishing, maximum extent of burning 0.25 inch per ASTM D635.
    - 2) Linear Coefficient of Thermal Expansion:  $25.0 \times 10^{-6}$  in/in per °F for temperature range of -12° to 140° F per ASTM D696.
    - 3) Bond Strength: When tested in accordance with Field Test Method for surface soundness and adhesion as described in ACI Committee No. 403 Bulletin Title No. 59-43 the Epoxy terrazzo shall comply with the following value: 100 percent concrete failure minimum, with 300 psi minimum tensile strength.
2. Marble Chips: To be determined by Architect in custom selecting terrazzo aggregate mix.



- a. Sizes: #2's, #1's and #0's, conforming to NTMA gradation standards.
  - b. Abrasion and Impact Resistance: ASTM C131-89; maximum 40 percent loss.
  - c. Chips shall contain no deleterious or foreign matter.
  - d. Post-Industrial Recycled Content: To be determined by Architect in custom selecting terrazzo aggregate mix.
- B. Mix: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and aggregate proportions and mixing.
1. Color and Pattern Schedule: To be determined by Architect in custom selecting terrazzo aggregate mix.
    - a. Number of colors expected are shown in the finish floor plans.

## 2.4 PRECAST TERRAZZO UNITS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Precast Terrazzo Enterprises, Raleigh, NC 800-849-8849
  2. Romoco Precast Terrazzo Products, Manheim, PA 717-665-2739
  3. Wausau Tile, Wausau, WI 800-388-8728
  4. Substitutions: As requirements of Section 01 63 00 - Product Requirements allow.
- B. Precast Units: Thin-set, precast epoxy terrazzo base units with cast-in nosing.
1. Size and Configuration: As indicated on Drawings.
  2. Precast Units: 2-inch-thick epoxy, with abrasive pattern consisting of 3 lines of abrasive strips.
  3. Colors and Patterns: To be determined by Architect in custom selecting terrazzo aggregate mix.

## 2.5 DIVIDER AND ACCESSORY STRIPS

- A. Thin –Set Divider Strips: L-type and T-type.
1. Material: half hard brass.
  2. Top Width: 1/16 inch.
- B. Heavy-Top Divider Strips: Angle type in depth required for topping thickness indicated.
1. Bottom-Section Material: Matching top-section material.
  2. Top-Section Material: White zinc alloy, unless otherwise indicated.
  3. Top-Section Width: 1/8 inch, unless otherwise indicated.
- C. Control joint Strips: Separate, double L-type divider strips, positioned back to back with 3/8 inch separation filled with sealant.
- D. Accessory Strips: Match divider-strip width, material, and color unless otherwise indicated. Provide the following types of accessory strips:

1. Base bead and base dividers.
  2. Edge beads for exposed edges of terrazzo.
- E. Nosings for Stair Treads and Landings: Extruded aluminum, with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder.
1. Fabricate nosings in sizes and configurations indicated and in uninterrupted lengths necessary for an accurate fit.
    - a. For Precast Treads and Landings: Apply clear lacquer to concealed bottoms, sides, and edges of extruded units set into precast terrazzo units.
  2. Available Manufacturers and Products:
    - a. Wooster Products Inc. Type 128 with Time Saver Anchor.
    - b. Balco Inc.
  3. Nosings: Square-back units, 1-7/8 inches wide with 1-1/8 inches lip, for casting into terrazzo steps.
  4. Provide anchors welded to underside of nosing for embedding units in terrazzo.

## 2.6 MISCELLANEOUS PRODUCTS

- A. Concrete Patch and Topping: 100 percent solids fill mortar system including blended aggregate.
1. Basis of Design Product: MorriFill™ Epoxy Slope and Fill Mortar.
  2. Compressive Strength: ASTM C579, 8,000 psi minimum.
  3. Hardness: ASTM D2240, 75-80 Shore D
- B. Moisture Remediation System: Two-component formulation designed to reduce moisture vapor transmission through concrete and provide bond with epoxy terrazzo flooring system.
1. Basis of Design: MasterGard™ Moisture Suppression System by Master Terrazzo Technologies.
  2. Adhesion: ASTM D4541, 500 psi.
  3. Moisture Vapor Transmission: ASTM E96, 0.30 perm.
- C. Primer: 100 percent solids, epoxy primer moisture insensitive. No solvent containing primers are allowed
1. Basis of Design Product: Morricite® Primer.
  2. Moisture Vapor Transmission: ASTM E96, 1 perm maximum.
- D. Crack Isolation Membrane
1. Basis of Design Product: MasterFlex™ Flexible Epoxy Membrane.
  2. Flexible Epoxy Membrane: Flexible epoxy membrane with 100 percent solids with the following properties:
    - a. Tensile Strength: ASTM D2370 at 68° F 1,500 psi.
    - b. Elongation: ASTM D2370 at 68° F 130 percent.
    - c. Adhesion: ASTM D4541, 350 psi.

- E. Membrane Reinforcing: Fiberglass mesh reinforcement fabric compatible with crack isolation membrane.
  - 1. Basis of Design Product: MasterFlex™ Fabric.
- F. Divider-Strip Adhesive: Epoxy-resin adhesive recommended by adhesive manufacturer for this use and acceptable to terrazzo manufacturer.
  - 1. Use adhesive that has a VOC content of 50g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- G. Anchoring Devices:
  - 1. Strips: Provide mechanical anchoring devices for strip materials as required for secure attachment to substrate.
  - 2. Precast Terrazzo: Provide mechanical anchoring devices as recommended by Terrazzo Contractor for proper anchorage and support of units for conditions of installation and support.
- H. Finishing Grout: Epoxy grout with 100 percent Solids.
  - 1. Basis of Design Product: Morricite® Terrazzo Grout.
- I. Control Joint Filler: Flexible, grindable, epoxy joint filler, 100 percent solids, with the following properties:
  - 1. Basis of Design Product: MTT ColorFlex™.
  - 2. Tensile Strength: ASTM D2370 at 68° F 1,600 psi.
  - 3. Elongation: ASTM D2370 at 68° F 100 percent.
  - 4. Tensile Modulus: ASTM D2370 at 68° F 27,800 psi.
  - 5. Color: As selected by the Architect.
- J. Joint Sealant: Comply with requirements of Section 07 92 05 "Joint Sealers."
- K. Expansion Joints: Comply with requirements of Section 07 92 05 "Joint Sealers" and Section 07 95 13 "Expansion Joint Cover Assemblies".
- L. Abrasive Strips: Metal channels matching strips to receive epoxy and abrasive aggregate.
  - 1. Barrier free profile, extruded aluminum base and anchor for casting into concrete fill, aluminum oxide blend abrasive filled, ribbed style with anti-slip surface, color as selected; 3 inches wide by 1/8 inch less the tread width long.
- M. Terrazzo Cleaner: As recommended by cleaner manufacturer for use on terrazzo type specified and as follows:
  - 1. Biodegradable
  - 2. Chemically neutral
  - 3. pH factor between 7 and 10
  - 4. Free from phosphate, crystallizing salts, and water soluble alkaline salts.
- N. Terrazzo Sealers: Slip- and stain-resistant sealer that is chemically neutral with a pH factor between 7 and 10, a standard coefficient of friction of 0.6 or higher, does not affect physical properties of terrazzo and complies with NTMA's "Terrazzo Specifications and Design Guide."

1. General: Provide sealers produced by or approved by terrazzo flooring system manufacturer.
2. Water Based Sealer: Provide a medium gloss water based sealer and finish system.
  - a. Basis of Design Product: MTT SealOn Waterborne Sealer.

## **2.7 SOURCE QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to evaluate epoxy terrazzo flooring fabricator's quality-control and testing methods.
- B. Testing: Test and inspect epoxy terrazzo flooring according to the following requirements:
  1. Cure specimens for 7 days at 75° F plus or minus 2° F and 50 percent plus or minus 2 percent RH.
  2. Conduct tests according to the test methods indicate for each product and characteristic indicated above in Part 2 of this Section.
- C. Epoxy terrazzo flooring will be considered defective if it does not pass tests and inspections.
  1. Acceptable results for each product and characteristic indicated above in Part 2 of this Section.
- D. Prepare test and inspection reports.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates and areas, with Terrazzo Contractor present, for compliance with requirements for installation tolerances and other conditions affecting performance.
  1. Evaluate slab condition, including slab moisture content and extent of repairs required to comply with substrate requirements of NTMA's "Terrazzo Specifications and Design Guide" and the requirements of this Section.
  2. Verify that concrete substrate was poured no fewer than 30 days prior to date of examinations.
  3. Verify existing work has no defects affect proper execution of terrazzo work.
  4. Verify that concrete substrate meets flatness tolerances.
  5. Verify that concrete substrates are visibly dry and free of moisture.
- B. Prepare written preconstruction examination report, endorsed by Installer, listing conditions detrimental to performance.
- C. Proceed with installation only after unsatisfactory conditions, including flatness tolerances, have been corrected.
- D. Verify measurements and dimensions; coordinate the installation of insert and work of other trades.

### **3.2 PREINSTALLATION TESTING**

- A. Concrete Moisture Testing, General

1. Conduct relative humidity test at each test site.
  2. Conduct one pH test at each test site.
- B. Calcium Chloride Testing:
1. Perform tests in accordance with ASTM F1869.
- C. Relative Humidity Testing:
1. Perform tests in accordance with ASTM F2170.
  2. Conduct relative humidity testing at the following depths:
    - a. Slabs-On-Grade: Measure temperature and relative humidity at 40 percent of slab thickness measured from top surface.
    - b. Elevated Slabs: Measure temperature and relative humidity at 20 percent of slab thickness measured from top surface.
  3. Drill test hole at each test site to accommodate test sleeve.
  4. Hole Diameter: In accordance with test equipment manufacturer's instructions.
  5. Drilling Fluids: Not permitted.
  6. Vacuum dust and debris from test hole.
  7. Insert sleeve, to the full depth of test hole. Cap or plug sleeve to prevent test hole contamination.
  8. Permit the test site to acclimate for minimum 72 hours before measuring relative humidity.
  9. Remove sleeve plug and insert probe to bottom of test hole. Allow test probe to reach temperature equilibration with concrete slab.
  10. Measure and record temperature and relative humidity at the test site.
- D. Proceed with terrazzo installation only after substrates have a maximum relative humidity measurement reading less than 80 percent.
1. If concrete substrate moisture exceeds 80% according to ASTM F2170, consult terrazzo manufacturer for additional drying or negative side moisture remediation methods.

### 3.3 PREPARATION

- A. Clean substrates of substances, including oil, grease and curing compounds, that might impair terrazzo bond. Provide clean, dry and neutral substrate for terrazzo application.
- B. Provide clean, dry, and neutral substrate for terrazzo application.
1. Determine dryness characteristics by performing moisture tests recommended by terrazzo manufacturer.
- C. Concrete Slabs:
1. Provide sound concrete surface free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil and other contaminants incompatible with epoxy terrazzo.
    - a. Prepare concrete mechanically by grinding.
      - 1) Surface preparation results should achieve a CSP3-CSP4 profile according to International Concrete Repair Institute Guideline No. 03732.

- b. Remove contaminating and bond breaking substances including but not limited to the following:
    - 1) Dust.
    - 2) Laitance.
    - 3) Curing compounds.
    - 4) Coatings.
    - 5) Sealers.
    - 6) Oil.
    - 7) Grease.
    - 8) Mastics.
    - 9) Adhesives.
  - c. Chemically remove oil and grease not removed by vacuum blasting.
  - d. Mechanically remove spalled and deteriorated concrete with scabbling or chipping hammers.
  - e. Do not acid etch concrete.
  - f. Repair or level damaged concrete with concrete patch and topping.
  - g. Do not use latex fills and self leveling underlayments.
  - h. Cracks and non-expansion joints greater than 1/16 inch wide after surface preparation shall be prepared until sound.
    - 1) Repair cracks and non-expansion joints according to NTMA Technical Bulletin #111.
- D. Protect other work from dust generated by grinding operations. Control dust to prevent air pollution and comply with environmental protection regulations.
- 1. Erect and maintain temporary enclosures and other suitable methods to limit dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.
- E. Protect other work from dust generated by grinding operations. Control dust to prevent air pollution and comply with environmental protection regulations.
- 1. Erect and maintain temporary enclosures and other suitable methods to limit dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.
- F. Apply one coat of moisture remediation system over concrete surface prepared to receive epoxy-resin terrazzo flooring according to manufacturer's written instructions.

### 3.4 INSTALLATION, EPOXY TERRAZZO

- A. General:
- 1. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type and accessory indicated unless more stringent requirements are specified within this section.
  - 2. Comply with written directions of product manufacturer.
  - 3. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control joint strips.
  - 4. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.

B. Full Membrane Application

1. Flexible Reinforcing Membrane:

- a. Prepare and prefill substrate cracks with concrete patch and topping material or with primer and allow to cure.
- b. Apply 25 mils of crack isolation membrane over prepared substrate to produce full substrate coverage in areas to receive terrazzo.
- c. Apply second coat of crack isolation membrane, 15 mils thick and install reinforcing fabric.
- d. Prepare membrane according to manufacturer's written instructions before applying primer.

2. Primer: Install primer if required by manufacturer over crack isolation membrane.

C. Crack Detailing Application

1. Primer: Apply epoxy primer evenly over entire prepared substrate, including cracks and non-expansion joints, at a rate of **200-250 square feet per gallon (5 - 6 sq. m per liter)**.

- a. Thoroughly wet surface with primer.
- b. Do not allow primer to pond.

D. Divider and Accessory Strips: Install in locations indicated in adhesive setting bed without voids below strips.

1. Anchoring Strips: Adhere the strips to the floor with primer or hot glue.

E. Control Joint Strips: Provide the following:

1. Back to Back Strips: Install L-type divider strips back to back over full membrane parallel to control and non-doweled construction joints leaving a space appropriate for anticipated movement - typically 1/4 to 3/8 inch according to NTMA Technical Bulletin #111, Detail #1.

- a. Fill gap between control joints with joint sealant.

F. Placing Terrazzo:

1. Mix terrazzo binder with chips and fillers in ratios as approved by manufacturer.  
2. Trowel-apply terrazzo mixture over epoxy primer to provide smooth seamless surface at a minimum of 3/8 inch thick.

- a. Allow terrazzo mixture to cure per manufacturer's recommendations prior to grinding operations.

G. Nosings for Cast Stair Treads and Landings: Install nosings in sizes and configurations indicated and in uninterrupted lengths necessary for an accurate fit with clear lacquer applied to concealed bottoms, sides, and edges of extruded units set into terrazzo.

H. Rough Grinding: Grind with 24 grit or finer stones or with comparable diamond plates.

I. Intermediate Grinding: Follow initial grind with 80 grit or finer stones .

J. Grouting: Prior to final grinding, apply epoxy grout as follows:

1. Cleanse floor with clean water and rinse thoroughly.
  2. Remove excess rinse water by wet vacuum and machine until completely dry.
  3. Apply epoxy grout to fill voids.
- K. Fine Grinding: Grind with 120 grit or finer stones until all grout is removed from surface.
1. Repeat rough grinding, grout coat, and fine grinding if large voids exist after initial fine grinding.
  2. Produce surface with a minimum of 70 percent aggregate exposure.
- L. Remove terrazzo in areas where terrazzo fails to bond properly to substrate and install new terrazzo.
1. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo.
- M. Construction Tolerances: Limit variation in terrazzo surface from level 1/4 inch in 10 feet.

### **3.5 INSTALLATION, PRECAST TERRAZZO**

- A. Set units using method recommended by NTMA and by epoxy terrazzo flooring manufacturer unless otherwise indicated.
- B. Set units with alignment level and true to dimensions, varying 1/8 inch maximum in length, height, or width.
1. Precast Units: Back-butter for full contact with substrate.
- C. Seal joints between units with joint sealants.

### **3.6 ADJUSTING**

- A. Cut out and replace terrazzo areas that evidence lack of bond with substrate. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Architect.

### **3.7 CLEANING**

- A. Cleaning:
1. Wash surfaces with cleaner according to NTMA's Maintenance Guide and manufacturer's written instructions.
  2. Remove grinding dust from installation and wash surfaces according to manufacturers recommended cleaning procedures.
  3. Allow surfaces to thoroughly dry before sealing.

### **3.8 PROTECTION**

- A. Protect surrounding substrates and surfaces, as well as in-place equipment from damage during surface preparation and system application.



- B. Maintain area where terrazzo work is being done be free of other trades during surface preparation, crack detailing, divider strip installation, terrazzo pouring, and for a period of 36 hours upon completion.
- C. Sealing:
  - 1. Seal surfaces according to NTMA's written recommendations.
  - 2. Apply terrazzo sealer according to sealer manufacturer's written instructions.
- D. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure terrazzo is without damage or deterioration at time of Substantial Completion.

**END OF SECTION**



**SECTION 09 68 13  
TILE CARPETING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Carpet tile, fully adhered.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied flooring.
- B. Section 09 05 61 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.
- C. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture and alkalinity testing and remediation procedures.

**1.03 REFERENCE STANDARDS**

- A. CRI (CIS) - Carpet Installation Standard; Carpet and Rug Institute; 2011.
- B. CRI (GLA) - Green Label Testing Program - Approved Adhesive Products; Carpet and Rug Institute; Current Edition.

**1.04 SUBMITTALS**

- A. See Section 01 33 00 for submittal procedures.
- B. Shop Drawings: Indicate layout of joints, direction of carpet pile, and location of edge moldings.
- C. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- E. Manufacturer's Installation Instructions: Indicate special procedures.
- F. Manufacturer's Qualification Statement.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- H. Maintenance Materials: Furnish the following for State of Mississippi's use in maintenance of project.
  - 1. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

**1.06 FIELD CONDITIONS**

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Tile Carpeting:
  - 1. As defined in drawings and specifications.
  - 2. Substitutions: See Section 01 63 00.

## **2.02 MATERIALS**

- A. Tile Carpeting: See Drawings and Finish Schedule for exact carpet manufacturer, style and color, manufactured in one color dye lot.
- B. Provide 5% extra materials of each product color.

## **2.03 ACCESSORIES**

- A. Subfloor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Edge Strips: Embossed aluminum, color as selected.
- C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.
- D. Adhesives: Acceptable to carpet tile manufacturer, compatible with materials being adhered; maximum VOC of 50 g/L; CRI Green Label certified; in lieu of labeled product, independent test report showing compliance is acceptable.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that subfloor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.
- B. Verify that subfloor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to subfloor surfaces.
- C. Cementitious Subfloor Surfaces: Verify that substrates are ready for flooring installation by testing for moisture and alkalinity (pH).
  - 1. Test in accordance with Section 09 05 61.
  - 2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.
  - 3. Follow moisture and alkalinity remediation procedures in Section 09 05 61.
- D. Verify that concrete sub-floor surfaces are dry enough and ready for flooring installation by testing for moisture emission rate and alkalinity in accordance with ASTM F710; obtain instructions if test results are not within limits recommended by carpet tile manufacturer and adhesive materials manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

### **3.02 PREPARATION**

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove subfloor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with subfloor filler.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- D. Vacuum clean substrate.

### **3.03 INSTALLATION**

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set aligned as indicated on shop drawings. See installation method for each type of carpet listed above.
- F. Fully adhere carpet tile to substrate.
- G. Trim carpet tile neatly at walls and around interruptions.
- H. Complete installation of edge strips, concealing exposed edges.

**3.04 CLEANING**

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

**END OF SECTION**



**SECTION 09 69 00**  
**ACCESS FLOORING**

**PART 1 - GENERAL**

**1.1 Section Includes**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Work of this section includes, but is not limited to: access floor panels, floor coverings, understructure and various electrical, data and communication accessories.

**1.2 Related Sections**

- A. Concrete sealer shall be compatible with pedestal adhesive, see Division 3.
- B. See Division 26 Section "Grounding and Bonding for Electrical Systems" for connection to ground of access flooring understructure. Note: The electrical engineer or contractor shall determine requirements for grounding and the electrical contractor shall provide the necessary labor and materials to electrically connect the access flooring to the building ground if it is required.

**1.3 Environmental Conditions for Storage and Installation**

- A. Area to receive and store access floor materials shall be enclosed and maintained at ambient temperatures between 35° to 95° F and relative humidity levels between 20 to 80%. All floor panels shall be stored at ambient temperatures between 50° to 90° F for at least 24 hours before installation begins. All areas of installation shall be enclosed and maintained at ambient temperature between 50° to 90° F and at relative humidity levels between 20% to 80% and shall remain within these environmental limits throughout occupancy.

**1.4 References**

- A. CISCA (Ceilings & Interior Systems Construction Association) - "Recommended Test Procedures for Access Floors" shall be used as a guideline when presenting load performance product information.

**1.5 Performance Certification**

- A. Product tests shall be witnessed and certified by independent engineering and testing laboratory based in the U.S. with a minimum of five years experience testing access floor components in accordance CISCA "Recommended Test Procedures for Access Floors".

**1.6 Country-of-Origin and Product Marking**

- A. Access floor materials shall comply with the provisions outlined in FAR Subpart 25.2 – Buy American Act – Construction Materials.
- B. Floor panels shall be permanently marked with manufacturer's name, product identification and logo, manufacturing date and country-of-origin. Removable Product ID stickers are not acceptable.

**1.7 Performance Requirements**

- A. **Design Load:** Panel supported on actual understructure (the system) shall be capable of supporting a safe working load or design load of 1250 lbs. This rating signifies that the system will withstand not only a concentrated load placed on a one square inch area at any location on the panel without yielding but also demonstrate the ability to withstand an overload capacity of two times its rating (i.e. a safety factor of 2). (For a detailed description of this important criterion, refer to the Design Load bulletin at <http://www.tateinc.com/> and click on Technical Resources/Whitepapers)

- B. **Safety Factor:** Panel supported on actual understructure (the system) shall be capable of withstanding a minimum of (2) two times the design load anywhere on the panel without failure. Failure is defined as the point at which the system will no longer accept the load.
- C. **Rolling Load:** Panel supported on actual understructure (the system) shall be able to withstand the following rolling loads at any location on the panel without developing a local and overall surface deformation greater than 0.040 inches. Note: wheel 1 and wheel 2 tests shall be performed on two separate panels.  

Wheel 1:	Size: 3" dia x 1 13/16" wide	Load: 1125 lbs.	Passes: 10
Wheel 2:	Size: 6" dia x 2" wide	Load: 800 lbs.	Passes: 10,000
- D. **Impact Load:** Panel supported on actual understructure (the system) shall be capable of supporting an impact load of 150 lbs. dropped from a height of 36 inches onto a one square inch area (using a round or square indenter) at any location on the panel.
- E. **Panel Drop Test:** Panel shall be capable of being dropped face up onto to a concrete slab from a height of 36", after which it shall continue to meet all load performance requirements as previously defined.
- F. **Panel Cutout:** Panel shall not receive cutouts, substitute standard ConCore® 1250 in any areas of requirement.
- G. **Recycled Content:** Panel shall be required to have a minimum recycled content of 41%
- H. **Axial Load:** Pedestal support assembly shall provide a minimum 5000 lb. axial load without permanent deformation.
- I. **Overtopping Moment:** Pedestal support assembly shall provide an average overturning moment of 1000 in-lbs. when glued to a clean, sound, uncoated concrete surface. ICBO number for the specific system or structural calculations shall be required attesting to the lateral stability of the system under seismic conditions.
- J. **Energy Capacity:** Panel shall contain 2.3 lbs (1.04 kg) of micro encapsulated phase change material with a core material that shall melt at a specified temperature of 75.2°F (24°C) and absorb up to 141 Btu (148.8 kJ) of thermal energy.
- K. **Phase Change Material:** Phase change material shall be micro encapsulated and comprised of a polymer shell and vegetable based bio degradable core thoroughly mixed into the cementitious fill material.

1.8 **Design Requirements:**

- A. Access floor system, where indicated on the design documents, shall consist of modular and removable fully encased cementitious filled welded steel panels fastened onto, and supported by, adjustable height pedestal assemblies. Pedestal head and panel corner design must provide a positive location and lateral engagement of the panel to the understructure support system without the use of fasteners.
- B. Panel shall be easily removed by one person with a suction cup lifting device and shall be interchangeable.
- C. Panel shall be located in areas with daily changes in thermal loading such as the perimeter of the building adjacent to the façade.
- D. Quantities, finished floor heights (FFH) and location of accessories shall be as specified on the contract drawings.

1.9 **Submittals for Review**

- A. Detail sheets, for each proposed product type, which provide the necessary information to describe the product and its performance.



- B. Test reports, certified by an independent testing laboratory with a minimum of five years experience testing access floor components in accordance CISCA Recommended Test Procedures, certifying that component parts perform as specified.

### 1.10 Submittals for Information

- A. Manufacturer's installation instructions and guidelines.
- B. Manufacturer's Owner Manual outlining recommended care and maintenance procedures.

## PART 2 - PRODUCTS

### 2.1 Manufacturers

- A. Access floor system shall be as manufactured by Tate Access Floors, Inc. and shall consist of the ConCore® 1250 access floor panels supported by PosiLock understructure system.
- B. Alternative products shall meet or exceed all requirements as indicated herein and must receive prior written approval by the architect or designer.
- C. Access floor manufacture shall be ISO9001:2000 certified demonstrating it has a robust and well documented quality management system with continual improvement goals and strategies.
- D. Access floor manufacturer's facilities shall be ISO14001:2004 certified demonstrating that they maintain an environmental management system.

### 2.2 Support Components

#### Pedestals:

- A. Pedestal assemblies shall be corrosive resistant, all steel welded construction, and shall provide an adjustment range of +/- 1" for finished floor heights 6" or greater.
- B. Pedestal assemblies shall provide a means of leveling and locking the assembly at a selected height, which requires deliberate action to change height setting and prevents vibration displacement.
- C. Pedestal head shall be designed with locating tabs and integral shape to interface with the panel for positive lateral retention and positioning without fasteners. Note: This allows the floor to be installed during the construction process without screws so that access by other related trades can be accomplished quickly and easily. It also enables the user to have a mixed installation of fastened and unfastened panels within the same installation.
- D. Hot dip galvanized steel pedestal head shall be welded to a threaded rod which includes a specially designed adjusting nut. The nut shall provide location lugs to engage the pedestal base assembly, such that deliberate action is required to change the height setting.
- E. Threaded rod shall provide a specially designed anti-rotation device, such that when the head assembly is engaged in the base assembly, the head cannot freely rotate (for FFH of 6" or greater). Note: This prevents the assembly from inadvertently losing its leveling adjustment when panels are removed from the installation during use.
- F. Hot dip galvanized pedestal base assembly shall consist of a formed steel plate with no less than 16 inches of bearing area, welded to a 7/8" square steel tube and shall be designed to engage the head assembly.

### 2.3 Panel Components

#### Floor Panels:

- A. Panels shall consist of a top steel sheet welded to a formed steel bottom pan filled internally with a cementitious material fill. Mechanical or adhesive methods for attachment of the steel top and bottom sheets are unacceptable.

- B. Cementitious fill material shall be totally encased within the steel welded shell.
- C. Cementitious fill material shall contain micro encapsulated phase change material with a core vegetable based material designed to melt at 75.2°F (24°C).
- D. Panel shall have an electrically conductive epoxy paint finish.
- E. Corner of panel shall have a locating tab and integral shape design to interface with the pedestal head for positive lateral retention and positioning with or without fasteners.
- F. Fastening of panels to pedestal heads shall be accomplished by the use of a machine screw which is specially designed to be self capturing within the body of the panel. Note: This prevents the inadvertent loss of panel fastening screws when accessing the underfloor space and potential damage to objects by screws which extend beyond the depth of the panel.
- G. Fit between the pedestal head, panel, and screw shall enable an installation with an average panel to panel gap of 0.015".

#### 2.4 **Accessories**

- A. Provide 10 spare floor panels and 40 square feet of understructure systems for each type used in the project for maintenance stock. Deliver to project in manufacturer's standard packaging clearly marked with the contents.
- B. Provide 2 panel lifting devices.

#### 2.5 **Finishes**

- A. Finish the surface of floor panels with floor covering material as indicated on the contract drawings. Where floor coverings are by the access floor manufacturer, the type, color and pattern shall be selected from manufacturer's standard.

#### 2.6 **Fabrication Tolerances**

- A. Floor panel flatness measured on a diagonal: +/- 0.035"
- B. Floor panel flatness measured along edges: +/- 0.025"
- C. Floor panel width or length of required size: +/- 0.010"
- D. Floor panel squareness tolerance: +/- 0.015"

### **PART 3 - EXECUTION**

#### 3.1 **Preparation**

- A. Examine structural subfloor for unevenness, irregularities and dampness that would affect the quality and execution of the work. Do not proceed with installation until structural floor surfaces are level, clean, and dry as completed by others.
- B. Concrete sealers, if used, shall be identified and proven to be compatible with pedestal adhesive. Verify that adhesive achieves bond to slab before commencing work.
- C. Verify dimensions on contract drawings, including level of interfaces including abutting floor, ledges and doorsills.
- D. The General Contractor shall provide clear access, dry subfloor area free of construction debris and other trades throughout installation of access floor system.
- E. Area to receive and store access floor materials shall be enclosed and maintained at ambient temperatures between 35° to 95° F and relative humidity levels between 20 to 80%. At least 24 hrs. before installation begins, all floor panels shall be stored at ambient temperatures between 50° to 90° F

and relative humidity levels between 20% to 80% and shall remain within these environmental limits throughout occupancy.

### 3.2 Installation

- A. Pedestal locations shall be established from approved shop drawings so that mechanical and electrical work can be installed without interfering with pedestal installation.
- B. Installation of access floor shall be coordinated with other trades to maintain the integrity of the installed system. All traffic on access floor shall be controlled by access floor installer. No traffic but that of access floor installers shall be permitted on any floor area for 24 hours to allow the pedestal adhesive to set. Access floor panels shall not be removed by other trades for 72 hours after their installation.
- C. Floor system and accessories shall be installed under the supervision of the manufacturer's authorized representative and according to manufacturer's recommendations.
- D. No dust or debris producing operations by other trades shall be allowed in areas where access floor is being installed to ensure proper bonding of pedestals to subfloor.
- E. Access floor installer shall keep the subfloor broom clean as installation progresses.
- F. Partially complete floors shall be braced against shifting to maintain the integrity of the installed system where required.
- G. Additional pedestals as needed shall support panels where floor is disrupted by columns, walls, and perimeter cutouts.
- H. Understructure shall be aligned such that all uncut panels are interchangeable and fit snugly but do not bind when placed in alternate positions.
- I. Finished floor shall be level, not varying more than 0.062" in 10 feet or 0.125" overall.
- J. Inspect system prior to application of floor covering and replace any floor panels that are cracked, broken and structurally damaged and do not comply with specified requirements.
- K. Installed panels shall be straight and square and spaced so that the distance from one end to the other of any line of 12 panels is not less than 24 feet and does not exceed 24' 1/8".
- L. Location requiring cutout or partially cut panel shall be replaced with Standard ConCore® Panel prior to installation.
- M. Acceptance: General contractor shall accept floor in whole or in part prior to allowing use by other trades.

**END OF SECTION**



## SECTION 09 84 53

### SOUND BARRIER MULLION TRIM CAP

#### PART 1 - GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.02 SUMMARY

- A. Section includes sound barrier mullion trim caps providing sound transmission control at storefront systems and curtain wall systems.
- B. Related Requirements:
  - 1. Section 04 23 00 "Glass Unit Masonry" for glass block installations.
  - 2. Section 07 92 05 "Joint Sealers" for joint sealing.
  - 3. Section 08 44 13 "Glazed Aluminum Curtain Wall" for curtain wall construction.
  - 4. Section 09 21 16 "Gypsum Board Assemblies" for interior wall construction.

##### 1.03 ACTION SUBMITTALS

- A. Product Data:
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for sound barrier wall end cap system.
- B. Shop Drawings:
  - 1. Include typical dimensioned cross-section(s) at the location where drywall partition and/or glass masonry partitions terminates at the perimeter storefront or curtain wall, indicating:
    - a. Dimensions
    - b. Finish
- C. Samples: For each exposed product and for each color and texture specified.
  - 1. Size: 6-inch (152 mm) sound barrier mullion trim cap sample and 2" x3-1/2" (51 mm x 89 mm) custom color paint sample.

##### 1.04 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

- B. Product Test Reports: For each sound barrier mullion trim cap assembly, for ASTM E 90 tests performed by a qualified third-party testing agency.

### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of aluminum extrusions and anodizing shall be ISO-9001 certified.
- B. Installer Qualifications: An entity that employs installers and supervisors who are approved by manufacturer.
- C. Testing Agency Qualifications: ASTM E 90 testing to be performed by laboratory accredited by IAS as complying with ISO/IEC Standard 17025.

### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver sound barrier mullion trim caps until spaces to receive them are clean, dry, and ready for their installation.
- B. Store sound barrier mullion trim caps in original undamaged packaging inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

### 1.07 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace sound barrier mullion trim caps that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Ten years limited warranty from date of Substantial Completion.
  - 2. Limited warranty does not cover adjacent products or improper installation.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide the following:
  - 1. MULL-it-OVER Products; Sound barrier mullion trim cap systems.
    - a. Tel: (616) 730-2162
    - b. url: [www.mullitoverproducts.com](http://www.mullitoverproducts.com)
  - 2. Substitutions: See Section 01 60 00 – Product Requirements.

### 2.02 SYSTEM DESCRIPTION

- A. General: Provide sound barrier mullion trim caps of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.

1. Furnish units in lengths of sufficient additional length to allow for field trimming to required length to match variations in construction tolerances of adjacent systems.

## **2.03 PERFORMANCE REQUIREMENTS**

### A. Sound Transmission:

1. Single Sided Installations: STC 50 or higher.
2. Double-Sided Installations: STC 55 or higher.

### B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Mullion trim cap to be sized to accommodate thermal movement.

## **2.04 SOUND BARRIER MULLION TRIM CAP**

### A. Sound Barrier Mullion Trim Cap:

1. Products: MULL-it-OVER Products; Mullion Trim Cap.

### B. Profile: 55 Classic Mullion Trim Cap or 55 Wide Mullion Trim Cap as shown in the drawings.

## **2.05 COMPONENTS**

### A. Aluminum Extrusions:

1. Thickness: 0.125 inches.
2. Profile: As selected and approved by Architect to allow solid attachment and fastening to the partition wall framing.

### B. Sound Absorbing Foam:

1. Resistant to smoke, flame, and microbial growth.
2. Fire Rating: ASTM E 84 Class 1.
3. Fungi Resistance: Zero rating per ASTM G 21.

### C. Compressible Foam: Between edge of extrusion and interior face of curtain wall glass.

1. Thickness: Standard 1/2 inch (12.7 mm), or 1 inch (25.4 mm) to accommodate a larger mullion deflection.
2. Color: Light gray or Charcoal as selected by Architect.

### D. Fasteners:

1. Self-Tapping or appropriate threaded fastener.
2. Compatible with all materials fasteners will contact with and not causing galvanic corrosion.

### E. Snap Cover: Snap-on fastener cover.

- F. Acoustical Sound Sealant: Acrylic latex based.

## 2.06 ACCESSORIES

- A. Provide necessary and related parts and tools to complete installation.

## 2.07 FABRICATION

- A. Extrusions and generic profiles to be shipped in custom lengths as required to meet project requirements or shipped in standard incremental foot lengths and cut to exact length on jobsite.

## 2.08 FINISHES

- A. Exposed surfaces of exposed aluminum extrusion:
  - 1. Standard Finish: Supplied in clear anodized finish.
  - 2. Custom Finish: Custom anodized finishes and painted finishes available upon request.
- B. Finishes:
  - 1. Aluminum - clear anodize when connecting to clear anodized aluminum frames:
    - a. Clear anodized finish in accordance with AA-M10 C22 A41 Class I (0.7 to 1.0 thick anodic coating)
  - 2. Aluminum - color anodize when connecting to color anodized frames or painted when connecting to painted aluminum frames:
    - a. Color Choice with matte or bright finish. Select from manufacturer's custom color offering.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine walls and adjacent curtain wall for suitable conditions where sound barrier wall end cap will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

- A. Measure and cut sound barrier wall end cap to proper lengths.
- B. Notch around horizontal mullions, sills, or other obstructions leaving appropriate gap for differential movement between the sound barrier wall end cap and the obstruction.



- C. Apply continuous bead of acoustical sealant to the unexposed side of extruded aluminum surface that will be in contact with the drywall edge.
- D. Place sound barrier wall end cap on the vertical surface of the drywall partition wall and loosely install fasteners in the top and bottom slotted holes of the wall end cap.
- E. Plumb the wall end cap leaving recommended gap spacing between the interior glass surface and the wall end cap. Foam gasket to be in contact with glass.
- F. Tighten top and bottom fasteners to secure end cap.
- G. Install additional fasteners at 12 inches on center, minimum.
- H. Install snap cover to conceal fasteners.
- I. Apply color matched sealant at joints of dissimilar materials as desired.

### **3.03 CLEANING**

- A. After work is complete in adjacent areas, clean exposed surfaces with suitable cleaner that will not harm or attack the finish.

### **3.04 PROTECTION**

- A. Protect sound barrier wall end caps from damage during installation, general construction activities, and until turnover of structure.

**END OF SECTION**



**SECTION 09 91 13  
EXTERIOR PAINTING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints, stains, and varnishes.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
- D. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
  - 5. Non-metallic roofing and flashing.
  - 6. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
  - 7. Marble, granite, slate, and other natural stones.
  - 8. Floors, unless specifically indicated.
  - 9. Ceramic and other types of tiles.
  - 10. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco.
  - 11. Glass.
  - 12. Concealed pipes, ducts, and conduits.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 50 00 - METAL FABRICATIONS: Shop-primed items.
- B. Section 09 91 23 - Interior Painting.

**1.03 DEFINITIONS**

- A. Conform to ASTM D16 for interpretation of terms used in this section.

**1.04 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2012.
- C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2012).
- D. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.
- E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; current edition, [www.paintinfo.com](http://www.paintinfo.com).
- F. SSPC-SP 1 - Solvent Cleaning; 2015.
- G. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).
- H. SSPC-SP 6 - Commercial Blast Cleaning; Society for Protective Coatings; 2007.
- I. SSPC-SP 13 - Surface Preparation of Concrete; Society for Protective Coatings; 2003 (Reaffirmed 2015).

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. MPI product number (e.g. MPI #47).
  - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
  - 4. Manufacturer's installation instructions.
  - 5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C. Samples: Submit One paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.
  - 2. Where sheen is not specified, discuss sheen options with The Architect and Owner before preparing samples, to eliminate sheens definitely not required.
  - 3. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, siding, factory finished metals, and wood doors, have been approved.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Maintenance Materials: Furnish the following for The Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
  - 3. Label each container with color in addition to the manufacturer's label.
  - 4. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum Five years' experience and approved by manufacturer.

#### **1.07 MOCK-UP**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
- B. Provide panel, 8 feet long by 8 feet wide, illustrating paint color, texture, and finish.
- C. Locate where directed by Architect.
- D. Mock-up may remain as part of the work.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

## 1.09 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for exterior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
  - 1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by the Architect and Owner is obtained using the specified procedures for substitutions.
- B. Paints:
  - 1. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
- C. Transparent Finishes:
  - 1. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
- D. Stains:
  - 1. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
- E. Primer Sealers: Same manufacturer as top coats.
- F. Substitutions: See Section 01 60 00 - Product Requirements.

### 2.02 PAINTS AND FINISHES – GENERAL

- A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
  - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
  - 3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
  - 4. Supply each paint material in quantity required to complete entire project's work from a single production run.
  - 5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
  - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
    - b. Architectural coatings VOC limits of State in which the project is located.
  - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by the Architect and Owner from the manufacturer's full line.
- E. Colors: To be selected from manufacturer's full range of available colors.
  - 1. Selection to be made by the Architect and Owner after award of contract.
  - 2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to The Owner.
  - 3. Extend colors to surface edges; colors may change at any edge as directed by The Architect and Owner.

**2.03 PAINT SYSTEMS – EXTERIOR: NOTE, ALL PAINT CONDITIONS ARE SHOWN FOR QUALITY, REFER TO DRAWINGS FOR QUANTITY OF EACH PAINT CONDITION REQUIRED IN THIS PROJECT. SOME PAINT TYPES MAY NOT BE REQUIRED IF CONDITION REQUIRING PAINT TYPE DOES NOT EXIST IN DRAWINGS.**

- A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry units, brick, cement board, primed wood, and primed metal.
  - 1. Two top coats and one coat primer.
  - 2. Top Coat(s): Exterior Latex.
    - a. Products:
      - 1) A-100 Exterior Latex (A6,A82,A8) Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  - 3. Top Coat(s): Exterior Light Industrial Coating, Water Based.
    - a. Products:
      - 1) Pro Industrial Acrylic (B66-600,650,660) Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  - 4. Top Coat(s): Exterior Alkyd Enamel.
    - a. Products:
      - 1) Pro Industrial Urethane Alkyd Enamel (b54-150) Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  - 5. Top Coat(s): Exterior Pigmented Elastomeric, Water Based.
    - a. Products:
      - 1) ConFlex XL High Build Coating (CF11-50) Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  - 6. Top Coat(s): Textured Latex Coating.
    - a. Products:
      - 1) UltraCrete Texture Coating (CF12-800) Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  - 7. Top Coat(s): Siloxane Water Repellent.
    - a. Products:
      - 1) Loxon 7% Siloxane Water Repellant (CF31T7)
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  - 8. Top Coat(s): Aluminum Paint, Solvent Based.
    - a. Products:
      - 1) Silver-Brite Aluminum (B59S11)
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  - 9. Top Coat(s): Hi Build Acrylic Coating
    - a. Products:
      - 1) Loxon XP Masonry Coating, (LX11, LX21) Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  - 10. Top Coat(s): Self Cleaning Acrylic Coating
    - a. Products:
      - 1) Loxon Self Cleaning Acrylic Coating, (LX13, LX14) Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.

11. Top Coat(s): WaterBased Alkyd Urethane (B53-1050, B53-1150, B53-1250)Series
  - a. Products:
    - 1) S-W Pro Industrial WaterBased Alkyd Urethane.
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
12. Primer: As recommended by top coat manufacturer for specific substrate.
- B. Paint E-OP-FL - Concrete Floors and Wood Decks to be Painted.
  1. Two top coats and one coat primer.
  2. Top Coat(s): High Build Acrylic Deck and Floor Coating.
    - a. Products:
      - 1) SuperDeck Exterior Deck & Dock Elastomeric Coating (SD9) Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  3. Top Coat(s): Latex Floor Paint, Low Gloss.
    - a. Products:
      - 1) Porch & Floor Enamel Int/Ext Acrylic Satin (A32-200) Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  4. Top Coat(s): Latex Floor Paint, Gloss.
    - a. Products:
      - 1) ArmorSeal TreadPlex Water Based Coating (B90) Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  5. Primer: As recommended by top coat manufacturer for specific substrate.
- C. Paint E-TR-W - Stain on Wood:
  1. Two coats stain.
  2. Stain: Exterior Solid Stain for Wood, Water Based.
    - a. Products:
      - 1) SuperDeck Exterior Waterborne Solid Color Stain (SD7) Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  3. Stain: Exterior Semi-Transparent Stain for Wood, Water Based.
    - a. Products:
      - 1) SuperDeck Exterior Waterborne Semi-Transparent Stain (SD3T215)
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
- D. Paint E-TR-C - Transparent Finish on Concrete Floors:
  1. 1 coat stain.
  2. Stain: Semi-Transparent Stain for Concrete Floors.
    - a. Products:
      - 1) H&C Infusion Water-Based Semi-Transparent Decorative Stain
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  3. Stain: Solid Color Stain for Concrete.
    - a. Products:
      - 1) H&C Colortop Solid Color Stain, Water Based
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  4. Sealer: Water Based for Concrete Floors.
    - a. Products:
      - 1) H&Concrete Clarishield Sealer Wet Look Water-Based
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
- E. Paint WE-OP-3L - Wood, Opaque, Latex, 3 Coat:
  1. One coat of latex primer sealer.
  2. Gloss: Two coats of latex enamel; A-100 Exterior Latex Gloss (A8 Series)
  3. Satin: Two coats of latex enamel; A-100 Exterior Latex Satin (A82 Series)
- F. Paint WE-TR-V - Wood, Transparent, Varnish, No Stain:
  1. One coat sealer; .
  2. Gloss: One coat of varnish; .
  3. Satin: One coat of varnish.

4. Flat: One coat of varnish.
- G. Paint WE-TR-VS - Wood, Transparent, Varnish, Stain:
  1. One coat of stain.
  2. One coat sealer.
  3. Gloss: One coat of varnish.
  4. Satin: One coat of varnish.
- H. Paint WE-TR-S - Wood, Transparent, Sealer, Optional Stain:
  1. One coat of stain.
  2. One coat of clear sealer.
- I. Paint CE-OP-3L - Masonry/Concrete, Opaque, Latex, 3 Coat:
  1. One coat of block filler; Pro Industrial Block Filler, (B42W150).
  2. Satin: Two coats of latex enamel; A-100 Exterior Latex Satin (A82 Series)
  3. Flat: Two coats of latex enamel; A-100 Exterior Latex Flat (A6 Series)
- J. Paint GE-OP-3L - Exterior Gypsum Board and Exterior Plaster, Opaque, Latex, 3 Coat:
  1. One coat of latex primer sealer; ProBlock Latex Int/Ext Primer/Sealer, (B51 Series).
  2. Flat: Two coats of latex; A-100 Exterior Latex Flat (A6 Series)
- K. Paint ME-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
  1. One coat of latex primer; Pro Industrial ProCryl Universal Acrylic Metal Primer, (B66-300).
  2. Gloss: Two coats of latex enamel; Pro Industrial Acrylic Gloss (B66-600 Series)
  3. Semi-gloss: Two coats of latex enamel; Pro Industrial Acrylic S/G (B66-650 Series)
- L. Paint MgE-OP-3L - Galvanized Metals, Latex, 3 Coat:
  1. One coat galvanize primer; Pro Industrial ProCryl Universal Acrylic Metal Primer, (B66-300).
  2. Gloss: Two coats of latex enamel; Pro Industrial Acrylic Gloss (B66-600 Series)
  3. Semi-gloss: Two coats of latex enamel; Pro Industrial Acrylic S/G (B66-650 Series)
- M. Paint MaE-OP-3A - Aluminum and Copper, Unprimed, Alkyd, 3 Coat:
  1. One coat etching primer; DTM Wash Primer, (B71Y1).
  2. Gloss: Two coats of alkyd enamel; Pro Industrial Urethane Alkyd Enamel (B54-150 Series)
  3. Semi-gloss: Two coats of alkyd enamel; DTM Alkyd S/G (B55 Series)

## 2.04 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
  1. Alkali Resistant Water Based Primer.
    - a. Products:
      - 1) Loxon Masonry Primer (LX2W50)
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  2. Interior/Exterior Latex Block Filler.
    - a. Products:
      - 1) Loxon Block Surfacer (LX1W200)
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  3. Anti-Corrosive Alkyd Primer for Metal.
    - a. Products:
      - 1) Kem Kromik Universal Metal Primer (B50Z Series)
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  4. Interior/Exterior Quick Dry Alkyd Primer for Metal.
    - a. Products:
      - 1) Kem Bond HS Universal Metal Primer (B50Z Series)
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  5. Alkyd Primer for Galvanized Metal.
    - a. Products:



- 1) Galvite Primer (B50WZ30)
- 2) Substitutions: Section 01 60 00 - Product Requirements.
6. Water Based Primer for Galvanized Metal.
  - a. Products:
    - 1) Pro Industrial Pro-Cryl Universal Acrylic Primer (B66-310 Series)
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
7. Rust-Inhibitive Water Based Primer.
  - a. Products:
    - 1) Pro Industrial Pro-Cryl Universal Acrylic Primer (B66-310 Series)
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
8. Interior/Exterior Quick Dry Primer for Aluminum.
  - a. Products:
    - 1) Pro Industrial Pro-Cryl Universal Acrylic Primer (B66-310 Series)
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
9. Stain Blocking Primer.
  - a. Products:
    - 1) PrepRite ProBlock Primer/Sealer Latex (B51-620 Series)
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
10. Latex Primer for Exterior Wood.
  - a. Products:
    - 1) Exterior Latex Wood Primer (B42W8041)
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
11. Alkyd/Oil Primer for Exterior Wood.
  - a. Products:
    - 1) Exterior Oil-Based Wood Primer (Y24W8020)
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
12. Bonding Primer, Water Based.
  - a. Products:
    - 1) PrepRite ProBlock Primer/Sealer Latex (B51-620 Series)
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
13. Acrylic Surface Conditioner; Masonry.
  - a. Products:
    - 1) Loxon Conditioner (LX3 Series)
    - 2) Substitutions: Section 01 60 00 - Product Requirements.

## 2.05 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- C. If substrate preparation is the responsibility of another installer, notify The Architect and Owner of unsatisfactory preparation before proceeding.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  1. Exterior Plaster and Stucco: 12 percent.

2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
3. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
4. Concrete Floors and Traffic Surfaces: 8 percent.

### 3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Concrete:
  1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
  2. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi at 6 to 12 inches. Allow to dry.
  3. Clean concrete according to ASTM D4258. Allow to dry.
  4. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
- H. Masonry:
  1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
  2. Prepare surface as recommended by top coat manufacturer.
  3. Clean surfaces with pressurized water. Use pressure range of 600 to 1500 psi at 6 to 12 inches. Allow to dry.
- I. Exterior Gypsum Board: Fill minor defects with exterior filler compound. Spot prime defects after repair.
- J. Exterior Plaster: Fill hairline cracks, small holes, and imperfections with exterior patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- K. Asphalt, Creosote, or Bituminous Surfaces: Remove foreign particles to permit adhesion of finishing materials. Apply latex based sealer or primer.
- L. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- M. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- N. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- O. Galvanized Surfaces:
  1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
  2. Prepare surface according to SSPC-SP 2.
- P. Ferrous Metal:
  1. Solvent clean according to SSPC-SP1.
  2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- Q. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.
- R. Exterior Wood to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied. Prime concealed surfaces.
- S. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### **3.03 APPLICATION**

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.
- C. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- D. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- E. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- F. Apply each coat to uniform appearance.
- G. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.
- H. Sand wood and metal surfaces lightly between coats to achieve required finish.
- I. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- J. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- K. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

### **3.05 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

### **3.06 PROTECTION**

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

**END OF SECTION**



**SECTION 09 91 23  
INTERIOR PAINTING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints, stains, and varnishes.
- C. Materials for backpriming woodwork.
- D. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
  - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
  - 2. Elevator pit ladders.
  - 3. Surfaces inside cabinets.
  - 4. Prime surfaces to receive wall coverings.
  - 5. Mechanical and Electrical:
    - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
    - b. In finished areas, paint shop-primed items.
- E. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
  - 5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
  - 6. Marble, granite, slate, and other natural stones.
  - 7. Floors, unless specifically indicated.
  - 8. Ceramic and other tiles.
  - 9. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
  - 10. Glass.
  - 11. Acoustical materials, unless specifically indicated.
  - 12. Concealed pipes, ducts, and conduits.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 50 00 - METAL FABRICATIONS: Shop-primed items.
- B. Section 09 91 13 - Exterior Painting.

**1.03 DEFINITIONS**

- A. Conform to ASTM D16 for interpretation of terms used in this section.

**1.04 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2012.
- C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2012).
- D. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

- E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; current edition, [www.paintinfo.com](http://www.paintinfo.com).
- F. SSPC-SP 1 - Solvent Cleaning; 2015.
- G. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).
- H. SSPC-SP 6 - Commercial Blast Cleaning; Society for Protective Coatings; 2007.
- I. SSPC-SP 13 - Surface Preparation of Concrete; Society for Protective Coatings; 2003 (Reaffirmed 2015).

### 1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. MPI product number (e.g. MPI #47).
  - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
  - 4. Manufacturer's installation instructions.
  - 5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C. Samples: Submit One paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.
  - 2. Where sheen is not specified, discuss sheen options with The Architect and Owner before preparing samples, to eliminate sheens definitely not required.
  - 3. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, factory finished metals, wood cabinets, and wood doors, have been approved.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.
- G. Maintenance Materials: Furnish the following for The Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
  - 3. Label each container with color in addition to the manufacturer's label.
  - 4. Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual, such as Sherwin-Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used

### 1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum Five years' experience and approved by manufacturer.

### **1.07 MOCK-UP**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
- B. Provide panel, 8 feet long by 8 feet wide, illustrating paint color, texture, and finish.
- C. Locate where directed by Architect.
- D. Mock-up may remain as part of the work.

### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

### **1.09 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior, unless required otherwise by manufacturer's instructions.
- F. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
  - 1. In the event that a single manufacturer cannot provide specified products, minor exceptions will be permitted provided approval by The Architect and Owner is obtained using the specified procedures for substitutions.
- B. Paints:
  - 1. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
- C. Transparent Finishes:
  - 1. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
- D. Stains:
  - 1. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
- E. Primer Sealers: Same manufacturer as top coats.
- F. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 PAINTS AND FINISHES – GENERAL**

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
  - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

3. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
  4. Supply each paint material in quantity required to complete entire project's work from a single production run.
  5. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
    - b. Architectural coatings VOC limits of State in which the project is located.
  2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Flammability: Comply with applicable code for surface burning characteristics.
- D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by The Architect and Owner from the manufacturer's full line.
- E. Colors: To be selected from manufacturer's full range of available colors.
1. Selection to be made by The Architect and Owner after award of contract.
  2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to The Owner.
  3. Extend colors to surface edges; colors may change at any edge as directed by The Architect and Owner.
  4. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.
  5. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the color coding scheme indicated.

**2.03 PAINT SYSTEMS – INTERIOR: NOTE, ALL PAINT CONDITIONS ARE SHOWN FOR QUALITY, REFER TO DRAWINGS FOR QUANTITY OF EACH PAINT CONDITION REQUIRED IN THIS PROJECT. SOME PAINT TYPES MAY NOT BE REQUIRED IF CONDITION REQUIRING PAINT TYPE DOES NOT EXIST IN DRAWINGS.**

- A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry units, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel, and aluminum.
1. Two top coats and one coat primer.
  2. Top Coat(s): High Performance Architectural Interior Latex. (Epoxy)(High Traffic Areas)
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Eg-Shel, K45-1150 Series. (MPI #139)
      - 2) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss, K46-1150 Series. (MPI #141)
      - 3) Substitutions: Section 01 60 00 - Product Requirements.
  3. Top Coat(s): Interior Latex. (Normal Conditions)
    - a. Products:
      - 1) Sherwin-Williams Harmony Interior Acrylic Latex, Flat, B5-1050 Series. (MPI #53)
      - 2) Sherwin-Williams Harmony Interior Acrylic Latex, Semi-Gloss, B10-1050 Series. (MPI #54)
      - 3) Sherwin-Williams Harmony Interior Acrylic Latex, Eg-Shel, B9-1050 Series. (MPI #44)
      - 4) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Flat, B30-2650 Series.



- 5) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Semi-Gloss, B31-2650 series. (MPI #43)
- 6) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Low Sheen, B24-2650 Series. (MPI #44)
- 7) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, Eg-Shel, B20-2650 Series. (MPI #52)
- 8) Substitutions: Section 01 60 00 - Product Requirements.
4. Top Coat(s) Latex Microbicial topcoat
  - a. Products:
    - 1) Sherwin Williams Paint Shield Microbicial Interior Latex Paint, D12-50 Series.
5. Top Coat Sheen:
  - a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
  - b. Velvet: MPI gloss level 2; use this sheen at all locations.
  - c. Eggshell: MPI gloss level 3; use this sheen at all locations.
  - d. Satin: MPI gloss level 4; use this sheen for items subject to frequent touching by occupants, including door frames and railings.
  - e. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
  - f. Gloss: MPI gloss level 6; use this sheen at all locations.
6. Primer: As recommended by top coat manufacturer for specific substrate.
- B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals and wood:
  1. Medium duty applications include doors, door frames, railings, handrails, guardrails, and balustrades.
  2. Two top coats and one coat primer.
  3. Top Coat(s): Interior Epoxy-Modified Latex. (High Performance Upgrade)
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Waterbased Catalyzed Epoxy, Gloss. (MPI #115)
      - 2) Sherwin-Williams Waterbased Catalyzed Epoxy, B73-360 Series EgshelSemi-Gloss.
      - 3) Sherwin-Williams Waterbased Catalyzed Epoxy, B73-300 Series Gloss.
      - 4) Substitutions: Section 01 60 00 - Product Requirements.
  4. Top Coat(s): High Performance Architectural Interior Latex. (Epoxy)(High Traffic Areas)
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Eg-Shel, K45-1150 Sereis. (MPI #139)
      - 2) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, Semi-Gloss, K46-1150 Series. (MPI #141)
      - 3) Substitutions: Section 01 60 00 - Product Requirements.
  5. Top Coat(s): Interior Light Industrial Coating, Water Based. (Normal Conditions)
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Acrylic Coating, Semi-Gloss, B66-650 Series. (MPI #153)
      - 2) Sherwin-Williams Pro Industrial Acrylic Coating, Gloss, B66-600 Series. (MPI #154)
      - 3) Substitutions: Section 01 60 00 - Product Requirements.
  6. Top Coat(s): Interior Alkyd,. (Normal Conditions)
    - a. Products:
      - 1) Sherwin-Williams ProMar 200 Alkyd, Eg-Shel, B33-250 Series.
      - 2) Sherwin-Williams ProMar 200 Alkyd, Gloss, B35-250 Series.
      - 3) Sherwin-Williams ProMar 200 Alkyd, Semi-Gloss, B34-250 Series.
      - 4) Substitutions: Section 01 60 00 - Product Requirements.
  7. Top Coat(s): Interior Waterbased Acrylic-Alkyd
    - a. Products:

- 1) Sherwin Williams ProMar 200 Waterbased acrylic alkyd, Egshel, B33-8250 Series.
  - 2) Sherwin Williams ProMar 200 Waterbased acrylic alkyd, Semigloss, B34-8250 Series
  - 3) Sherwin Williams Pro Mar 200 Waterbased acrylic alkyd, Gloss, B35-8250 Series
  - 4) Substitutions: Section 01 06 00 – Product Requirements
8. Top Coat Sheen:
- a. Eggshell: MPI gloss level 3; use this sheen at all locations.
  - b. Satin: MPI gloss level 4; use this sheen at all locations.
  - c. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
  - d. Gloss: MPI gloss level 6; use this sheen at all locations.
9. Primer: As recommended by top coat manufacturer for specific substrate.
- C. Paint I-OP-MD-WC - Medium Duty Vertical and Overhead: Including gypsum board, plaster, concrete, concrete masonry units, uncoated steel, shop primed steel, galvanized steel, and aluminum.
1. Two top coats and one coat primer.
  2. Top Coat(s): Interior Epoxy-Modified Latex. (High Performance Upgrade)
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Waterbased Catalyzed Epoxy, Gloss. (MPI #115)
      - 2) Sherwin-Williams Waterbased Catalyzed Epoxy, B73-300 Gloss.
      - 3) Sherwin-Williams Waterbased Catalyzed Epoxy, B73-360 EgshelSemi-Gloss.
  3. Top Coat(s): High Performance Architectural Interior Latex. (High Traffic Areas)
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K45-1150 Series Eg-Shel. (MPI #139)
      - 2) Sherwin-Williams Pro Industrial Pre-Catalyzed Waterbased Epoxy, K46-1150 series Semi-Gloss. (MPI #141)
      - 3) Sherwin-Williams Pro Industrial Acrylic Coating, B66-660 Series Eg-Shel.
      - 4) Sherwin-Williams Pro Industrial Acrylic Coating, B66-650 Series Semi-Gloss. (MPI #141)
      - 5) Substitutions: Section 01 60 00 - Product Requirements.
  4. Top Coat(s): Institutional Low Odor/VOC Interior Latex. (Normal Conditions)
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Acrylic Coating, B66-660 Series Eg-Shel.
      - 2) Sherwin-Williams Pro Industrial Acrylic Coating, B66-600 Series Gloss. (MPI #148)
      - 3) Sherwin-Williams Pro Industrial Acrylic Coating, B66-650 Series Semi-Gloss. (MPI #147)
      - 4) Sherwin-Williams Harmony Interior Acrylic Latex, B9-1050 Series Eg-Shel. (MPI #144)
      - 5) Sherwin-Williams Harmony Interior Acrylic Latex, B5-1050 Series Flat. (MPI #143)
      - 6) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, B30-2650 Series Flat.
      - 7) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, B24-2650 Series Low Sheen. (MPI #144)
      - 8) Sherwin-Williams ProMar 200 Zero VOC Interior Latex, B31-2650 Series Semi-Gloss.
      - 9) Substitutions: Section 01 60 00 - Product Requirements.
  5. Top Coat Sheen:
    - a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
    - b. Velvet: MPI gloss level 2; use this sheen at all locations.
    - c. Eggshell: MPI gloss level 3; use this sheen at all locations.

- d. Satin: MPI gloss level 4; use this sheen at all locations.
  - e. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
  - f. Gloss: MPI gloss level 6; use this sheen at all locations.
  6. Primer: As recommended by top coat manufacturer for specific substrate.
- D. Paint I-OP-DF - Dry Fall: Metals; exposed structure and overhead-mounted services in utilitarian spaces, including shop primed steel deck, structural steel, metal fabrications, galvanized ducts, galvanized conduit, and galvanized piping.
1. Shop primer by others.
  2. One top coat.
  3. Top Coat: Alkyd Dry Fall.
    - a. Products:
      - 1) Sherwin-Williams Dryfall Flat, B48W60. (MPI #55)
      - 2) Sherwin-Williams Super Save-Lite Dryfall, B47W62 Semi-Gloss. (MPI #89)
      - 3) Sherwin-Williams Super Save-Lite Dryfall, Gloss VOC Complying.
      - 4) Substitutions: Section 01 60 00 - Product Requirements.
  4. Top Coat: Latex Dry Fall.
    - a. Products:
      - 1) Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, B42-180 Series Flat. (MPI #118)
      - 2) Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, Eg-Shel, B42W822. (MPI #155, 226)
      - 3) Sherwin-Williams Pro Industrial Waterborne Acrylic Dryfall, B42W83 Semi-Gloss. (MPI #226)
      - 4) Substitutions: Section 01 60 00 - Product Requirements.
  5. Top Coat Sheen:
    - a. Flat: MPI gloss level 1; use this sheen at all locations.
    - b. Eggshell: MPI gloss level 3; use this sheen at all locations.
    - c. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
    - d. Gloss: MPI gloss level 6; use this sheen at all locations.
  6. Primer: As recommended by top coat manufacturer for specific substrate.
- E. Paint I-OP-FL - Concrete and Wood Floors to be Painted.
1. Two top coats and one coat primer.
  2. Top Coat(s): Latex Floor Paint, Low Gloss.
    - a. Products:
      - 1) Sherwin-Williams Porch and Floor Enamel, A32-250 Series.
      - 2) Sherwin-Williams Tread-Plex Acrylic Floor Coating, B90-100 Series. (MPI #60)
      - 3) Substitutions: Section 01 60 00 - Product Requirements.
  3. Top Coat Sheen:
    - a. Eggshell: MPI gloss level 3; use this sheen at all locations.
    - b. Satin: MPI gloss level 4; use this sheen at all locations.
    - c. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
    - d. Gloss: MPI gloss level 6; use this sheen at all locations.
  4. Primer: As recommended by top coat manufacturer for specific substrate.
- F. Paint I-TR -W - Transparent Finish on Wood.
1. Stain: Semi-Transparent Stain for Wood.
    - a. Products:
      - 1) Sherwin-Williams Minwax Performance Series Tintable Wood Stain, 250 VOC. (MPI #90)
      - 2) Sherwin-Williams Minwax Performance Series Tintable Wood Wood Classics Interior Oil Stain. (MPI #90)
      - 3) Substitutions: Section 01 60 00 - Product Requirements.
  2. Sealer: Alkyd, Sanding Sealer, Clear.
    - a. Products:

- 1) Sherwin-Williams Wood Classics Minwax Performance Series FastDry Sanding Sealer. (MPI #102)
- 2) Substitutions: Section 01 60 00 - Product Requirements.
3. Top Coat(s): Polyurethane Varnish, Oil Modified.
  - a. Products:
    - 1) Sherwin-Williams Minwax Fast Drying Polyurethane Varnish, Satin. (MPI #57)
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
4. Top Coat(s): Alkyd Varnish
  - a. Products:
    - 1) Sherwin-Williams Minwax Performance Series FastDry Varnish, Satin. (MPI #73)
    - 2) Sherwin-Williams Minwax Performance Series FastDry Varnish, Gloss. (MPI #75)
    - 3) Substitutions: Section 01 60 00 - Product Requirements.
5. Top Coat(s): Clear Water Based Varnish.
  - a. Products:
    - 1) Rodda Waterborne Alkyd Urethane Varnish, 593 Series. (MPI #128, 129, 130)
    - 2) Sherwin-Williams Minwax Polycrylic Waterborne Polyurethane Varnish, Gloss. (MPI #130)
    - 3) Sherwin-Williams Minwax Polycrylic Waterborne Polyurethane Varnish, Satin.
    - 4) Substitutions: Section 01 60 00 - Product Requirements.
6. Top Coat Sheen:
  - a. Flat: MPI gloss level 1; use this sheen at all locations.
  - b. Eggshell: MPI gloss level 3; use this sheen at all locations.
  - c. Satin: MPI gloss level 4; use this sheen at all locations.
  - d. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
  - e. Gloss: MPI gloss level 6; use this sheen at all locations.
- G. Paint I-TR-FL - Transparent Finish on Wood Floors:
  1. Top coats over stain.
  2. Stain: Semi-Transparent Stain for Wood.
    - a. Products:
      - 1) Sherwin-Williams Minwax Performance Series Tintable Wood Stain 250 VOC. (MPI #90)
      - 2) Sherwin-Williams Minwax Performance Series Tintable Wood Stain. (MPI #90)
      - 3) Substitutions: Section 01 60 00 - Product Requirements.
  3. Top Coat(s): Polyurethane Varnish, Oil Modified.
    - a. Products:
      - 1) Sherwin-Williams Minwax Fast Dry Polyurethane Varnish, Gloss. (MPI #56)
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  4. Top Coat Sheen:
    - a. Satin: MPI gloss level 4; use this sheen at all locations.
    - b. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
    - c. Gloss: MPI gloss level 6; use this sheen at all locations.
- H. Paint I-TR-SC - Transparent Finish on Concrete Floors. Use this Product where called for "sealed concrete"
  1. 1 coat stain.
  2. Sealer: Water Based for Concrete Floors.
    - a. Products:
      - 1) H&C Colortop Solvent Based Stain (stain & sealer): color to be selected.
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
- I. Paint I-OP-HPC – Colored Finish on Concrete Floors. Use this Product where called for "high performance coating" on concrete floor such as in aircraft hangars, vehicle work bays, shops and other places called for in the finish schedule.

1. Apply number of coats recommended by manufacturer to achieve 30 mil thickness.
2. High-Build Coating: Epoxy Coating for Concrete Floors.
  - a. Products:
    - 1) Armorseal 650 SL/RC; Color: Haze Gray.
    - 2) Substitutions: Section 01 60 00 – Product Requirements.
  - b. Primer: 33 Epoxy Primer/Sealer

## 2.04 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
1. Alkali Resistant Water Based Primer.
    - a. Products:
      - 1) Loxon Concrete & Masonry Primer: LX2W50
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  2. Interior Institutional Low Odor/VOC Primer Sealer.
    - a. Products:
      - 1) Pro Mar 200 0 VOC Primer: B28W2600
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  3. Interior/Exterior Latex Block Filler.
    - a. Products:
      - 1) Loxon Block Surfacer: LX1W200.
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  4. Interior Latex Primer Sealer.
    - a. Products:
      - 1) PrepRite ProBlock Primer Sealer B51-620 Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  5. Interior Drywall Primer Sealer.
    - a. Products:
      - 1) Pro Mar 200 0 VOC Primer: B28W2600
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  6. Anti-Corrosive Alkyd Primer for Metal; MPI #79.
    - a. Products:
      - 1) Kem Kromik Universal Metal Primer: B50Z Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  7. Interior Rust-Inhibitive Water Based Primer;
    - a. Products:
      - 1) Pro Industrial Pro-Cryl Universal Acrylic Primer: B66-310 Series.
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  8. Interior/Exterior Quick Dry Alkyd Primer for Metal; MPI #76.
    - a. Products:
      - 1) Kem Bond HS Universal Alkyd Primer: B50WZ4
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  9. Interior Water Based Primer for Galvanized Metal.
    - a. Products:
      - 1) Pro Industrial Pro-Cryl Universal Acrylic Primer: B66-310 Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  10. Alkyd Primer for Galvanized Metal.
    - a. Products:
      - 1) Galvite HS: B50WZ30
      - 2) Substitutions: Section 01 60 00 - Product Requirements.
  11. Interior/Exterior Quick Dry Primer for Aluminum.
    - a. Products:
      - 1) Pro Industrial Pro-Cryl Universal Acrylic Primer: B66-310 Series
      - 2) Substitutions: Section 01 60 00 - Product Requirements.

12. Interior Latex Enamel Undercoat.
  - a. Products:
    - 1) Premium Wall & Wood Primer: B28W8111
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
13. Stain Blocking Primer.
  - a. Products:
    - 1) PrepRite ProBlock Primer Sealer B51-620 Series
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
14. Stain Blocking Primer, Water Based.
  - a. Products:
    - 1) PrepRite ProBlock Primer Sealer B51-620 Series
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
15. Latex Primer for Interior Wood.
  - a. Products:
    - 1) Premium Wall & Wood Primer: B28W8111
    - 2) Substitutions: Section 01 60 00 - Product Requirements.
16. Bonding Primer, Water Based.
  - a. Products:
    - 1) PrepRite ProBlock Primer Sealer B51-620 Series
    - 2) Substitutions: Section 01 60 00 - Product Requirements.

## 2.05 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Do not begin application of paints and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- D. If substrate preparation is the responsibility of another installer, notify The Architect and Owner of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  1. Gypsum Wallboard: 12 percent.
  2. Plaster and Stucco: 12 percent.
  3. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
  4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
  5. Concrete Floors and Traffic Surfaces: 8 percent.

### 3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.
- D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Concrete:
  - 1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
  - 2. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi at 6 to 12 inches. Allow to dry.
  - 3. Clean concrete according to ASTM D4258. Allow to dry.
  - 4. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.
- H. Masonry:
  - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
  - 2. Prepare surface as recommended by top coat manufacturer.
  - 3. Clean surfaces with pressurized water. Use pressure range of 600 to 1500 psi at 6 to 12 inches. Allow to dry.
- I. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- J. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- K. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- L. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- M. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- N. Galvanized Surfaces:
  - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
  - 2. Prepare surface according to SSPC-SP 2.
- O. Ferrous Metal:
  - 1. Solvent clean according to SSPC-SP1.
  - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
  - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- P. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- Q. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
- R. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.
- S. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### **3.03 APPLICATION**

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- G. Sand wood and metal surfaces lightly between coats to achieve required finish.
- H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- I. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

### **3.05 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

### **3.06 PROTECTION**

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

**END OF SECTION**



**SECTION 10 11 00  
VISUAL DISPLAY UNITS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Porcelain enamel steel markerboards.
- B. Tackboards.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Blocking and supports.
- B. Section 09 21 16 - Gypsum Board Assemblies: Concealed supports in metal stud walls.

**1.03 REFERENCE STANDARDS**

- A. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).
- B. ANSI A208.1 - American National Standard for Particleboard; 2016.
- C. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2018.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data on markerboard.
- C. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.
- D. Samples: Two, 2 by 2 inches in size illustrating materials and finish, color and texture of porcelain enamel steel markerboard and trim.
- E. Manufacturer's printed installation instructions.
- F. Maintenance Data: Include data on regular cleaning, stain removal.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year warranty for markerboard to include warranty against discoloration due to cleaning, crazing or cracking, and staining.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Claridge Products and Equipment, Inc; \_\_\_\_: [www.claridgeproducts.com/#sle](http://www.claridgeproducts.com/#sle).
- B. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 VISUAL DISPLAY UNITS**

- A. Porcelain Enamel Steel Markerboards:
  - 1. Color: White.
  - 2. Steel Face Sheet Thickness: 24 gauge, 0.0239 inch .
  - 3. Core: Particleboard, manufacturer's standard thickness, laminated to face sheet.
  - 4. Backing: Aluminum foil, laminated to core.
  - 5. Height: 48 inches.
  - 6. Length: 8 feet , in one piece.
  - 7. Frame: Extruded aluminum , with concealed fasteners.
  - 8. Frame Profile: Manufacturer's standard profile.

9. Frame Finish: Anodized, natural.
10. Accessories: Provide marker tray and map rail.
- B. Tackboards: Fine-grained, homogeneous natural cork.
  1. Cork Thickness: 1/8 inch.
  2. Color: As selected from manufacturer's full range.
  3. Backing: Hardboard, 1/4 inch thick, laminated to tack surface.
  4. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
  5. Size: As indicated on drawings.
  6. Frame: Extruded aluminum , with concealed fasteners.
  7. Frame Profile: Manufacturer's standard.
  8. Frame Finish: Anodized, natural.

### **2.03 MATERIALS**

- A. Porcelain Enameled Steel Sheet: ASTM A424/A424M, Type I, Commercial Steel, with fired-on vitreous finish.
- B. Hardboard for Cores: ANSI A135.4, Class 1 - Tempered, S2S (smooth two sides).
- C. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.
- D. Foil Backing: Aluminum foil sheet, 0.005 inch thick.

### **2.04 ACCESSORIES**

- A. Map Rail: Extruded aluminum, manufacturer's standard profile, with cork insert and runners for accessories; 1 inch wide overall , full width of frame.
- B. Temporary Protective Cover: Sheet polyethylene, 8 mil thick.
- C. Marker Tray: Aluminum, manufacturer's standard profile, one piece full length of markerboard, molded ends, concealed fasteners, same finish as frame.
- D. Mounting Brackets: Concealed.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.
- C. Verify flat wall surface for frameless adhesive-applied boards.

### **3.02 PREPARATION**

- A. Acclimatize tackable wall panels by removing from packaging in installation area not less than 24 hours before application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### **3.03 INSTALLATION**

- A. Install boards in accordance with manufacturer's instructions.
- B. Secure units level and plumb.
- C. Install visual display board at height as indicated in Drawings.

### **3.04 CLEANING**

- A. Clean board surfaces in accordance with manufacturer's instructions.
- B. Cover with protective cover, taped to frame.
- C. Remove temporary protective cover at Date of Substantial Completion.

**END OF SECTION**

**SECTION 10 14 00  
SIGNAGE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Cash allowance for signs, plaques and dimensional letters.
- B. Room and door signs.
- C. Vinyl stick-on dimensional letters.
- D. Interior directional and informational signs.
- E. Exterior aluminum signage (Dimensional Letters)
- F. Plaque.

**1.02 PRICE AND PAYMENT PROCEDURES**

- A. See Section 01 21 00 - Allowances, for cash allowances affecting this section.
- B. Allowance amount covers purchase and delivery but not installation. Allowance includes the purchase and delivery of all ADA room signs, directional signage, egress signs, exterior dimensional letters, building plaques, etc. The installation of all signage shall be included in the base bid price.

**1.03 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

**1.04 SUBMITTALS**

- A. See Section 01 33 00 - Shop Drawings, Product Data and Samples, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Selection Samples: Where colors are not specified, submit two sets of color selection charts or chips.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

**1.06 FIELD CONDITIONS**

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

**PART 2 PRODUCTS**

**2.01 SIGNAGE APPLICATIONS**

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs: Provide a sign for every doorway, whether it has a door or not, not including corridors, lobbies, and similar open areas.
  - 1. Sign Type: Flat signs with engraved panel media as specified.
  - 2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
  - 3. Character Height: 1 inch.

4. Sign Height: 6 inches, unless otherwise indicated.
  5. Office Doors: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section for replaceable occupant name.
  6. Conference and Meeting Rooms: Identify with room numbers to be determined later, not the numbers indicated on drawings; in addition, provide "window" section with sliding "In Use/Vacant" indicator.
  7. Service Rooms: Identify with room names and numbers to be determined later, not those indicated on drawings.
  8. Rest Rooms: Identify with pictograms, the names "MEN" and "WOMEN", room numbers to be determined later, and braille. Utilize HC symbols on the signs as well.
- C. Interior Directional and Informational Signs:
1. Sign Type: Same as room and door signs.
  2. Sign Type: Flat signs with engraved panel media as specified.
  3. Sizes: As indicated on drawings.
  4. Where suspended, ceiling mounted, or projecting from wall signs are indicated, provide two-sided signs with same information on both sides.

## 2.02 SIGN TYPES

- A. Flat Signs: Signage media without frame.
1. Edges: Square.
  2. Corners: Square.
  3. Clear Cover: For customer produced sign media, provide clear cover of polycarbonate plastic, glossy on back, non-glare on front.
  4. Wall Mounting of One-Sided Signs: Tape adhesive.
  5. Wall and Ceiling Mounting of Two-Sided Signs: Aluminum wall bracket, powder coated, color selected from manufacturer's standard colors, attached with screws in predrilled mounting holes, set in clear silicone sealant.
  6. Suspended Mounting: Stainless steel suspension cables, cable clamps, and ceiling fastener suitable for attachment to ceiling construction indicated.
- B. Color and Font: Unless otherwise indicated:
1. Character Font: Helvetica, Arial or other sans serif font.
  2. Character Case: Upper case only.
  3. Background Color: To be determined.
  4. Character Color: Contrasting color.

## 2.03 TACTILE SIGNAGE MEDIA

- A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:
1. Total Thickness: 1/16 inch.

## 2.04 PLAQUES

- A. Metal Plaques:
1. Provide plaque for installation per direction of the Owner and Architect. The plaque shall be mounted to solid blocking utilizing concealed fasteners of the same material as the plaque. Verbiage for the plaque is to be determined. The plaque shall be submitted to the Architect for approval before production.
  2. Metal: Aluminum casting.
  3. Metal Thickness: 1 inch, minimum.
  4. Size: As indicated on drawings.
  5. Text and Typeface:
    - a. Character Font: Helvetica, Arial, or other sans serif font.
    - b. Character Case: Upper and lower case (title case).
  6. Border Style: Double line.
  7. Background Texture: Sand.

8. Surface Finish: Polished.
9. Protective Coating: Manufacturer's standard clear coating.
10. Mounting: Blind studs.

## **2.05 DIMENSIONAL LETTERS**

- A. Metal Letters:
  1. Metal: Aluminum casting.
  2. Metal Thickness: 1 inch minimum.
  3. Letter Height: As indicated on drawings.
  4. Text and Typeface:
    - a. Character Font: Helvetica, Arial, or other sans serif font.
  5. Finish: As selected by Architect from manufacturer's full range.
  6. Mounting: Concealed screws.

## **2.06 ACCESSORIES**

- A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
- B. Tape Adhesive: Double sided tape, permanent adhesive.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.
- D. Locate signs where indicated:
  1. Room and Door Signs: Locate on wall at latch side of door with centerline of sign at 60 inches above finished floor.
  2. If no location is indicated obtain State of Mississippi's instructions.
- E. Protect from damage until Date of Substantial Completion; repair or replace damaged items.

**END OF SECTION**



**SECTION 10 21 13.19**  
**PLASTIC TOILET COMPARTMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Solid plastic toilet compartments.
- B. Urinal screens.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Blocking and supports.
- B. Section 10 28 00 - Toilet, Bath, and Laundry Accessories.

**1.03 REFERENCE STANDARDS**

- A. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- C. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2015.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination: Coordinate the work with placement of support framing and anchors in walls and ceilings.

**1.05 SUBMITTALS**

- A. See Section 01 33 00 - Shop Drawings, Product Data and Samples, for submittal procedures.
- B. Product Data: Provide data on panel construction, hardware, and accessories.
- C. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall and ceiling supports, door swings.
- D. Samples: Submit two samples of partition panels, 2 x 3 inch in size illustrating panel finish, color, and sheen.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Minimum 5 years experience in manufacture of phenolic toilet compartments with products in satisfactory use under similar service conditions.
- B. Installer Qualifications: Minimum 5 years experience in work of this section.

**1.07 WARRANTY**

- A. Provide manufacturer's 25 year warranty against breakage, corrosion, and delamination under normal conditions.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Solid Plastic Toilet Compartments:
  - 1. Basis of Design: Hiny Hiders Partitions as manufactured and supplied by Scranton Products. [www.scrantonproducts.com](http://www.scrantonproducts.com).
  - 2. Substitutions: Section 01 63 00 - Substitutions and Product Options.

**2.02 PLASTIC TOILET COMPARTMENTS**

- A. Hiney Hiders Solid Plastic Toilet Partitions:
  - 1. Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid molded high density polyethylene (HDPE), tested in accordance with NFPA 286, floor-mounted headrail-braced.

- a. Color: As selected by Architect from manufacturer standard colors.
- b. Texture: Orange Peel.
2. Doors:
  - a. Thickness: 1 inch.
  - b. Width(s): As shown on the Drawings. If not indicated on Drawings, doors shall be 24 inches wide.
  - c. Width for Handicapped Use: 36 inch, out-swinging.
  - d. Height: 55 inch.
  - e. Mounting Height: Top of door set at 5'-9" AFF and bottom of door set at 1'-2" AFF, unless noted otherwise in drawings.
  - f. Door & Pilaster Edge: Standard.
3. Panels:
  - a. Thickness: 1 inch.
  - b. Height: 55 inch.
  - c. Depth: As indicated on drawings.
  - d. Mounting Height: Top of panel set at 5'-9" AFF and bottom of panel set at 1'-2" AFF, unless noted otherwise in drawings.
  - e. Slotted on one edge to accept wall bracket.
4. Pilasters:
  - a. Thickness: 1 inch.
  - b. Width: As required to fit space; minimum 3 inch.
  - c. Height: 6'-10", unless noted otherwise in drawings.
5. Pilaster Shoes: 3 inches, 20 gauge stainless steel. Secured to pilasters with a stainless steel tamper resistant Torx head sex bolt.
6. Headrail: Heavy-duty extruded 6463-T5 alloy aluminum with anti-grip design. Finish to be clear anodized. Fastened to headrail brackets with stainless steel tamper resistant Torx head sex bolt, and fastened at the top of the pilaster with stainless steel tamper resistant Torx head screws.
  - a. Headrail Brackets: 20 gauge stainless steel with satin finish. Secured to the wall with stainless steel tamper resistant Torx head screws.
7. Wall Brackets:
  - a. Stainless Steel Brackets: Stainless steel type 304.
  - b. Type: Continuous.
  - c. Brackets are fastened to pilasters with stainless steel tamper resistant Torx head screws and fastened to the panels with stainless steel tamper resistant Torx head sex bolts.
8. Door Hardware:
  - a. Vault Hinge: Heavy-duty 304 stainless steel hinge having gravity-acting cams with a brushed finish and wrap around flanges; two per door.
  - b. Latch Mechanism: Occupancy Indicator Latch and Housing:
    - 1) Material: Satin stainless steel.
    - 2) Occupancy indicators: Green for occupied and red not occupied.
    - 3) Slide bolt and button.
  - c. Doors supplied with one coat hook/bumper and door pull made of chrome plated Zamak.
  - d. Equip outswing handicapped doors with second door pull and door stop.
- B. Privacy Screens: Compartments without doors; all features to match standard toilet compartments; wall brackets and vertical support/bracing same as toilet compartments.
- C. Urinal Screens: To match toilet compartments; mounted to wall with brackets same as toilet compartments.
  1. Thickness: 1 inch.
  2. Depth: 18 inch.
  3. Height: 55 inch.



4. Mounting Height: Top of panel set at 5'-7" AFF and bottom of panel set at 1'-0" AFF, unless noted otherwise in drawings.
5. Color: To match partitions.
6. Texture: To match partitions.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify correct spacing of and between plumbing fixtures.
- C. Verify correct location of built-in framing, anchorage, and bracing.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Examine areas to receive toilet partitions, screens, and shower compartments for correct height and spacing of anchorage/blocking and plumbing fixtures that affect installation of partitions. Report discrepancies to the architect.

#### **3.03 INSTALLATION**

- A. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions and approved shop drawings.
- B. Maintain 3/8 inch to 1/2 inch space between wall and panels and between wall and end pilasters.
- C. No evidence of cutting, drilling, and/or patching shall be visible on the finished work.
- D. Finished surfaces shall be cleaned after installation and be left free of imperfections.

#### **3.04 TOLERANCES**

- A. Maximum Variation From True Position: 1/4 inch.
- B. Maximum Variation From Plumb: 1/8 inch.

#### **3.05 ADJUSTING**

- A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch.
- B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.
- C. Adjust adjacent components for consistency of line or plane.

#### **3.06 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION**



**SECTION 10 28 00  
TOILET, BATH, AND LAUNDRY ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Commercial toilet accessories.
- B. Under-lavatory pipe supply covers.
- C. Utility room accessories.
- D. Grab bars.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00.10 - Rough Carpentry (Architectural): Concealed supports and blocking for accessories.
- B. Section 09 30 00 - Tiling: Ceramic washroom accessories.
- C. Section 10 21 13.19 - Plastic Toilet Compartments.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- B. ASME A112.18.9 - Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures; 2011 (Reaffirmed 2017).
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2023.
- D. ASTM C1822 - Standard Specification for Insulating Covers on Accessible Lavatory Piping; 2021.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- F. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2004, with Editorial Revision (2016).
- G. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- H. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

**1.05 SUBMITTALS**

- A. See Section 01 33 00 - Shop Drawings, Product Data and Samples, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Commercial Toilet, Shower, and Bath Accessories:
  - 1. Bobrick: [www.bobrick.com](http://www.bobrick.com).
  - 2. ASI - American Specialties, Inc: [www.americanspecialties.com](http://www.americanspecialties.com).
  - 3. Bradley Corporation: [www.bradleycorp.com](http://www.bradleycorp.com).
- B. Provide products of each category type by single manufacturer.

## 2.02 MATERIALS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
  - 1. Grind welded joints smooth.
  - 2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.
- B. Stainless Steel Sheet: ASTM A666, Type 304.
- C. Fasteners, Screws, and Bolts: Stainless Steel; tamper-proof; security type.

## 2.03 FINISHES

- A. Stainless Steel: Satin finish, unless otherwise noted.

## 2.04 COMMERCIAL TOILET ACCESSORIES

- A. Toilet Paper Dispenser: Double roll, surface-mounted, stainless steel unit with pivot hinge, tumbler lock.
  - 1. Products:
    - a. Bobrick B-4288 Surface-Mounted Multi-roll Toilet Tissue Dispenser..
    - b. Substitutions: Section 01 63 00 - Substitutions and Product Options.
- B. Combination Towel Dispenser/Waste Receptacle: Recessed flush with wall, stainless steel; seamless wall flanges, continuous piano hinges, tumbler locks on upper and lower doors.
  - 1. Waste receptacle liner: Reusable, heavy-duty vinyl.
  - 2. Towel dispenser capacity: 600 C-fold.
  - 3. Waste receptacle capacity: 6.3 gallons.
  - 4. Products:
    - a. Bobrick B-3803 Recessed Paper Towel Dispenser and Waste Receptable..
    - b. Substitutions: Section 01 63 00 - Substitutions and Product Options.
- C. Soap Dispenser (installed where there are no counters): Liquid soap dispenser, wall-mounted, surface, with stainless steel cover and horizontal stainless steel tank and working parts; push type soap valve, check valve, and window gage refill indicator, tumbler lock.
  - 1. Minimum Capacity: 40 ounces.
  - 2. Product: B-2111 manufactured by Bobrick.
- D. Mirrors: Stainless steel framed, 1/4 inch thick annealed float glass; ASTM C1036.
  - 1. Annealed Float Glass: Silvering, protective and physical characteristics in compliance with ASTM C1503.
  - 2. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
  - 3. Products:
    - a. Bobrick B-165 24x54.
    - b. Substitutions: Section 01 63 00 - Substitutions and Product Options.
- E. Grab Bars: Stainless steel, satin-finish, slip-resistant surface.
  - 1. Standard Duty Grab Bars:
    - a. Push/Pull Point Load: 250 pound-force, minimum.
    - b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
    - c. Length and Configuration: As indicated on drawings.
    - d. Products:
      - 1) Bobrick B-5800 Series Two-Wall Compartment Bar.
      - 2) Bobrick B-5806 Wall Mounted Vertical Grab Bar.
      - 3) Substitutions: Section 01 63 00 - Substitutions and Product Options.
- F. Sanitary Napkin Disposal Unit: Stainless steel, surface-mounted, self-closing door, locking bottom panel with full-length stainless steel piano-type hinge, removable receptacle.
  - 1. Receptacle Liner: Removable, leak-proof molded polyethylene.
  - 2. Capacity: 1.2-gal.

3. Shall be equipped with international graphic symbols identifying sanitary napkin disposal.
4. Products:
  - a. Bobrick B-254 Surface-Mounted Sanitary Napkin Disposal..
  - b. Substitutions: Section 01 63 00 - Substitutions and Product Options.
- G. Diaper Changing Station: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding {rs#1}.
  1. Style: Horizontal.
  2. Material: Stainless steel shell with polyethylene body.
  3. Mounting: Recessed.
  4. Minimum Rated Load: 250 lbs.
  5. Manufacturers:
    - a. Koala Kare Products; Product: KB-200: [www.koalabear.com](http://www.koalabear.com).
    - b. Substitutions: 01 60 00 - Product Requirements.

## 2.05 UNDER-LAVATORY PIPE AND SUPPLY COVERS

- A. Under-Lavatory Pipe and Supply Covers:
  1. Insulate exposed drainage piping, including hot, cold, and tempered water supplies under lavatories or sinks to comply with ADA Standards.
  2. Exterior Surfaces: Smooth non-absorbent, non-abrasive surfaces.
  3. Construction: 1/8 inch flexible PVC.
    - a. Surface Burning Characteristics: Flame spread index of 25 or less and smoke developed index of 450 or less, when tested in accordance with ASTM E84.
    - b. Comply with ASTM C1822, type indicated.
    - c. Comply with ASME A112.18.9.
    - d. Comply with ICC A117.1.
    - e. Microbial and Fungal Resistance: Comply with ASTM G21.
  4. Color: White.
  5. Fasteners: Reusable, snap-locking fasteners with no sharp or abrasive external surfaces.

## 2.06 UTILITY ROOM ACCESSORIES

- A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets.
  1. Drying rod: Stainless steel, 1/4 inch diameter.
  2. Hooks: Three, 0.06 inch stainless steel rag hooks at shelf front.
  3. Mop/broom holders: Four spring-loaded rubber cam holders at shelf front.
  4. Length: 36 inches.
  5. Products:
    - a. Bobrick B-224 Utility Shelf with Mop/Broom Holders and Rag Hook.
    - b. Substitutions: Section 01 63 00 - Substitutions and Product Options.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. Verify that field measurements are as indicated on drawings.
- D. See Section 09 21 16 for installation of blocking, reinforcing plates, and concealed anchors in walls.

### 3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

**3.03 INSTALLATION**

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.
  - 1. Grab Bars: As indicated on drawings.
  - 2. Other Accessories: As indicated on drawings.

**3.04 PROTECTION**

- A. Protect installed accessories from damage due to subsequent construction operations.

**END OF SECTION**

**SECTION 10 44 16  
FIRE EXTINGUISHERS & CABINETS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.
- C. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 09 21 16 - Gypsum Board Assemblies: Roughed-in wall openings.

**1.03 REFERENCE STANDARDS**

- A. FM (AG) - FM Approval Guide; current edition.
- B. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.
- C. UL (DIR) - Online Certifications Directory; Current Edition.

**1.04 PERFORMANCE REQUIREMENTS**

- A. Conform to NFPA 10.
- B. Provide extinguishers classified and labeled by Underwriters Laboratories Inc. for the purpose specified and indicated.

**1.05 SUBMITTALS**

- A. See Section 01 33 00 - Shop Drawings, Product Data and Samples, for submittal procedures.
- B. **Fire Extinguisher and Fire Extinguisher Cabinets must be coordinated so that one fits inside the other perfectly before purchasing.**
- C. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- D. Product Data: Provide extinguisher operational features.
- E. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

**1.06 FIELD CONDITIONS**

- A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Fire Extinguishers:
  - 1. Larsen's Manufacturing Co: [www.larsensmfg.com](http://www.larsensmfg.com).
  - 2. Substitutions: See Section 01 63 00.
- B. Fire Extinguisher Cabinets and Accessories:
  - 1. Larsen's Manufacturing Co; Architectural Series: [www.larsensmfg.com](http://www.larsensmfg.com).
  - 2. Substitutions: See Section 01 63 00.

**2.02 FIRE EXTINGUISHERS**

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent. Provide fire extinguisher type suitable for location.
  - 1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.

1. Cartridge Operated: Spun shell.
2. Class: A:B:C type.
3. **Size and classification must be checked and approved by fire marshal for all locations in building before purchasing extinguishers.**
4. Finish: Baked polyester powder coat, red color.
5. Temperature range: Minus 65 degrees F to 120 degrees F.

### **2.03 FIRE EXTINGUISHER CABINETS**

- A. Cabinet Configuration: Semi-recessed type. Use where marked as "**FE#2**" on plans.
  1. Size to accommodate accessories.
  2. Trim: Flat, with 5/16 inch wide face.
- B. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with roller type catch. Hinge doors for 180 degree opening with two butt hinge.
- C. Door Glazing: Tempered glass, clear, 1/8 inch thick, and set in resilient channel glazing gasket.
- D. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- E. Fabrication: Weld, fill, and grind components smooth.
- F. Finish of Cabinet Exterior Trim and Door: No. 4 Stainless Steel.
- G. Finish of Cabinet Interior: White colored enamel.

### **2.04 ACCESSORIES**

- A. Extinguisher Brackets: Formed steel, chrome-plated for use where marked as "**FE#1**" on plans.
- B. Cabinet Signage: Vertical letters, red in color, down face of glass.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Secure rigidly in place.
- C. Place extinguishers in cabinets and on wall brackets.

**END OF SECTION**



**SECTION 12 21 13  
HORIZONTAL LOUVER BLINDS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Horizontal slat louver blinds.
- B. Operating hardware.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Concealed wood blocking for attachment of headrail brackets.

**1.03 REFERENCE STANDARDS**

- A. WCMA A100.1 - Safety of Window Covering Products; 2018.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the placement of concealed blocking to support blinds. See Section 06 10 00.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating physical and dimensional characteristics.
- C. Shop Drawings: Indicate opening sizes, tolerances required, method of attachment, clearances, and operation.
- D. Samples: Submit two samples, 6 inch long illustrating slat materials and finish, cord type and color.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Horizontal Louver Blinds:
  - 1. Hunter Douglas: [www.hunterdouglas.com](http://www.hunterdouglas.com).
  - 2. Levolor Contract: [www.levolorcontract.com](http://www.levolorcontract.com).
  - 3. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 BLINDS**

- A. Description: Horizontal slat louvers hung from full-width headrail with full-width bottom rail.
- B. Manual Operation: Control of raising and lowering by "push up method" with full range locking; blade angle adjustable by control wand.
- C. Blinds: Horizontal slat louvers hung from full-width headrail with full-width bottom rail; manual control of raising and lowering by "push up method" with full range locking; blade angle adjustable by cord; complying with WCMA A100.1.
- D. Metal Slats: Heat-treated and spring tempered pre-finished aluminum; eased slat corners, with manufacturing burrs removed.
  - 1. Width: 1 inch.
  - 2. Thickness: 0.006 inch.
  - 3. Color: As selected by Architect.
  - 4. Basis of Design: Hunter Douglas CD62 Mini Aluminum Blind
- E. Slat Support: Woven polypropylene cord, ladder configuration.

- F. Head Rail: Pre-finished, formed steel box, with end caps; internally fitted with hardware, pulleys, and bearings for operation; same depth as width of slats.
  - 1. Height: 1.375 inches.
  - 2. Color: Same as slats.
- G. Bottom Rail: Pre-finished, formed steel with top side shaped to match slat curvature; with end caps.
  - 1. Color: Same as headrail.
- H. Tilting Mechanism: Permanently lubricated die-cast worm and gear type tilter gear mechanism in fly enclosed housing.
- I. Control Wand: Extruded hollow plastic; hexagonal shape.
- J. Headrail Attachment: As required for installation at specific conditions.
- K. Accessory Hardware: Type recommended by blind manufacturer.

## **2.03 FABRICATION**

- A. Determine sizes by field measurement.
- B. Fabricate blinds to fit within openings with uniform edge clearance of .25 inch.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that openings are ready to receive the work.
- B. Ensure structural blocking and supports are correctly placed. See Section 06 10 00.

### **3.02 INSTALLATION**

- A. Install blinds in accordance with manufacturer's instructions.
- B. Secure in place with flush countersunk fasteners.

### **3.03 TOLERANCES**

- A. Maximum Variation of Gap at Window Opening Perimeter: 1/4 inch.
- B. Maximum Offset From Level: 1/8 inch.

### **3.04 ADJUSTING**

- A. Adjust blinds for smooth operation.

### **3.05 CLEANING**

- A. Clean blind surfaces just prior to occupancy.

**END OF SECTION**

**SECTION 12 24 00  
WINDOW SHADES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Window shades and accessories.
- B. Electric motor operators.
- C. Motor controls.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Concealed wood blocking for attachment of headrail brackets.
- B. Section 09 21 16 - Gypsum Board Assemblies: Substrate for window shade systems.

**1.03 REFERENCE STANDARDS**

- A. ASTM D4674 - Standard Practice for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environments; 2002a (Reapproved 2010).
- B. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015, with Editorial Revision (2021).
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2015.
- E. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems; Current Edition, Including All Revisions.
- F. WCMA A100.1 - Safety of Window Covering Products; 2018.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordination:
- B. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of all affected installers.
- C. Sequencing:
  - 1. Do not fabricate shades until field dimensions for each opening have been taken.
  - 2. Do not install shades until final surface finishes and painting are complete.

**1.05 SUBMITTALS**

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.
  - 1. Motorized Shades: Include power requirements and standard wiring diagrams.
- B. Shop Drawings: Include shade schedule indicating size, location and keys to details.
- C. Shop Drawings - Motorized Shades: Provide schematic system riser diagram indicating component interconnections. Include requirements for interface with other systems.
- D. Certificates: Manufacturer's documentation that line voltage components are UL listed or UL recognized.
- E. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.
- F. Selection Samples: Include fabric samples in full range of available colors and patterns.
  - 1. Motorized Shades: Include finish selections for controls.
- G. Verification Samples: Minimum size 6 inches square, representing actual materials, color and pattern.

- H. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in State of Mississippi's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this type with minimum \_\_\_\_ years of documented experience.

#### **1.07 MOCK-UP**

- A. Mock-Up: Provide full size mock-up of window shade complete with selected shade fabric including sample of seam when applicable.
  - 1. Obtain Albert & Robinson Architects's approval of light and privacy characteristics of fabric prior to fabrication.
  - 2. Full-sized mock-up may become part of the final installation.

#### **1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.
- B. Handle and store shades in accordance with manufacturer's recommendations.

#### **1.09 FIELD CONDITIONS**

- A. Do not install products under environmental conditions outside manufacturer's absolute limits.

#### **1.10 WARRANTY**

- A. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
  - 1. Shade Hardware: One year.
  - 2. Electric Motors: One year.
  - 3. Electronic Control Equipment: One year.
  - 4. Fabric: One year.
  - 5. Aluminum and Steel Coatings: One year.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Interior Manually Operated Roller Shades:
  - 1. Hunter Douglas Architectural; RB500 Manual Roller Shades: [www.hunterdouglasarchitectural.com/#sle](http://www.hunterdouglasarchitectural.com/#sle).
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Interior Motorized Roller Shades, Motors and Motor Controls:
  - 1. Hunter Douglas Architectural; RB500 Motorized Roller Shades: [www.hunterdouglasarchitectural.com/#sle](http://www.hunterdouglasarchitectural.com/#sle).
  - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

#### **2.02 WINDOW SHADE APPLICATIONS**

#### **2.03 ROLLER SHADES**

- A. Roller Shades: Fabric roller shades complete with mounting brackets, roller tubes, hembars, hardware and accessories.
  - 1. Drop: Regular roll.
  - 2. Size: As indicated on drawings.
- B. Fabric: Non-flammable, color-fast, impervious to heat and moisture, and able to retain its shape under normal operation.
  - 1. Sheer Shades: Reduce glare yet still reveal considerable details to the outside; no privacy; Openness Factor greater than 1 percent.

2. Flammability: Pass NFPA 701 large and small tests.
3. Fungal Resistance: No growth when tested according to ASTM G21.
- C. Roller Tubes: As required for type of operation.
  1. Material: Extruded aluminum or galvanized steel; as required for shade location.
  2. Size: Manufacturer's standard, selected for suitability for installation conditions, span, and weight of shades.
  3. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge.
  4. Finish: Clear anodized.
  5. Take-Up Roller: Manufacturer's standard roller tube pre-tensioned for winding lift cable in bottom-up type shades.
- D. Hembars: Designed for weight requirements and adaptation to uneven surfaces, to maintain bottom of shade straight and flat.
  1. Style: Exposed aluminum bottom bar, flat profile with closed ends, containing a spline groove top to receive and secure fabric end.
  2. Style: Half wrap fabric covered bottom bar, flat profile with closed ends.
  3. Style: Thermally sealed fabric pocket covering rectangular aluminum hembar.
  4. Finish: Painted.
  5. Color: White.
- E. Manual Operation for Interior Shades: Clutch operated continuous loop; beaded ball chain.
- F. Manual Operation for Exterior Shades: Crank operated; removable powder coated steel crank with handle.
- G. Motor Operation: Motor system housed inside roller tube, controlling shade movement via motor controls indicated; listed to UL 325.
  1. Audible Noise: Maximum 39 dBA measured 3 feet from the motor unit; no audible clicks when motor starts and stops.
  2. Motors: Size and configuration as recommended by manufacturer for the type, size, and arrangement of shades to be operated; integrated into shade operating components and concealed from view.
  3. Motor Type: Both AC and DC motors are acceptable; provide required transformers for DC motors.
  4. Coupling of Multiple Shades: Where possible, minimize number of motors by coupling adjacent shades.
  5. Control Compatibility: Fully compatible with the controls to be installed.

## 2.04 MOTOR CONTROLS

- A. Motorized shades, unless otherwise indicated, to be controlled by wall-mounted controls as specified below.
- B. Control Requirements:
  1. Unless specifically indicated to be excluded, provide all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the control intent indicated.
  2. Capable of controlling shade speed for tracking within plus or minus 0.0625 inch throughout entire travel.
  3. Capable of stopping within accuracy of 0.125 inch at any point between open and close limits.
  4. Capable of assigning shades to groups and subgroups without rewiring.
  5. Capable of synchronizing multiple units of the same size to start, stop and move in unison.
  6. Provide all components and connections necessary to interface with other systems as indicated.
- C. Wall-Mounted Controls: UV stabilized visible parts meeting ASTM D4674; furnished with backlit buttons; provided by shade manufacturer.

1. Control Functions:
  - a. Open: Automatically open controlled shade(s) to fully open position when button is pressed.
  - b. Close: Automatically close controlled shade(s) to fully closed position when button is pressed.
  - c. Raise: Raise controlled shade(s) only while button is pressed.
  - d. Lower: Lower controlled shade(s) only while button is pressed.
  - e. Stop shade(s) in motion by tap on any button.
  - f. Presets: Provide button(s) as indicated for selection of programmable scenes.
2. Button Engraving: Manufacturer's standard engraving, unless otherwise indicated.

## **2.05 ACCESSORIES**

- A. Fascias: Size as required to conceal shade mounting.
  1. Style: As selected by Albert & Robinson Architects from shade manufacturer's full selection.
  2. Material and Color: To match shade.
- B. Brackets and Mounting Hardware: As recommended by manufacturer for mounting configuration and span indicated.
- C. Interior Side Channels: As required for light sealing blackout shade applications.
- D. Exterior Side Channels: As required in exterior applications for guiding and securing shade material.
- E. Lifting Cables: Nylon coated cable for lifting bottom-up type shades.
- F. Number Plates: Stamp number on opening and coordinate with marked packaging.
- G. Number Plates: Number each opening and shade. Provide aluminum number plates for each shade unit and each opening. Fasten shade plate to the back of roller. Fasten opening plate on unexposed surface of the opening.
- H. Fasteners: Non-corrosive, and as recommended by shade manufacturer.

## **2.06 FABRICATION**

- A. Field measure finished openings prior to ordering or fabrication.
- B. Fabricate shades to fit openings within specified tolerances.
  1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch space between bottom bar and window sill.
  2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb.
  3. Horizontal Dimensions - Inside Mounting: Provide symmetrical light gaps on both sides of shade not to exceed 3/4 inch total.
  4. Horizontal Dimensions - Outside Mounting: Cover window frames, trim, and casings completely.
  5. Horizontal Dimensions - Outside Mounting: Extend shades 2 inches beyond jambs on each side.
- C. Dimensional Tolerances: As recommended in writing by manufacturer.
- D. At openings requiring continuous multiple shade units with separate rollers, locate roller joints at window mullion centers; butt rollers end-to-end.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine finished openings for deficiencies that may preclude satisfactory installation.

### **3.02 PREPARATION**

- A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.
- B. Coordinate with window installation and placement of concealed blocking to support shades.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.
- B. Installation Tolerances:
  - 1. Inside Mounting: Maximum space between shade and jamb when closed of 1/16 inch.
  - 2. Maximum Offset From Level: 1/16 inch.
- C. Replace shades that exceed specified dimensional tolerances at no extra cost to State of Mississippi.
- D. Adjust level, projection and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

### **3.04 SYSTEM STARTUP**

- A. Motorized Shade System: Provide services of a manufacturer's authorized representative to perform system startup.

### **3.05 CLEANING**

- A. Clean soiled shades and exposed components as recommended by manufacturer.
- B. Replace shades that cannot be cleaned to "like new" condition.

### **3.06 PROTECTION**

- A. Protect installed products from subsequent construction operations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**





**SECTION 12 36 00  
COUNTERTOPS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Countertops for architectural cabinet work.
- B. Wall-hung counters and vanity tops.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 41 00 - Architectural Wood Casework: Use Section 06 41 00 for specification vanity, and countertop brackets and supports.
- B. Section 22 40 00 - Plumbing Fixtures: Sinks.

**1.03 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2021a.
- B. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- C. ISFA 3-01 - Classification and Standards for Quartz Surfacing Material; 2013.
- D. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- E. NSI (DSDM) - Dimensional Stone Design Manual, Version VIII; 2016.

**1.04 SUBMITTALS**

- A. See Section 01 33 00 - Shop Drawings, Product Data and Samples, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- F. Installation Instructions: Manufacturer's installation instructions and recommendations.
- G. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- B. Fabricator Qualifications: Same fabricator as for cabinets on which tops are to be installed.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

**1.07 FIELD CONDITIONS**

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## **PART 2 PRODUCTS**

### **2.01 COUNTERTOPS**

- A. Solid Surfacing Countertops: Solid surfacing sheet over continuous substrate.
  - 1. Flat Sheet Thickness: 1/2 inch, minimum.
  - 2. Color and Pattern: As indicated on drawings.
  - 3. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
  - 4. Other Components Thickness: 1/2 inch, minimum.
  - 5. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; marine edge.
  - 6. Back and End Splashes: Same sheet material, radiused top; minimum 4 inches high.
  - 7. Fabricate in accordance with manufacturer's standard requirements.
- B. Natural Quartz and Resin Composite Countertops: Sheet or slab of natural quartz and plastic resin over continuous substrate.
  - 1. Flat Sheet Thickness: 3/4 inch, minimum.
  - 2. Natural Quartz and Resin Composite Sheets, Slabs and Castings: Complying with ISFA 3-01 and NEMA LD 3; orthophthalic polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard stone fabrication tools; no surface coating; color and pattern consistent throughout thickness.
    - a. Factory fabricate components to the greatest extent practical in sizes and shapes indicated; comply with NSI (DSDM).
    - b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
    - c. Finish on Exposed Surfaces: Polished.
    - d. Color and Pattern: As indicated on drawings.
  - 3. Other Components Thickness: 3/4 inch, minimum.
  - 4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; edge profile as indicated on drawings; use marine edge at sinks.
  - 5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.
  - 6. Skirts: As indicated on drawings.
  - 7. Fabricate in accordance with manufacturer's standard requirements.

### **2.02 MATERIALS**

- A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- B. Joint Sealant: Mildew-resistant silicone sealant, white.

### **2.03 FABRICATION**

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
  - 1. Join lengths of tops using best method recommended by manufacturer.
  - 2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
  - 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
  - 4. All joint locations must be approved by Architect.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
  - 1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
  - 2. Height: 4 inches, unless otherwise indicated.
- C. Solid Surfacing: Fabricate tops up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Albert & Robinson Architects of unsatisfactory preparation before proceeding.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### **3.03 INSTALLATION**

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Seal joint between back/end splashes and vertical surfaces.

### **3.04 TOLERANCES**

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

### **3.05 CLEANING**

- A. Clean countertops surfaces thoroughly.

### **3.06 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION**