KADMAR PLAZA

ORLANDO, FLORIDA

CIVIL ENGINEERING

FLORIDA ENGINEERING GROUP INC.

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Orlando, Florida 32809— (407) 895–8324 FAX (407) 895–0325
CERTIFICATE #EB-0006595

Sam J. Sabaali, P.E. # 42075

# GENERAL NOTES:

STRUCTURAL DESIGN GROUP

Minsheng Xie P.E. Florida No. 51161

10244 East Colonial Drive, Suite 202 Orlando, Florida 32817 — 407—677—5565 Fax 407—730—2999 Certificate of Authorization No. 25873

TENANT IS REQUIRED TO MAKE A FIELD SURVEY OF THE EXISTING ELECTRICAL SERVICE AND IS RESPONSIBLE FOR MAKING ANY AND/OR ALL MODIFICATIONS REQUIRED TO ENSURE THAT THE TOTAL CONNECTION LOAD DOES NOT EXCEED THE ELECTRICAL SERVICE.

APPROVAL OF TENANT'S CONSTRUCTION DOCUMENTS AND SPECIFICATIONS BY THE LANDLORD <u>DOES NOT</u> RELEASE THE TENANT OR THE TENANT'S CONTRACTOR FROM COMPLYING WITH THE LEASE AGREEMENT AND ALL APPLICABLE BUILDING CODES AND GOVERNING REGULATIONS.

NOTHING IS PERMITTED TO BE ATTACHED TO, SUSPENDED FROM, OR PENETRATE THE ROOF DECK ABOVE. YOU ARE REQUIRED TO FRAME, BRACE, AND/OR SUSPEND, AS NEEDED, TO/FROM THE TOP CHORD OF JOISTS OR STRUCTURAL STEEL WHICH EXISTS ABOVE YOU RESPECTIVE TENANT SPACE.

THE TENANT SHALL BE RESPONSIBLE FOR VERIFYING THAT THESE REMODEL/CONSTRUCTION DOCUMENTS MEET ALL A.D.A. STANDARDS OR REQUIREMENTS.

PLEASE NOTE: ANY ITEM SCHEDULED TO BE REUSED MUST BE REFURBISHED AND MAINTAINED TO A "LIKE NEW" CONDITION. NO EXCEPTIONS

1. ALL WORK SHALL CONFORM TO THE FOLLOWING: FLORIDA BUILDING CODE SIXTH EDITION (2017), BUILDING FLORIDA BUILDING CODE SIXTH EDITION (2017), FUEL GAS

10381 Hart Branch Circle Orlando, Florida 32832— (407) 381—4555 FAX (407) 249—1520 CA #26069

Randall D. Stoffer, P.E. # 37367

- FLORIDA BUILDING CODE SIXTH EDITION (2017), MECHANICAL FLORIDA BUILDING CODE SIXTH EDITION (2017), PLUMBING 2017 FLORIDA FIRE PREVENTION CODE
- 2014 NATIONAL ELECTRIC CODE FLORIDA BUILDING CODE SIXTH EDITION (2017), ACCESSIBILITY CODE. FLORIDA BUILDING CODE SIXTH EDITION (2017), ENERGY CONSERVATION
- 2. SUBCONTRACTORS SHALL VERIFY ALL CONDITIONS, DETAILS AND DIMENSIONS BEFORE PROCEEDING WITH

THE WORK AND SHALL BE NOTIFIED OF ANY DISCREPANCIES.

- 3. DO NOT SCALE DRAWINGS.
- 4. ALL WORK IN QUESTION INCLUDING MATERIALS, FINISHES AND COLORS SHALL BE COORDINATED WITH THE PROJECT MANAGER.
- 5. SPRINKLER CONTRACTOR SHALL VERIFY EXISTING LAYOUT AND SUBMIT PROPOSAL OF WORK REQUIRED TO MEET CODE.
- 6. MECHANICAL AND ELECTRICAL SUBCONTRACTORS SHALL BE RESPONSIBLE FOR SUBMITTING DRAWINGS AND OBTAINING THEIR RESPECTIVE PERMITS.
- TENANT TO CERTIFY THAT NO ASBESTOS CONTAINING MATERIAL HAS BEEN USED FOR CONSTRUCTION OF THIS PREMISES.

8. ALL INTERIOR WALL AND CEILING FINISHES SHALL COMPLY WITH NFPA 101, SECTION 10.2.3 AND TABLE 803.5 OF FBC 2010.

OCCUPANCY - M (MERCANTILE), SHELL ONLY CONSTRUCTION TYPE - II-B, FULLY SPRINKLERED MIN. INT. FINISH CLASS - "B"

FBC SIXTH EDITION (2017) - TABLE 601 - FIRE RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS

ØHR

CONSTRUCTION TYPE II-B PRIMARY STRUCTURAL FRAME BEARING WALLS

EXTERIOR

INTERIOR

NONBEARING WALLS AND PARTITONS

FLOOR CONSTRUCTION

ROOF CONSTRUCTION

OHR

NOTE:

NEW DOORS AND WINDOWS HAVE BEEN DESIGNED TO MEET OR EXCEED THE REQUIREMENTS OF SEC. 1609 OF THE FLORIDA BUILDING CODE SIXTH EDITION (2017).

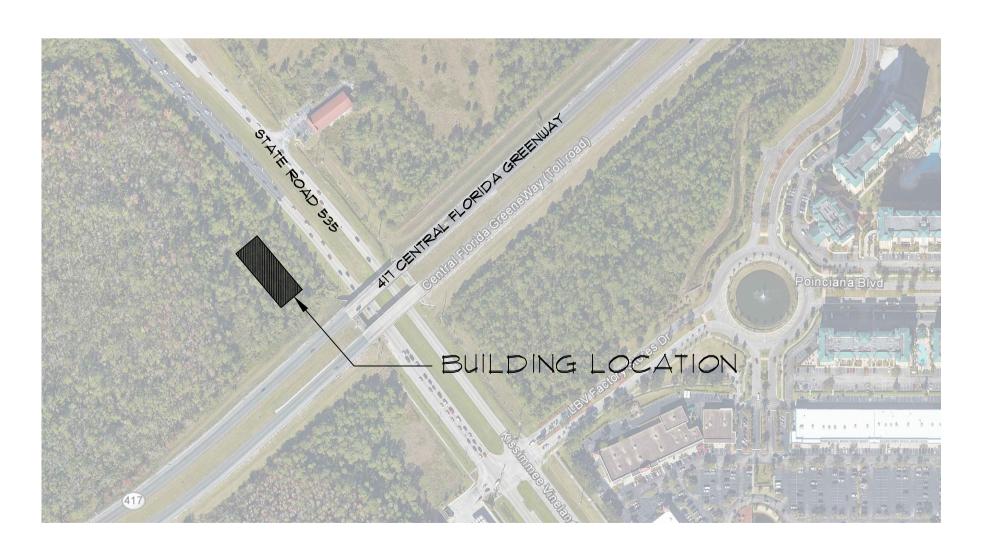
1. RISK CATEGORY = 11
2. NOMINAL DESIGN WIND SPEED = 124
3. ULTIMATE DESIGN WIND SPEED = 160
4. WIND IMPORTANCE FACTOR = 1.0
5. WIND EXPOSURE = CATEGORY 'C'

TABULAF	RINFORMATION		
CONDITIONED AREA COVERED ENTRANCE SPRINKLER ROOM	14,948 SQ FT 1,926 SQ FT 24 SQ FT		
TOTAL AREA UNDER ROOF	16,898 SQ FT		

SI	HEET #	SHEET DESCRIPTION	REVISION
	CS	COVER SHEET	
	CNO1	GENERAL NOTES	
-	GN01 GN02		
-	GN02 GN03	GENERAL NOTES GENERAL NOTES	
,	GN03 GN04	GENERAL NOTES  GENERAL NOTES	
7I	GN04 GN05	GENERAL NOTES  GENERAL NOTES	
$\mathbb{R}^{\prime}$	GN05 GN06	GENERAL NOTES  GENERAL NOTES	
5	GN07	GENERAL NOTES  GENERAL NOTES	
ARCHITECTURAI	GNOT	GENERAL NOTES	
$O_{1}$	A100	SITE PLAN	
	A101	FLOOR PLAN	
Ŧ	A102	REFLECTED CEILING PLAN	
$\frac{1}{2}$	A103	ROOF PLAN	
NY	A201	EXTERIOR ELEVATIONS	
A			
Ì	A301	SECTIONS	
Ì	A302	SECTION/ DETAILS	
	A601	SCHEDULES/ DETAIL	
ĺ	A701	LIFE SAFETY PLAN	
Ī			
	S1.01	STRUCTURAL GENERAL NOTES	
,	S2.01	FOUNDATION PLAN ROOF FRAMING PLAN	
STRUCTURAL	S3.01		
$\mathbb{R}^{2}$	S5.01	DETAILS	
5	S5.02	DETAILS	
	S5.03	DETAILS	
5	S5.04	DETAILS	
35	S5.05	DETAILS	
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MECHANICAL			
$C_{1}$	M-1	FLOOR PLAN — HVAC	
ij	M-2	HVAC NOTES AND DETAIL	
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A	ES1	SITE PLAN — ELECTRICAL	
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<u>ال</u>	E-2	ELECTRICAL DETAILS AND RISER	
ELECTRICAL	1 ~	LILOTINICAL DETAILS AND MISEN	
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7 17			
NG	P-1	FLOOR PLAN – PLUMBING	
31			
1E	P-2	PLUMBING ISOMETRICS	
J	P-3	DETAILS & NOTES	
PLUMBI			
<u>Д</u>			

INDEX OF DRAWINGS

SHELL PERMIT ONLY - INTERIOR BUILDOUT WILL BE PERMITTED SEPARATELY AT A LATER DATE



LOCATION PLAN



173C518@3 DATE @1/@9/2

<u>n - 0 w 4 w 0 - 0</u>

COVER SHEE

KADMAR PLAZA

OMANNO PLANNING AND A POS50 info@rabits-architect.com

CHITECTURE

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FAX ACT 223, 6000

SIGN/SEAL

DATE

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### Division 2 - Sitework

Section 02361 Termite Control See Site Engineering Drawings

#### Division 3 - Concrete

Section 03300 Cast - In Place Concrete

### Division 4 - Masonry

Section 04810 Unit Masonry Assemblies

### **Division 5 - Metals**

# Reference Structural Drawings

#### **Division 6 - Wood and Plastic**

Section 06100 Rough Carpentry Section 06200 Pre-fabricated wood trusses

### <u>Division 7 - Thermal and Moisture Protection</u>

Section 07210 Building Insulation Section 07410 Standing Seam Metal Roofing

Section 07500 Membrane Roofing Section 07620 Sheet Metal Flashing & Trim

Section 07720 Roof Accessories

Section 07920 Joint Sealants

### **Division 8 - Doors and Windows**

Section 08110 Steel Doors and Frames

Section 08211 Flush Wood Doors

Section 08410 Aluminum Entrances and Storefront

Section 08800 Glazing

Section 09220 Portland cement Plaster

#### Section 09260 Gypsum Board Assemblies Section 09512 Acoustical Ceiling Tiles

**Division 10 - Specialties** 

#### Section 10200 Louvers and Vents Section 10536 Fabric Awnings

Section 10801 Toilet and Bath Accessories

### Division 11 - Equipment

Not used

Not used

### **Division 13 - Special Construction**

Not Used

#### **Division 14 - Conveying Systems** Not Used

### **Division 15 - Mechanical**

Reference: Mechanical Drawings

### Division 16 - Electrical

**Reference Electrical Drawings** 

### SECTION 02361 - TERMITE CONTROL

# PART I - GENERAL

### 1.1 SUMMARY

A. This Section includes soil treatment for termite control.

comply with EPA regulations and authorities having jurisdiction.

### 1.2 SUBMITTALS

A. Product Data: For each product indicated, including EPA-Registered Label.

B. Product certificates.

# 1.3 QUALITY ASSURANCE

A. Applicator Qualifications: A pest control operator who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment in jurisdiction where Project is located

## B. Regulatory Requirements: Formulate and apply termiticides, and label with a Federal registration number, to

## 1.4 WARRANTY

A. Soil Termiticide Special Warranty: Manufacturer's standard form, signed by applicator and Contractor, certifying that applied soil termiticide treatment will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered within 5 years from date of Substantial Completion, retreat the soil and repair or replace damage caused by termite infestation.

### PART 2 -PRODUCTS

### 2.1 TERMITE CONTROL

- A. Soil Treatment: EPA-registered termiticide complying with requirements of authorities having jurisdiction, in a soluble or emulsible, concentrated formulation that dilutes with water or foaming agent. Use only soil treatment solutions that are not harmful to plants.
- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- a. AgrEvo Environmental Health, Inc.; a company of Hoechst and Schering, Berlin.
- b. Bayer Corp.; Garden & Professional Care. c. DowElanco.

### PART 3 - EXECUTION

## 3.1 SOIL TREATMENT APPLICATION

- A. Apply soil treatment at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to the product's EPA-Registered Label.
- 1. Mix termiticide solution to a uniform consistency.
- 2. Apply to produce a continuous horizontal and vertical termiticidal barrier or treated zone around and under

#### constructions. Distribute the treatment evenly.

- 3. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
- 4. Foundations: Adjacent soil including soil along entire inside perimeter of foundation walls, along both sides of interior partition walls, around pipes and electric conduit penetrating slab, and around interior column footers, piers, and chimney bases; and along entire outside perimeter, from grade to bottom of footing. Avoid soil washout
- 5. Crawlspaces: Soil under and adjacent to foundations. Treat adjacent areas including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.
- 6. Masonry: Treat voids.
- 7. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.
- B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry. C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are
- installed. Use waterproof barrier according to EPA-Registered Label instructions. D. Post warning signs in areas of application.
- E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

#### END OF SECTION 02361

#### SECTION 03300 - CAST-IN-PLACE CONCRETE

## PART 1 - GENERAL

A. This Section includes cast-in-place concrete, including reinforcement, concrete materials, mix design, placement procedures, and finishes.

- A. Product Data: For each manufactured material and product indicated.
- B. Design Mixes: For each concrete mix indicated.
- C. Shop Drawings: Include details of steel reinforcement placement including material, grade, bar schedules, stirrup
- spacing, bent bar diagrams, arrangement, and supports. D. Material test reports.

#### 1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM
- C 94 requirements for production facilities and equipment. B. Comply with ACI 301, "Specification for Structural Concrete," including the following, unless modified by the
- requirements of the Contract Documents. 1. General requirements, including submittals, quality assurance, acceptance of structure, and protection of in-place
- Formwork and form accessories. 3. Steel reinforcement and supports.
- Concrete mixtures.
- 5. Handling, placing, and constructing concrete.

#### PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Formwork: Furnish formwork and form accessories according to ACI 301.
- 1. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- 2. Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets. C. Concrete Materials:
- 1. Portland Cement: ASTM C 150, Type I.
- 2. Normal-Weight Aggregate: ASTM C 33, uniformly graded, not exceeding 1/4-inch nominal size. 3. Lightweight Aggregate: ASTM C 330.
- 4. Water: Complying with ASTM C 94. D. Admixtures:
- 1. Air-Entraining Admixture: ASTM C 260. 2. Water-Reducing Admixture: ASTM C 494, Types A, D, F or G. If "F", see 2.2A.
- E. Vapor Retarder: Polyethylene sheet, ASTM D 4397, not less than 10 mils thick.
- FPreformed Joint-Filler: ASTM D 1751, asphalt-saturated cellulosic fiber. G. Curing Materials:
- 1. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete. 2. Moisture-Retaining Cover: ASTM C 171, polyethylene film.
- Water: Potable.
- 4. Clear, Solvent-Borne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

## 2.2 CONCRETE MIXES

- A. Comply with ACI 301 requirements for concrete mixtures.
- B. Prepare design mixes, proportioned according to ACI 301, for normal-weight concrete determined by either laboratory
- trial mix or field test data bases, as follows: Compressive Strength (28 Days).
- 2. Slump: 4 inches.

### PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. Formwork: Design, construct, erect, shore, brace, and maintain formwork according to ACI 301.
- B. Vapor Retarder: Install, protect, and repair vapor-retarder sheets according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.
- 1. Lap joints 6 inches and seal with manufacturer's recommended tape. C. Steel Reinforcement: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting
- reinforcement. 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- D. Joints: Construct joints true to line with faces perpendicular to surface plane of concrete.
- 1. Construction Joints: Locate and install so as not to impair strength or appearance of concrete, at locations indicated 2. Isolation Joints: Install preformed joint filler at junctions with slabs-on-grade and vertical surfaces, Such as column
- pedestals, foundation walls, grade beams, and other locations, to full width and depth of joint, terminating flush with 3. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as
- indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows: a. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface
- and before concrete develops random contraction cracks. E. Tolerances: Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials.

### 3.2 CONCRETE PLACEMENT

A. Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete. Consolidate concrete with mechanical vibrating equipment.

### 3.3 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and Defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed Down or chipped off. 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Completely remove fins and other projections.

- 1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied
- directly to concrete, such as waterproofing, damp proofing, veneer plaster, or painting. 2. Apply grout-cleaned finish, defined in ACI 301, to smooth-formed finished concrete.
- A. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

#### 3.4 FINISHING UNFORMED SURFACES

- A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not
- B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on the surface.
- C. Scratch Finish: Apply scratch finish to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finish, unless otherwise indicated.
- D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo. E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be
- F. Nonslip Broom Finish: Apply a nonslip broom finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin

### 3.5 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection, and follow recommendations in ACI 305R for hot-weather protection during
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions occur before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.

continuity of coating and repair damage during curing period.

D. Cure formed and unformed concrete for at least seven days as follows: 1. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain

### 3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Tests will be performed according to ACI 301.
- 1. Testing Frequency: One composite sample for each day's pour of each concrete mix exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

### END OF SECTION 03300

#### SECTION 04810 - UNIT MASONRY ASSEMBLIES

#### PART - 1 GENERAL

1.1 SUMMARY A. This Section includes unit masonry assemblies consisting of the following

- A. Product Data: For each masonry unit, accessory, and other manufactured product indicated. B. Samples: Showing the full range of a,1urs and textures available for exposed masonry units and colored mortars.

A. Cold-Weather Requirements: Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or

C. Material Test Reports: For each type of masonry unit, mortar, and grout required.

by freezing conditions. Comply with cold-weather construction requirements in ACI 530.1.

1. Integral color split-face concrete masonry units with integral water repellant.

#### B. Hot-Weather Requirements: When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

1.3 PROJECT CONDITIONS

### PART 2 - PRODUCTS

2.1 COLORS AND TEXTURES

## A. Exposed Masonry Units: As selected from manufacturer's full range.

- 2.2 MASONRY UNITS
- A. Concrete Masonry Units: ASTM C 90. 1. Unit Compressive Strength: 1900-psi minimum, average net-area compressive strength.
- 2. Weight Classification: Normal weight.
- 3. Type: II, nonmoisture-controlled units.
- 4. Exposed Faces of Decorative Units: Normal-weight aggregate, split-face finish 5. Special Shapes: Provide for lintels, corners, jambs, sash, control joints, headers, bonding, and other special

6. Water Repellant Admixture: In addition to other constituants previously established as suitable for use in concrete

7. Manufacturers: Subject to compliance with requirements, provide concrete masonry units from the following:

masonry conforming to ASTM standards, all units shall be manufactured with an integral water repellant admixture. The integral water repellant admixture shall be certified, by the admixture manufacturer, with the wall showing no visible water when tested in accordance with ASTM E514-90.

## a. Demaco.

C. Mortar Cement ASTMC 1329

1. Colored Masonry Cement

- 2.3 MORTAR AND GROUT MATERIALS
- A. Portland Cement: ASTM C 150. Type I. except Type III may be used for cold-weather construction. B. Hydrated Lime. ASTMC 207,type S
- 1. Products:
- a. Blue Circle Cement; Magnolia Superbond Mortar Cement. b. Lafarge Corporation; Lafarge Mortar Cement.
- D. Masonry Cement: ASTM C 91. E. Pigmented Mortar: Colored cement or cement-lime formulation as required to produce the color indicated.
- a. Products:
- 1) Blue Circle Cement; Magnolia Masonry Cement. 2) Essroc Materials, Inc.; Brixment-in-Color.
- 3) Holnam, Inc.; Rainbow Mortamix Custom Color Masonry Cement.
- F. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
- G. Aggregate for Grout: ASTM C 404. H. Water: Potable.

### 2.4 REINFORCING

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M; ASTM A 616/A 616M, including Supplement 1; or ASTM A 617/A

C. Adjustable Anchors for Connecting to Steel Frame: Two-piece assemblies that allow vertical or horizontal adjustment

- B. Masonry Joint Reinforcement: ASTM A 951; mill galvanized, carbon-steel wire for interior walls and hot-dip galvanized, carbon-steel wire for exterior walls 1. Single-Wythe Masonry: Use either ladder or truss type with single pair of side rods and cross rods spaced not more
- but resist tension and compression forces perpendicular to wall. 1. Anchor section Crimped 1/4-inch diameter, galvanized steel wire anchor section for welding steel.

- 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.1875-inch-
- D. Anchors for Connecting to Concrete: Provide two-piece assemblies that allow vertical or horizontal adjustment but
- resist tension and compression forces perpendicular to wall.
- 1. Anchor Section: Dovetail anchor section formed from 0.0528-inch- thick, galvanized steel sheet 2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0. 1875-inch-

#### 2.5 MISCELLANEOUS MASONRY ACCESSORIES

diameter, galvanized steel wire.

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible to 35 percent;
- ormulated from neoprene. B. Preformed Control-Joint Gaskets: Designed to fit standard sash block and to maintain lateral stability masonry wall.
- Made from styrene-butadiene-rubber compound complying with ASTM D 2000, Designation M2AA-805. C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type (No. 15 asphalt felt).

PART 3 - EXECUTION

2.6 MASONRY CLEANERS A. Job-Mixed Detergent Solution: Solution of 1/2-cup dry measure tetrasodium polyphosphate and 1/2-c dry measure laundry detergent dissolved in I gal. of water.

3.1 INSTALLATION, GENERAL A. Cut masonry units with motor-driven saws. Allow units cut with water-cooled saws to dry before placing, unless wetting

1. For conspicuous vertical and horizontal lines, such as external corners, door jambs, reveals, a expansion and control

- of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed. B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
- C. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:

## joints, do not vary from plumb by more than 1/4 inch in 20 feet, nor 1/2 in maximum.

corners, jambs, and, where possible, at other locations.

- 3.2 LAYING MASONRY WALLS A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses a for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half size units, particularly at
- B. Bond Pattern for Exposed Masonry: Lay exposed masonry in bond pattern indicated; do not use units with less than nominal 4-inch horizontal face dimensions' at corners or jambs

#### C. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

### 3.3 MORTAR BEDDING AND JOINTING

otherwise indicated.

A. Lay hollow masonry units as follows

of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

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, and pilasters, and where adjacent to cells or cavities td be filled with grout.

B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than the joint thickness, unless

3. For starting course on footings where dells are not grouted, spread out full mortar bed, including areas under cells.

3.4 MASONRY JOINT REINFORCEMENT

### B. Provide continuity at corners and wall intersections by using prefabricated "L" and "T" sections.

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following: 1. Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise

2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.

A. Provide continuous masonry joint reinforcement as indicated. Install with a minimum cover of 5/8 inch on exterior side

3.6 LINTELS

#### A. Provide masonry lintels where shown. Provide precast lintels made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcing bars indicated or required to support loads indicated.

- 3.7 FIELD QUALITY CONTROL
- A. Owner will engage a qualified independent testing agency to perform field quality-control testing indicated below 1. Testing Frequency- Tests and Evaluations listed in these subparagraphs will be performed during construction for

3. Grout: Sampled and tested for compressive strength per ASTM C 1019.

each 5000 sq. ft. of wall area or portion thereof. 2. Mortar: Properties will be tested per ASTM C 780.

### 3.8 PARGING

A. Parge predampened masonry walls, where indicated, with Type S or Type N mortar applied in 2 uniform coats to a total thickness of 3/4 inch with a steel-trowel finish. Form a wash at top of parging and a cove at bottom. Damp-cure parging for at least 24 hours.

A. Clean unit masonry by brushing to remove mortar and smears before tooling joints, as work progresses.

### 3.9 CLEANING

END OF SECTION 04810

### SECTION 06100 - ROUGH CARPENTRY

1.1 SUMMARY

PART 1 -GENERAL

Wood nailers.

PART 2 - PRODUCTS

#### A. This Section includes the following: Wood blocking.

#### Wood sheathing. 4. Plywood backing panels.

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards

1. Factory mark each piece of lumber with grade stamp of grading agency.

- 2. For exposed lumber indicated to receive stained or natural finish, mark grade stamp on end or back of each piece. 3. Provide dressed lumber, S4S, unless otherwise indicated.
- 4. Provide dry lumber with 15 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated. B. Wood Structural Panels:

Committee Board of Review.

 Plywood: DOC PS I. 2. Oriented Strand Board: DOC PS 2.

SIGN/SEAL

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- A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that is not in contact with The ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic
- B. Application: Treat items indicated on Drawings, and the following:
- 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flaming, vapor barriers, and waterproofing.
- 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
- 3. Wood framing members less than 18 inches above grade. 4. Wood floor plates that are installed over concrete slabs directly in contact with earth.

#### 2.3 FIRE-RETARDANT TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, provide materials that comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having
- 1. Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664, for item number and
- 2. Use treatment that does not promote corrosion of metal fasteners.
- 3. Use Exterior type for exterior locations and where indicated. 4. Use Interior Type A High Temperature (HT), unless otherwise indicated.

### 2.4 DIMENSION LUMBER

- A. General: Of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.
- B. Non-Load-Bearing Interior Partitions: Construction, Stud, or No. 2 grade and any of the following species:
- Mixed southern pine; SPIB
- 2. Eastern softwoods; NELMA
- C. Exposed Framing: Hand select material for uniformity of appearance and freedom from characteristics that would impair finish
- 1. Species and Grade: As indicated above for load-bearing construction of same type.
- 2. Species and Grade: Hem-er or Hem-fir (north), Select Structural grade; NLGA, WCLIB, or WWPA.
- 3. Species and Grade: Southern pine, Select Structural No. 1 grade; SPIB.
- 4. Species and Grade: Spruce-pine-fir or Spruce-pine-fir (south), Select Structural No. I grade; NELMA, NLGA, WCLIB, or

#### 2.5 SHEATHING

- A. Plywood Wall Sheathing: Exterior, Structural I sheathing.
- B. Paper-Surfaced Gypsum Wall Sheathing: ASTM C 79/C 79M, with water-resistant material incorporated into core and with water-repellent per bonded to core's face, back, and long edges.
- Manufacturers:
- a. American Gypsum Co.
- b. G-P Gypsum Corporation.
- c. National Gypsum Company.
- d. United States Gypsum Co. 2. Type and Thickness: Regular, 1/2 inch and Type X, 5/8 inch thick as indicated on drawings.
- C. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/C 11 77M.
- 1. Product: Subject to compliance with requirements, provide "Dens-Glass Gold" by G-P Gypsum Corp.
- 2. Type and Thickness: Regular, 1/2 inch and Type X, 5/8 inch thick as indicated on drawings.
- D. Extruded-Polystyrene-Foam Wall Sheathing: ASTM C 578, Type IV, in manufacturer's standard lengths and widths with tongue-and-groove or shiplap long edges as standard with manufacturer.
- Manufacturers
- c. DiversiFoam Products.
- d. Dow Chemical Company (The). e. Owens Corning.
- Tenneco Building Products. E. Plywood Roof Sheathing: Exterior sheathing.
- F. Oriented-Strand-Board Roof Sheathing: Exposure 1 sheathing.
- 2.6 PLYWOOD BACKING PANELS

# A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness

indicated or, if not indicated, not less than 1/2 inch thick.

#### 2.7 MISCELLANEOUS MATERIALS A. Fasteners:

- 1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- 2. Power-Driven Fasteners: CABO NER-272.
- 3. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers. Metal Framing Anchors: Made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating
- C. Building Paper: Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated.

### PART 3 -EXECUTION

### 3.1 INSULATION

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate [furring,] nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- B. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.
- C. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
- 1. CABO NER-272 for power-driven fasteners.

nails. Cover upstanding flashing with 4-inch overlap.

- 2. Published requirements of metal framing anchor manufacturer. D. Apply building paper horizontally with 2-inch overlap and 6-inch end lap; fasten to sheathing with galvanized staples or roofing
- E. Apply sheathing tape to joints between sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

### END OF SECTION 06100

### SECTION 06200

### PRE-ENGINEERED WOOD TRUSSES:

General: Provide Pre-engineered wood trusses where shown. Comply with applicable requirements of NLMA's "National Design Specifications for Stress Graded Lumber and Its Fastenings" and Truss Plate Institute's "Light Metal Connected Wood Trusses". See notes requiring special visual grade lumber for architecturally exposed areas.

Provide pre-engineered and shop-assembled trusses by a recognized manufacturer of wood trusses. Design for the span, loading, truss shape and spacing shown. If loads are not shown design as per governing Building Code. Fabricate in plant of manufacturer or his licensed fabricator.

Connector Plate Manufacturer's Qualifications: Provide truss connector plates manufactured by a firm which is a member of TPI and which complies with TPI quality control procedures for manufacture of connector plates published in TPI "Quality Standard for Metal Plate Connected Wood Trusses", and has a minimum of five years experience of similar projects.

Fabricator's Qualifications: Provide trusses by a firm which has a record of successfully fabricating trusses similar to type indicated and which complies with the following requirements for quality

Fabricator practices a quality control program which complies with, or is comparable to, one published in TPI "Quality Standard for Metal Plate Connected Wood Trusses" and which involves inspection by an independent inspection and testing agency acceptable to Architect and authorities having jurisdiction.

Single Source Responsibility for Connector Plates: Provide metal connector plates from a single

Quality Control: Submit Certification Fabricated Trusses have been inspected in accordance with TPI Quality Control procedures or by an independent testing laboratory.

Store, handle, and erect trusses in accordance with manufacturer's printed instructions. Provide temporary supports and bracing as required. Note: The truss erector shall design and provide any temporary bridging and bracing as required during erection of the roof trusses, temporary bridging and bracing shall remain in place until the complete system has been installed and completed.

Bridging: Unless otherwise shown, install continuous 2x4 horizontal bridging at top and bottom chord, at each end and at 8 feet on centers. Nail to each truss.

Manufacturer's specifications and installation instructions for all pre-engineered wood trusses.

Shop Drawings: Submit shop drawings for all pre-engineered wood trusses. Provide erection plans, indicate species and stress grade of lumber to be used and details of metal connectors to be used at joints. Show pitch, span, and location of trusses, and all permanent horizontal or diagonal bridging required. Provide large scale details of typical connections and anchorages.

Submit Truss Manufacturer's design and engineering data for all pre-engineered wood trusses including stress diagrams and name and seal of a licensed professional structural engineer registered in Florida.

Submit truss manufacturer's qualifications and quality control program procedures.

#### Performance Criteria and Design Requirements for Wood Trusses:

Wood trusses shall be designed in accordance with The Building Code specified and as indicated on the drawings. Wind loads shall be designed in accordance with the specified design requirements and The Building Code indicated. Wood truss submittals will not be reviewed or approved until all of the design requirements have been completed and all submittals have been received. Changes or revisions to the design criteria or intent of the drawings will not be approved unless approved in writing by the engineer prior to the shop drawing and truss engineering submittal.

The Design Building Code shall be The Florida Building Code, 2001 Edition, unless otherwise indicated. Wind design shall be based on ASCE 7-98. See drawings for additional wind design criteria.

All wood truss members shall be No. 2 Southern Pine or better minimum lumber grade for all top and bottom chords and all web members. Provide members of sufficient size and located properly to allow installation of the support connectors shown on the drawings.

#### END OF SECTION 06200

SECTION 07210 - BUILDING INSULATION

## PART I - GENERAL

#### 1.1 SUMMARY

- A. This Section includes the following:
- Concealed building insulation 2. Loose-fill building insulation.
- Vapor retarders.

#### 1.2 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

### PART 2 - PRODUCTS

### 2.1 INSULATING MATERIALS

- A. General: Provide insulating materials that comply with requirements and with referenced standards
- B. Molded-Polystyrene Insulation: ASTM C 578, Type I, 0.90 lb/cu. ft, with maximum flame-spread and smoke-developed indices of 75 and 450, respectively. For use in nonrated masonry walls.
- C. Mineral-fiber blanket insulation consisting of fibers manufactured from glass:
- 1. Faced Mineral-Fiber Blanket Insulation: ASTM C 665, Type III, Class A; Category 1, faced with foil-scrim-kraft, foil-scrim, or foil-scrim-polyethylene vapor-retarder membrane on one face
- D. Perlite Loose-Fill Insulation: ASTM C 549, Type II or Type IV, with a thermal resistance for 4.1- to 7.4- lb/cu. ft. insulation of 3.3 to 2.8 deg F x h x sq. ft/Btu at 75 deg F for 1-inch thickness. For use in rated masonry walls
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the Producer Members of Perlite

### 2.2 VAPOR RETARDERS

- A. Polyethylene Vapor Retarder: ASTM D 4397, 8 mils thick, with maximum permeance rating of 0.13 perm.
- B. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

### 2.3 AUXILIARY INSULATING MATERIALS

A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

### PART 3 -EXECUTION

- A. General: Install insulation to comply with insulation manufacturer's written instructions applicable to products and application indicated. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- B. Pour granular insulation into cavities indicated to receive insulation, taking care to fill voids completely. Maintain inspection ports to show presence of insulation at extremities of each pour area. Close ports after confirming complete coverage. Limit fall of insulation to one story in height, but not exceeding 20 feet.
- C. Installation of General Building Insulation: Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

### 3.1 INSTALLATION

adjoining framing members.

- 1. Seal joints between closed-cell (nonbreathing) insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant.
- 2. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements: a. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to
  - fill cavity, provide lengths that will produce a snug fit between ends. b. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and
- 3. For metal-framed wall cavities where cavity heights exceed 96 inches support unfaced blankets mechanically and support faced blankets by taping stapling flanges to flanges of metal studs.
- 4. Retain insulation in place by meta' clips and straps or integral pockets within window frames, spaced at intervals recommended in writing by insulation manufacturer to hold insulation securely in place without touching spandrel glass. Maintain cavity width of dimension indicated between insulation and glass.
- 5. Install insulation where it contacts perimeter fire-containment system to prevent insulation from bowing under pressure from perimeter fire-containment system.

- 6. Place loose-fill insulation into spaces and onto surfaces as shown, either by pouring or by machine blowing to comply with ASTM C 1015. Level horizontal applications to uniform thickness as indicated, lightly settle to uniform density, but do not compact excessively.
- 7. Stuff glass-fiber insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent
- of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.
- D. Installation of Vapor Retarders: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
- 1. Seal vertical joints in vapor retarders over framing by lapping not less than two wall studs. Fasten vapor retarders to
- 2. Seal overlapping joints in vapor retarders with adhesives or vapor-retarder tape according to vapor retarder manufacturer's instructions. Seal butt joints and fastener penetrations with vapor-retarder tape. Locate all joints over framing members or other solid substrates

framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c.

- 3. Firmly attach vapor retarders to substrates with mechanical fasteners or adhesives as recommended by vapor-retarder
- 4. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarder.
- 5. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarder.

#### END OF SECTION 07210

#### SECTION 07410 - STANDING SEAM METAL ROOFING

PART I - GENERAL

#### 1.1 DESCRITION

A Work includes Arkema "Kynar 500" fluoropolymer coating system standing seam metal roofing materials and flashings and work incidental thereto required to complete and provide a watertight roofing system over all roof surfaces shown on the drawings.

### B. Related work specified elsewhere:

Section 07210: Building Insulations

2. Section 07710: Sheet Metal Flashing and Trim

- 1.2 QUALITY ASSURANCE A. Have all work done by applicators approved by the manufacturer of the materials and installed in strict accordance with the manufacturer's direction, and all applicable requirements of Factory Mutual Engineering Corporation
- B. Comply with requirements of Factory Mutual Loss Prevention Data 1-29 edition for resistance to wind blow-off in correlation with requirements in applicable building codes.

### 1.3 SUBMITTALS

A. Product Data: Submit manufacturer's product information and installation instruction for each item used in roofing installation.

### 1.4 JOB CONDITIONS

wet or likely to become damp or wet by the elements. 1.5 WARRANTY AND CERTIFICATION

that roof deck and flashing attachments and all other conditions have been met as required to produce a bondable or

guaranteed roofing and flashing application, and that it is in compliance with FM or UL classification requirements,

A. Weather: Conduct no roofing operations when water in any form is present on the deck, or when materials are damp,

A. 30 year unconditional guarantee. The General Contractor shall furnish the Owner with a certified, written statement

B. Provide the Owner with the manufacturers written 30-year No Dollar Limit Roof System Guarantee. Contractor shall provide a 20-year workmanship guarantee, on the installation of the above roofing and components.

all as have been included in these Specification and/or indicted on the drawings, or both.

## PART 2 - PRODUCTS

## 2.1 ROOFING SYSTEM

- A. Kynar 500 fluoropolymer coating system standing seam metal roofing panels with the appropriate base flashing and metal counter flashing or wall covering, as specified manufacturers specifications. Roof shall be installed by a roofing Contractor authorized to install the specified Roof System.
- B 16" Wide 26 GA Pre-finished Integral Metal valleys and 2-1/2" 26GA. Integral Metal drip edge.
- C. Finish to meet performance criteria of AAMA 2605 Specification.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Make all sub-surfaces free from material projections, dust, loose and foreign materials and any other obstruction, presenting a smooth plane, ready for installation.
- B. No roofing shall be applied until all vents, pipes, or roof mounted or protruding items have been installed in their final position and the general condition and acceptability of the deck surface to be covered has been determined by
- C. Commencing of roofing application shall constitute acceptance of the deck surface by roofing applicator.

### A. Standing seam metal roof system shall be installed on 30 lb felt paper approved by the roofing manufacturer, and

3.2 INSTALLATION

installed in strict accordance with manufacturer's written specification

A. When work is stopped at the end of the day, or when work is stopped because of the probability of precipitation,

#### exercise care to ensure that water does not flow beneath completed sections of roof by sealing loose edge of roofing system in accordance with the roofing manufacturer's printed instruction.

3.4 FIELD QUALITY CONTROL

- 3.5 CLEAN-UP
- A. Clean entire roof surface B. Promptly remove foreign matter, debris, equipment and surplus materials from job site.

-END OF SECTION-

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#### SECTION 07500 SINGLE PLY ROOFING SYSTEM THERMAL PROPYLENE OLEFIN (TPO)

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#### CONSTRUCTION STANDARD SPECIFICATION

SECTION 07533

#### SINGLE PLY ROOFING SYSTEM - THERMAL PROPYLENE OLEFIN (TPO)

### PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provision of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections.
- B. Related Sections include the following:

1. Section 07600 Flashing and Sheet Metal

2. Section 13100 Lightning Protection

3. Section 15401 Plumbing, for roof drains

### 1.02 DESCRIPTION OF WORK

- A. This section includes all material, labor, equipment, temporary protection and tools for the proper installation and completion of the work as required in this specification.
- B. The following items are specified in this section:
- 1. Roof Insulation
- 2. Fasteners
- 3. Roof membrane
- 4. Roof membrane flashings
- 5. Treated Wood
- 6. Sealants

7. Adhesives

### 1.03 REFERENCES

- A. American Society of Testing and Materials (ASTM)
- A653 Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial
- D413 Test Methods for Rubber Property-Adhesion of Flexible Substrate
- D573 Test Method for Rubber-Deterioration in an Air Oven
- D751 Test Methods for Coated Fabrics
- D1149 Test Method for Rubber Deterioration-Surface Ozone Cracking in a Chamber
- D1203 Test Methods for Volatile Loss from Plastics Using Activated Carbon Methods
- D1204 Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature
- D2136 Test Method for Coated Fabrics-Low Temperature Bend Test
- D2240 Test Method for Rubber Property-Durometer Hardness
- E84 Test Method for Surface Burning Characteristics of Building Materials
- E408 Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter
- E838 Practice for Performing Accelerated Outdoor Weathering Using Concentrated Natural Sunlight
- E903 Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres
- B. California South Coast Air Quality Management District (AQMD)
- Rule 1168 Adhesive and Sealant Applications
- C. California Bay Area Air Quality Management District (AQMD) Regulation 8 Rule 51, Organic Compounds Adhesive and Sealant Products
- D. Factory Mutual (FM) Approval Guide
- Approval Standard No. 4470 Class 1 Roof Covers
- E. Federal Specification (FS)
- HH-I-1972/2 Class 1 Insulation Board, Thermal Polyurethane or Polyisocyanurate, Faced with Asphalt/Glass Fiber Felt on Both Sides of the Foam
- F. Federal Test Method (FTM)
- FTM 101B Method 2031 Puncture Resistance
- G. National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual
- H. Underwriter's Laboratories, Inc. (UL)
- Roofing Materials and Systems Directory
- 1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data, installation instructions and recommendations for each type of roofing product required. Include data substantiating that materials comply with the specified requirements.
- B. Submit copy of the membrane manufacturer's warranty covering materials.
- C. Submit copy of the Roofing Contractor's warranty covering workmanship.
- D. Submit dimensioned shop drawings, which shall include: An outline of the roof and roof size.

Contract Documents.

- 2. Proposed installation method for insulation and membrane for each different section of roof. Include insulation type (e.g. flat, tapered) and fastener patterns if applicable. Show Contractor's proposed
- method of achieving specified roof slopes. 3. Proposed profile details of flashing methods for penetrations and terminations if not indicated in the
- 4. Proposed location of manufacturer approved walkpads. Corners are to be rounded and installed in accordance with manufacturer's written instructions. All side and end joints shall be hot-air welded a minimum of 2"-inch (51mm). No adhesive shall be present within the lap areas.
- E. Submit report from an independent testing laboratory certifying that manufacturer's membrane has met
- a minimum of 2,000,000 langleys concentrated natural sunlight, according to ASTM E838. F. Submit written documentation from the manufacturer that the proposed roofing system including insulation and fasteners are compatible and meet the applicable requirements and code approvals as referenced in this specification and that the roofing system meets the requirements for the manufacturers
- standard warranty covering material.
- G. Submit certification that membrane installer is a manufacturer-approved applicator. H. Submit manufacturer's documentation of Energy Star labeled roofing materials.
- I. Submit Material Safety Data Sheets (MSDS) and manufacturer's documentation of Volatile Organic
- Compound (VOC) content for each adhesive and sealant product. J. Submit manufacturer's documentation of recycled content for Polyisocyanurate insulation.

#### 1.05 QUALITY ASSURANCE

- A. Roofing system shall be applied only by an approved Contractor authorized prior to bid by the roof membrane manufacturer. Prior to bid, the Roofing Contractor must have completed a minimum of 500 roofing squares of Thermal Propylene Olefin (TPO) membrane in the Southwest.
- B. There shall be no deviation from this specification or the approved shop drawings without prior written approval by the manufacturer and the Sandia Delegated Representative (SDR).
- C. Code Requirements: The proposed roofing system shall meet the requirements of the following recognized code approval or testing agencies. These requirements are the minimum standards and no roofing work shall commence without written documentation of the system's compliance, as in Article 1.03
- 1. Underwriters Laboratories (UL) Class A membrane.
- 2. Factory Mutual (FM) I-90 uplift rating, per FM Approval Standard No. 4470.
- D. Energy Star Roof Compliance: The proposed roofing system shall be Energy Star Roof-compliant and roofing materials shall be Energy Star labeled.
- E. For new installations, ponding shall not occur in accordance with NRCA Roofing and Waterproofing manual good roof design practice, which dictates that there be no ponding of water 48 hours after
- F. There shall be no more than 20 patches per 10,000sf on new construction.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. All products delivered to the job site shall be in the original unopened container or wrappings.
- B. Membrane rolls and insulation shall be stored fully protected from moisture and wind damage. Remove plastic from insulation and cover with tarpaulins on a raised surface.
- C. Bonding adhesives shall be stored at temperatures recommended by manufacturer.
- D. Handle all materials to prevent damage. Any materials which are determined damaged, according to the SDR, are to be removed from the job site and replaced at no cost to Sandia National Laboratories (SNL).

### 1.07 PROJECT CONDITIONS

- A. Construction may not be fully represented on the drawings, and some modifications to details may be required to accomplish the intent of the documents.
- 1. Contractor shall ascertain to his satisfaction, coordinate with General Contractor and other sub-contractors prior to bidding, that the specifications and drawings are workable and that they are
- B. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks, and any damages shall be repaired or replaced at no cost to SNL. All exterior lighting, equipment, landscaping and paving shall be protected from damage.
- C. Contractor shall test drains per SDR's direction prior to and upon completion of roofing work to insure that no blockage exists or has occurred. D. Only as much of the new roofing as can be made weather tight each day including all flashing work, shall
- be installed. Plug all roof drains before starting work each day and unplug all drains at the end of each workday. E. All surfaces to receive insulation, membrane or flashing shall be thoroughly clean and dry. Should
- surface moisture occur, the Contractor shall provide the necessary equipment and labor to dry the surface prior to application. F. All construction, including equipment and accessories, shall be secured against wind blow-off damage. G. Temporary waterstops shall be installed at the end of each day's work and shall be removed before
- proceeding with the next day's work. Waterstops shall be compatible with all materials, shall not emit dangerous or incompatible fumes, and shall be installed per manufacturer's recommendations. H. Contractor shall provide all necessary protection and barriers to segregate the work area and to prevent
- damage to adjacent areas. Plywood protection shall be provided for all new and existing roof areas which receive traffic during construction I. Contaminants, such as grease, fats, oils and solvents shall not be allowed to come into direct contact with the roofing membrane. Any exposures shall be presented to the membrane manufacturer for assessment
- of impact on the roof system performance. J. Contractor shall take care during application and storage that overloading of deck and structure does not
- K. Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Coordinate closing or shut-offs of vents and air intakes during roofing and flashing operations.

- A. Upon completion of construction, the manufacturer's ten (10) year warranty covering materials shall be
- B. Roofing Contractor shall supply SNL with a minimum two (2) year workmanship warranty. In the event any work related to roofing, flashings, or metal work is found to be defective or otherwise not in accordance with the Contract Documents within two (2) years of final acceptance, the roofing Contractor shall remove and replace the defects at no cost to SNL.

### PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Provide an insulated roofing system that is comprised of fully compatible components for use in the proposed application. All proposed materials shall be compatible with substrate.
- A. TPO: Polyester scrim reinforced Thermal Proplylene Olefin (TPO) sheet conforming to the following minimum physical properties:
- $\underline{PropertyASTM\ Test\ MethodSpecification}ColorWhite\ WeightD7510.18\ lbs/sq\ ft\ (0.88\ kg/m_2)Nominal\ Thickness$ (min.)D7510.060"-inch (1.52 mm)Breaking Strength (min.)D751 (Grab Method)225 lbf (1.0 kN)Tear Strength (min.)D751 (Tongue Tear)55 lbf (245 N)Low Temperature BendD2136PassShore A HardnessD224080 +5Heat AgingD573Maintains original strengthVolatility, Max. LossD1203, Method A0.5 %Hydrostatic Resistance (min.)D751, Method A300 psi (2.1 Mpa)Ozone ResistanceD1149No EffectEmmaqua Concentrated Natural Sunlight, 2 million langleysE838No visible surface cracking or stiffeningDimensional Stability (max.)D12040.5 %Puncture Resistance (min.)FTM 101B, Method 2031250 lbf (1.1 kN)180 degrees Peel

- Strength (min.)D41335 lbf (156 N)Change in Weight After Immersion in Water (max.)D570+3.0% Initial solar Reflectance (min.)E9030.65 3-year aged Solar Reflectance (min.)E9030.50 Emissivity (min.)E4080.90 2.03 FLASHING MEMBRANE
- A. Flashing membrane shall be as supplied by the roofing membrane manufacturer. Flashing membranes are generally the same material as the roofing membrane unless otherwise specified in the Contract Documents. Unreinforced 0.055"-inch (1.4 mm) thick ethylene propylene - base membrane shall be supplied for vent stacks, pipes, drains and corners.

- A. General: Provide insulating materials to comply with referenced standards and requirements indicated for materials; provide manufacturer's standard thickness, in size to fit applications. 1. Fully Adhered Systems: Provide no greater than 4'-feet x 4'-feet (1.2m x 1.2m) boards.
- 2. Mechanically Fastened Systems: Provide 4'-feet x 8'-feet (1.2m x 2.4m) boards.
- B. Polyisocyanurate Board Roof Insulation: Furnish and install rigid, cellular thermal insulation with Polyisocyanurate closed-cell foam core and manufacturer's standard facing laminated to both sides to comply with FS HH-I-1972/2 Class 1. Provide in two (2) layers for a total thickness to meet an average R-value of 30.0, unless indicated elsewhere on the Contract Documents.
- 1. Surface Burning Characteristics: Comply with ASTM E84 with a maximum flame spread and smoke developed values of 25 and 145, respectively.
- 2. Recycled Content: Minimum 9 percent.
- C. Insulation, fasteners and adhesive shall be supplied or approved by the roof membrane manufacturer for compatibility with the system and the required FM and UL requirements. Adhesives shall comply with VOC limits of California South Coast (AQMD) Rule #1168.
- D. Recovery Board: Provide one half-inch (1/2"-inch, 13mm) Dens Deck, or approved equal, over all insulation and tapered insulation.

### 2.05 ACCESSORY PRODUCTS

- A. Flashing Adhesive: As specified by the membrane manufacturer to comply with VOC limits of California South Coast (AQMD) Rule #1168. Any adhesives containing carcinogens shall be limited to vertical surfaces and flashings.
- B. Walkway Membrane: Membrane manufacturer's walkway material.
- C. Wood Nailers: Wood shall be #2 or better pressure preservative treated lumber using CCA preservatives. Height of nailers shall match that of the insulation thickness or as indicated on the drawings D. Sealants: As recommended by the membrane manufacturer to comply with VOC limits of California Bay
- Area (AQMD) Regulation 8, Rule 51. E. Miscellaneous Fasteners and Anchors: In general, all fasteners, anchors, nails and straps shall be of zinc-coated steel, galvanized, or stainless steel and cadmium-free. All fasteners and anchors shall have a
- minimum embedment of 1-1/2"-inch (38 mm) and shall be approved for such use by the fastener manufacturer and the membrane manufacturer. F. Sheet Metal Accessory Materials: ASTM A653, with 0.20 percent copper, G90 hot-dipped galvanized,
- G. Expansion Joint Covers: Shall be the manufacturer's prefabricated units of the same material as the roof
- H. Perimeter Edge Metal: Shall be supplied by the membrane manufacturer and coated with the same material as the roofing membrane and shall be compatible with the roofing membrane for hot-air
- I. Slip Sheet: Provide only when needed between incompatible materials. Use membrane manufacturers J. Base Sheet: Provide membrane manufacturers recommended vented base sheet on all types of concrete
- decks or when required or recommended by membrane manufacturer for the intended application. K. B-Line Rooftop Supports or approved equal. To be placed at a minimum of 10'- feet (3m) on center for
- proper support. Refer to SNL Standard Detail Drawing for rooftop supports, AE5035 and AE5036.

### PART 3 - EXECUTION

24-gauge (0.61 mm) or heavier

- 3.01 INSPECTION
- A. Prior to all work of this section, Contractor shall carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that work of other trades that penetrate the roof deck has been completed.
- C. Verify that roofing system may be installed in strict accordance with all pertinent codes and regulations, the original design and the manufacturer's recommendations
- E. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully F. Upon starting the installation of a new roof, the SDR and the General Contractor and their sub-contractor, if applicable, will designate a portion of the installation to be used as a mock up. This area will be the model of how the roof installation shall be installed. The mock up should include the
- insulation, a curb, flashing, parapet and an inside and outside corner along with a termination and lap G. Throughout the project and at completion, the SDR shall be allowed to inspect the roof, including probing

### as necessary to ensure proper installation.

D. In the event of discrepancy, immediately notify the SDR.

- 3.02 PREPARATION OF SUBSTRATE A. General: Comply with the insulation and membrane manufacturer's instructions for preparation of the
- substrate to receive the roofing system B. Clean substrate of dust, debris, and other substances detrimental to the system work. Remove sharp
- C. Notify the SDR to inspect the substrate. Contractor shall not proceed with installation until the SDR has

#### approved the substrate. 3.03 INSTALLATION OF INSULATION

- A. Insulation shall be installed according to the insulation manufacturer's instructions and shall be
- approved by the SDR and membrane manufacturer. Stagger joints between layers.
- B. Insulation shall be neatly cut to fit around all penetrations and projections. C. Install tapered insulation where applicable in accordance with insulation manufacturer's approved shop drawings in order to achieve the specified slope.
- D. Install tapered insulation around drains creating a drain sump. E. Do not install more insulation board than can be covered with membrane by the end of the day, or onset
- of inclement weather. 1. Insulation shall be mechanically fastened to the deck with approved fasteners and plates at a rate and pattern acceptable to Factory Mutual's and membrane manufacturer's requirements for
- fastening rates and patterns. 2. Fasteners are to be installed in accordance with the fastener manufacturer's recommendations. Fasteners are to have a minimum penetration into the structural deck as recommended by the fastener manufacturer and membrane manufacturer. Fasten only in top of ribs of metal deck, not
- 3. Perform pull out tests for the SDR to verify deck conditions and actual pull out values prior to
- 4. Use fastener tools with a depth locator as recommended or supplied by the fastener manufacturer to ensure proper installation.

### 3.04 INSTALLATION OF MEMBRANE

- A. Install materials in accordance with manufacturers instructions for the intended application. B. Surface of the insulation shall be inspected prior to installation of the roof membrane. The insulation surface shall be clean and smooth with no excessive surface roughness, contaminated surfaces, or
- unsound surfaces such as broken or delaminated insulation boards. C. Membrane shall be installed per the membrane manufacturer's written installation procedures for an
- approved mechanically fastened system. D. No bonding adhesive shall be applied to lap areas that are to be welded to flashing or adjacent sheets. All sheets shall be applied in the same manner, lapping all sheets as required by welding techniques. No
- peel and stick products allowed. E. Any repairs or patches shall be hot-air welded. No peel and stick products allowed.
- F. Adjacent sheets shall be welded in accordance with the manufacturer's written instructions. G. Hand and machine welding shall be carried out per the manufacturer's written instructions. All mechanics intending to use the welding equipment shall have successfully completed a course of instruction provided by a manufacturer's representative prior to welding. All welding equipment must be
- approved by the manufacturer prior to use. H. All completed seams shall be checked by the Contractor after cooling for continuity using a screwdriver or suitable blunt instrument. In addition, on-site evaluation of welded seams shall be made by Contractor at locations as directed by the SDR or membrane manufacturer's representative. Contractor shall provide 2"-inch (51 mm) wide cross-sectional samples taken through completed seams. Approximately two samples will be taken per 100 roofing squares. Correctly welded seams display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Contractor at no additional charge to SNL.

- I. Exposed or cured membrane shall be hot-air welded per manufacturer's instructions.
- J. During the course of the work, the entire roof area shall be kept clear of loose or spilled fasteners and metal scraps to guard against accidental puncture of the membrane

#### 3.05 MEMBRANE FLASHINGS

3.06 TEMPORARY CUT-OFF

- A. All flashing shall be installed concurrently with the roof membrane as the job progresses. No temporary membrane flashings shall be allowed without the prior written approval of the SDR. Approval shall only
- be for specific locations on specific dates. B. All flashing membranes shall be fully adhered to substrates. All interior and exterior corners and miters shall be cut and hot-air welded in place, or prefabricated corners and miters may be used.
- 1. Bituminous elements shall not be in contact with non-compatible membrane. Manufacturers recommended isolator shall be used to isolate non-compatible membrane flashing from bituminous coated elements such as vent stacks and pipes penetrating the roof.
- C. All flashings shall be hot-air welded at their joints and at their connections with the roof membrane. No peel and stick products allowed.
- D. Pipe penetrations shall be flashed a minimum of 8"-inches (203 mm) above the roofing membrane, and terminate with a stainless steel hose clamp with sealant applied along the top edge. Pipe should be isolated by membrane. Factory fabricated pipe seals and roof membrane shall be welded as outlined. A
- buffer layer of membrane shall be installed between hose clamp and flashing sheet to avoid damage. E. All curb flashing membranes shall be mechanically fastened along the top using nails with 1"-inch (25 mm) diameter heads spaced a maximum of 6"-inches (152 mm) on center, or predrilled metal strips. All roof edge flashings shall be hot-air welded to the membrane manufacturer's coated metal. Predrilled metal strips shall be caulked along the top edge with a sealant. Expansion pins with nylon sheaths set in predrilled holes shall be used to secure flashings to masonry and concrete surfaces. Reglets shall be used on walls as shown on the Contract Documents.
- F. Edge metal shall be supplied by the membrane manufacturer and shall be coated with the same material as the roofing membrane. The edge metal and membrane strips joining each piece of edge metal shall closely match the color of the building perimeter, unless specified elsewhere on the Contract Documents or by the SDR.
- A. Flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. When a break in the day's work occurs in the central area of the roof, a temporary waterstop shall be constructed to provide a watertight seal.
- 1. Waterstop shall be installed per the manufacturer's recommendations and per details shown on the
- 2. When work on the new system is suspended, the stagger of the insulation joints shall be maintained by installing partial fillers. New membrane shall be carried into the waterstop. 3. When work resumes, the contaminated membrane, insulation fillers, etc., shall be removed from the
- work area and disposed off-site. Do not reuse these materials in new work B. If inclement weather occurs while a temporary waterstop is in place, the Contractor shall provide the

labor necessary to monitor the situation to maintain a watertight condition.

3.07 WALKWAY INSTALLATION Walkways: Install walkway pads at location shown on Construction Documents. Hot-air weld along edges a minimum of 2"-inches (51mm) to substrate, and fully adhere walkway pads between welds to substrate with compatible adhesive according to roofing system manufacturer's written instruction. Corners of walkway are to be rounded and hot-air welded in accordance with manufacturer's written instruction.

#### 3.08 COMPLETION

- A. At the completion of construction and prior to Contractor's request for final inspection by SDR, membrane manufacturer's technical consultant shall provide on-site inspection of installed roofing
- 1. Membrane manufacturer shall provide Contractor and SDR with itemized list of defects or non-compliance with manufacturer's recommendations
- 2. Contractor shall immediately correct identified items. Complete corrections before request for final inspection from SDR
- B. Prior to demobilization from site, work shall be reviewed by SDR and Contractor. 1. Itemize defects or non-compliance with these specifications or membrane manufacturer's recommendations in punch list.
- 2. Contractor shall immediately correct identified items prior to demobilization, to satisfaction of SDR and membrane manufacturer
- C. Upon completion of construction, the Contractor shall install a metal sign (minimum size of 8" x10", or 203mm x 254mm) at each roof entryway providing the following information:
- 1. Contractor Company Name 2 Membrane Manufacture

3. SNL Inspector Name

4. Date of Installation

END OF SECTION

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DATE

OF

- 1.1 SUMMARY A. This Section includes the following:
- Manufactured reglets.
- Formed roof drainage system.
- 3. Formed low-slope roof flashing and trim.
- 4. Formed steep-slope roof flashing and trim. Formed wall flashing and trim.

#### 1.2 SUBMITTALS A. Product Data: For each product indicated.

- B. Shop Drawings: Show layouts, profiles, shapes, seams, dimensions, and details for fastening, joining, supporting, and anchoring sheet metal flashing and trim
- C. Samples: For each type of sheet metal flashing and trim upon request of the Architect.

#### 1.3 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
- Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

#### 2.2 SHEET METALS

- A. Copper Sheet: ASTM B 370, Temper H00 or HO I, cold-rolled copper sheet.
- B. Lead-Coated Copper Sheet: ASTM B 101, Temper H00 and HO1, cold-rolled copper sheet, of weight indicated below, coated both sides with lead weighing not less than 12 lb/100 sq. ft. nor more than 15 lb/100 sq. ft. of copper sheet (total weight of lead
- C. Aluminum Sheet: ASTM B 209, Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished as follows:
- 1. Mill Finish: Standard one-side bright.
- 2. Factory Prime Coating: Factory-applied, baked-on epoxy primer coat.
- 3. High-Performance Organic Finish: Two-coat, thermocured system containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AA (A 2604.
- a. Color: Match Architect's samples
- 4. Clear Anodic Finish: Class II, AA-M12C22A31, complying with AAMA 611. 5. Color Anodic Finish: Class II, AA-M12C22A34, complying with AAMA 611.
- Color: Dark bronze.
- D. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, No. 2D finish.
- E. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality, mill
- F. Aluminum-Zinc Alloy Coated Steel Sheet (Galvalume Plus): ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality with manufacturer's standard clear acrylic coating both sides.
- G. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
- Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
- 2. Exposed Finishes: Apply the following coil coating:
- a. Factory Prime Coating: Factory-applied, baked-on epoxy primer coat.
- b. High-Performance Organic Finish: Two-coat thermocured system containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 2604,
- 1) Humidity and Salt Spray Resistance: 1000 hours.
- 2) Color: Match Architect's samples H. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet.
- 2.3 MISCELLANEOUS MATERIALS
- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other
- miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Felt Underlayment: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
- C. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads
- Nails for Copper Sheet: Copper or hardware bronze, 0.109 inch (2.8 mm) minimum and not less than 7/8 inch (22 mm) long, barbed with large head.
- 2. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory applied coating.
- 3. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head. 4. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
- D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing.
- Provide permanently elastic, nonsag, nontoxic, nonstaining tape. E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant, of type, grade, class, and use classifications required
- to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound.
- H. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat.

### 2.4 REGLETS

- A. Reglets: Units of type, material, and profile indicated, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory- mitered and welded corners and junctions. Manufacturers:
  - a. Cheney Flashing Company, Inc.
  - b. Fry Reglet Corporation.
- c. Heckmann Building Products Inc. 2. Material: Aluminum, 0.024 inch thick.

# 2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems. 1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet
- ioints for additional strength.
- 2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- C Sealed joints: Form nonexpansion but movable joints in metal to accommodate elastometric sealant to comply with SMACNA recommendations.
- D. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- E. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise
- F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal, and in thickness not less than that of metal being secured.

### 2.6 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch-long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters.
- 1. Fabricate from the following material:
- a. Aluminum: 0.040 inch thick. B. Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material
- 1. Fabricate downspouts from the following material:
- a. Aluminum: 0.024 thick
- C. Parapet Scuppers: Fabricate scuppers of dimensions required with closure flange trim to exterior, 4-inchwide wall flanges to interior, and base extending 4 inches beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper. 1. Fabricate parapet scuppers from the following material:
- a. Aluminum: 0.0320 inch thick.
- D. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape indicated
- complete with outlet tubes and built-in overflows. 1. Fabricate conductor heads from the following material:
- a. Aluminum: 0.0320 inch thick

### 2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A Roof Edge Flashing (Gravel Stop) and Fascia Caps: Fabricate in minimum 96-inch long, but not exceeding 10-foot-long, sections. Furnish with 6-inch- wide joint cover plates.
- 1. Fabricate from the following material:
- a. Aluminum: 0.050 inch thick. E. Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 10-foot- (3-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and[ drill elongated holes for
- fasteners on] interior leg. Miter corners, seal, and solder or weld watertight. 1. Fabricate copings from the following material:
- a. Aluminum: 0.050 inch thick.
- C. Base Flashing: Fabricate from the following material: 1. Aluminum: 0.040 inch thick.
- D. Counterflashing: Fabricate from the following material:
- 1. Aluminum: 0.0320 inch > thick.
- E. Roof-Penetration Flashing: Fabricate from the following material as indicated on drawings: 1 Lead: 4.0 lb / sq. ft., hard tempered.
- F. Roof-Drain Flashing: Fabricate from the following material:
- 1. Lead: 4.0 lb/sq. ft., hard tempered.

### PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of
- surfaces to be covered before fabricating sheet metal. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of

- Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of comer or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- G. Fasteners: Use fasteners of size that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for
- 1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
- 2. Aluminum: Use aluminum or stainless-steel fasteners. 3. Copper: Use copper or stainless-steel fasteners.
- 4. Stainless Steel: Use stainless-steel fasteners
- H. Seal joints with elastomeric sealant as required for watertight construction.
- I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches except where pretinned surface would show in finished Work.
- 1. Do not solder aluminum sheet.

### 3.2 ROOF DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
- B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with elastometric sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts.
- 1. Install gutter with expansion joints at locations indicated but not exceeding 50 feet apart. Install expansion joint caps. 2. Install continuous gutter screens on gutters with noncorrosive fasteners, removable for cleaning gutters.
- B. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
- Parapet Scuppers: Install scuppers where indicated through parapet. Continuously support scupper, set to correct elevation, and
- seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane
- D. Conductor Heads: Anchor securely to wall with elevation of conductor head rim 1 inch (25 mm) below scupper discharge

### 3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Roof Edge Flashing and Copings: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 and the authority having jurisdiction.
- C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or eceivers and fit tightly to base flashing. Secure in a waterproof manner. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with elastomeric sealant.
- D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:
- 1. Turn lead flashing down inside vent piping, being careful not to block vent piping with flashing. 2. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for lead flashing on vent piping.

## END OF SECTION 07620

### SECTION 07720 - ROOF ACCESSORIES

### PART I- GENERAL

- 1.1 SUMMARY A. This Section includes the following:
- Roof curbs. Roof hatches

### 1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.
- C. Samples: For each exposed finish upon request of architect.

### 1.3 QUALITY ASSURANCE

- A. Standards: Comply with the following:
- 1. SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to
- coordinate with type of roofing indicated. 2. NRCA's "Roofing and Waterproofing Manual" details for installing units.

#### PART 2 - PRODUCTS

- A. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M with Class AZ-50 coating, structural quality, Grade 40 (Grade 275), or as required for strength.
- B. Insulation: Manufacturer's standard rigid or semi rigid glass-fiber board of thickness indicated.
- C. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, complying with AWPA
- D. Fasteners: Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened. Provide non removable fastener heads.
- E. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, or PVC; or flat design of foam rubber, sponge
- F. Bituminous Coating: SSPC-Paint 12, solvent-type bituminous mastic, nominally free of sulfur and containing no asbestos fibers,
- compounded for 15-mil dry film thickness per coating. G. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- H. Elastomeric Sealant: Recommended by unit manufacturer that is compatible with joint surfaces; ASTM C 920, Type S, Grade I. Roofing Cement: ASTM D 4586, nonasbestos, fibrated asphalt cement designed for trowel application or other adhesive

## 2.2 ROOF CURBS AND EQUIPMENT SUPPORTS

compatible with roofing system.

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- 1. Custom Curb, Inc.
- 2. Metallic Products Corporation.
- 3. Vent Products Co., Inc.
- supported. Coordinate dimensions with equipment to be supported. I. Provide preservative-treated wood nailers at tops of units and formed flange at perimeter bottom for mounting to roof.

C. General: Units capable of supporting superimposed live and dead loads, including equipment loads and other construction to be

2. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile. 3. Fabricate units to minimum height of 8 inches, unless otherwise indicated.

4. Where slope of roof deck exceeds 1/4 inch per foot, fabricate support units with height tapered to match slope to level tops

structural-quality, hot-dip galvanized or aluminum-zinc alloy-coated steel sheet; factory primed and prepared for painting

# Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.0747-inch-thick,

- with welded or sealed mechanical corner joints. 2. Fabrication: Unless otherwise indicated or required for strength, fabricate units from minimum 0.063-inch-thick, sheet
- aluminum with welded corner joints. 3. Insulation: Manufacturer's standard rigid or semi-rigid insulation where indicated.

# 4. Cants: Formed cants and base profile coordinated with roof insulation thickness

- PART 3 EXECUTION
- 3.1 INSTALLATION A. General: Coordinate installation of roof accessories with installation of roof deck, roof insulation, f lashing, roofing membranes, penetrations, equipment, and other construction to ensure that combined elements are waterproof and weather tight. Anchor roof accessories securely to supporting structural substrates so they are capable of withstanding lateral and thermal stresses, and
- inward and outward loading pressures. B. Install roof accessory items according to construction details in NRCA's "Roofing and Waterproofing Manual," unless otherwise
- C. Separation: Separate metal from incompatible metal or corrosive substrates, including wood, by coating concealed surfaces, at locations of contact, with bituminous coating or providing other permanent separation.
- D. Flange Seals: Unless otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form seal.
- E. Cap Flashing: Where required as component of accessory, install cap flashing to provide waterproof overlap with roofing or roof flashing (as counterflashing). Seal overlap with thick bead of mastic sealant.

F. Clean exposed surfaces according to manufacturer's written instructions. Touch up and damaged metal coatings

# END OF SECTION 07720

# SECTION 07920 - JOINT SEALANTS

Sections, apply to this Section.

### PART 1 - GENERAL

1.1 RELATED DOCUMENTS A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division I Specification

- 1.2 SUMMARY A. This Section includes sealants for the following:
- 1. Exterior joints in vertical surfaces and non-traffic horizontal surfaces. 2. Exterior joints in horizontal traffic surfaces.

3. Interior joints in vertical surfaces and horizontal non-traffic surfaces.

4. Interior joints in horizontal traffic surfaces. 5. Fire stop system through fire resistance - rated walls.

6. Exterior joints in sheet metal flashing and trim.

#### 1.3 SUBMITTALS

A. Fire stop System Submittals: For each through-penetration fire stop system, show each kind of construction condition penetrated, relationships to adjoining construction and kind of penetrating item. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidence compliance with requirements for each condition.

### 1.4 QUALITY ASSURANCE

- A. Sealant Compatibility and Adhesion Testing: Use sealant manufacturers standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
- B. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates using test method indicated in Part 3 "Field Quality Control" Article.
- C. Fire-resistive joint sealant systems are identical to those tested per ASTM E 119 under conditions where positive furnaces pressures of at least 0.01 inch of water is maintained at a distance of 0.78 inch below the fill materials surrounding the penetrating items in the test assembly. Provide rated systems complying with the following requirements:
- 1. Fire-Resistive Rating of Joint Sealants: As indicated by reference to design designations listed by UL in their "Fire Resistance Directory" or by another testing inspecting agency
- D. Mockups: Before installing joint sealants, apply elastomeric sealants to demonstrate aesthetic effects and qualities of materials

### 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### A. Special Installer's Warranty: Written warranty in which Installer agrees to repair or replace elastomeric joint sealants that do not meet requirements specified in this Section or fail in adhesion within specified warranty period two years from date of Final

Acceptance.

2.1 MANUFACTURERS

PART 2 - PRODUCTS

#### A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection: 1. Products: Subject to compliance with requirements, provide one of the products specified.

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field
- B. Colors of Exposed Joint Sealants: As selected from manufacturer's full range

### 2.03 ELASTOMERIC JOINT SEALANTS

- A. Silicone Sealant: (Gutters & Coping Sealant) Products:
- a. Dow Corning; 795.

b. GE Silicone, SilPruf.

c. Tremco Spectrem 2

- B. Single-Component Nonsag Urethane :Sealant: 1. For vertical masonry control joints, provide the following:
  - a. Products: 1) Sonneborn Building Products Div., ChemRex Inc.; NP 1.
  - 2) Tremco; Vulkem 1 16. 3) Sika Corporation; Sikafiex - I a.

b. Type and Grade: S (single component) and NS (nonsag).

- c. Class: 25.
- 2. Exposure: Use T (traffic) and NT (non-traffic). 3. Substrates: Uses M, G, A, and, as applicable to joint substrates indicated, O.
- 1. Concrete paving joints, horizontal traffic surfaces.

2) Sonneborn, "SL-1".

- a. Products: 1) Bostik, "Chem-Calk 950"
- b. Type and Grade S (singe component) and NS (nonsag).

c. Class 25

Products:

C. Urethane Sealant:

- d. Exposure: T (traffic). e. Substrate:0
- 2.03 ELASTOMERIC JOINT SEALANTS A. Silicone Sealant: (Gutters & Coping Sealant)

B. Single-Component Nonsag Urethane :Sealant:

- a. Dow Corning; 795. b. GE Silicone, SilPruf.
- c. Tremco Spectrem 2
- 1. For vertical masonry control joints, provide the following: a. Products:

2) Tremco; Vulkem 1 16.

3) Sika Corporation; Sikafiex - I a.

1) Sonneborn Building Products Div., ChemRex Inc.; NP 1.

- b. Type and Grade: S (single component) and NS (nonsag). c. Class: 25.
- 2. Exposure: Use T (traffic) and NT (non-traffic). 3. Substrates: Uses M, G, A, and, as applicable to joint substrates indicated, O.
- 1. Concrete paving joints, horizontal traffic surfaces. a. Products:

1) Bostik, "Chem-Calk 950".

3) Tremco, Vulkem 45 b. Type and Grade S (singe component) and NS (nonsag).

c. Class 25

2) Sonneborn, "SL-1".

d. Exposure: T (traffic). e. Substrate:0

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- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop system under conditions of service and application, as demonstrated by through-penetration firestop system manufacturers based on testing and field
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and comply with "Performance Requirements" article. Use only components specified through penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
- 1. Permanent forming/damming/backing materials, include the following:
- a. Slat-/rock-wood-fiber insulation.
- b. Sealants in combination with other forming/damming/backing materials to prevent leakage of full materials in
- c. Fire-rated form board.
- Fillers for sealants.
- Temporary forming materials.
- Substrate primers.
- Collars.
- Steel sleeves.
- Products:
- a. 3M Fire Prevention Products.
- b. Hilti Firestop Systems c. International Protective Coatings Corporation (IPC, a Division of W.R. Grace).
- d. Tremco Inc.

#### 2.4 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance
- 1. Type: C (closed-cell material with a surface skin)
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

#### 2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates
- indicated, as determined from preconstruction joint-sealant-substrate tests and field tests. B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

#### PART 3 - EXECUTION

#### 3.1 INSTALLATION

A. Contractor performing work must be one the Sealant Manufacturer's Approved Applicators.

any way, and formulated to promote optimum adhesion of sealants with joint substrates.

- B. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.
- 1. Remove foreign material from joint substrates that could interfere with adhesion of joint sealant.
- 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free
- 3. Remove laitance and form-release agents from concrete
- 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues could interfere with adhesion of joint sealants.
- 5. All surfaces to be caulked shall be clean and dry.
- C. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- D. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
- E. Sealant Installation: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- F. Install sealant backings to support sealants during application and at position required to produce optimum sealant movement capability.
- 1. Do not leave gaps between ends of sealant backings.
- 2. Do not stretch, twist, puncture, or tear sealant backings. 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry
- G. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.
- H. Place sealants so they directly contact and fully wet joint substrates. 1. Completely fill recesses provided for each joint configuration
- 2. Produce uniform, cross-sectional shapes and depths that allow optimum sealant movement capability.
- 3. All deep cracks should be filled to within 1/2 inch of the surface with an appropriate back up material and caulk with a caulking gun. Caulking beads shall be smooth and straight.
- 4. Caulk around all door and storefront openings and where noted on the drawings. Masonry control joints shall be caulked with a high-quality paintable urethane caulk. Control depth of caulk at 3/8 inch to 1/2 inch with a continuous
- J. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to
- form smooth, Uniform beads, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. 1. Remove excess sealants from surfaces adjacent to joint.
- 2. Use tooling agents that are approved by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- 3. Joint Configuration: Concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated. K. Clean excess sealants or sealant smears adjacent to joints as installation progresses by methods and with cleaning materials
- approved in writing by manufacturers of joint sealants and of products in which joints occur.
- L. Through-Penetration Firestop Installation:
- 1. General: Installation through-penetration systems to comply with "Performance Requirements" of the firestop system manufacturer's written installation instructions and published drawings for the applications indicated.

## END OF SECTION 07920

#### SECTION 08110 - STEEL DOORS AND FRAMES

#### PART 1 - GENERAL

### 1.1 SUMMARY

A. This Section includes steel doors and frames.

A. Product Data: For each product indicated. Include door designation, type, level and model, material description, label compliance, fire-resistance ratings, and finishes. Door Schedule. Use same reference designations indicated on Drawings.

#### 1.3 QUALITY ASSURANCE

A. Steel Door and Frame Standard: Comply with ANSI A 250.8, unless more stringent requirements are indicated. B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting

agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 1. Amweld Building Products, Inc.
- 2. Ceco Door Products; a United Dominion Company.
- 3. Steelcraft; a division of Ingersoll-Rand.

### 2.2 MATERIALS

- A. Hot-Rolled Steel Sheets: ASTM A 569/A 569M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects;
- B. Cold-Rolled Steel Sheets: ASTM A 366/A 366M, Commercial Steel (CS), or ASTM A 620/A 620M, Drawing Steel (DS), Type B: stretcher-leveled standard of flatness.
- C. Metallic-Coated Steel Sheets: ASTM A 653/A 653M, Commercial Steel (CS), Type B, with an A40 zinc-iron-alloy (galvannealed) coating; stretcher-leveled standard of flatness.
- D. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591/A 591 M, Commercial Steel (CS), Class B coating; mill phosphatized; suitable for unexposed applications; stretcher-leveled standard of flatness where used for face sheets.

#### 2.3 DOORS

- A. Interior Doors: Complying with ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level indicated. 1. Level 1 and Physical Performance Level C, Model 1 (Full Flush).
- B. Exterior Doors: Complying with ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level
- 1. Level 1 and Physical Performance Level C, Model I (Full Flush).

2.4 FRAMES

- A. General: ANSI A250.8; conceal fastenings, unless otherwise indicated.
- B. Frame Steel Sheet Thickness:

in place of steel sheet.

- 1. 0.042-inch-for level 1 steel doors
- 2. 0.053-inch- (1.3-mm-) for openings wider than 48 inches.
- C. Door Silencers: Three silencers on single-door frames and two silencers on double-door frames.
- D. Plaster Guards: 0.016-inch-thick, steel sheet plaster guards or mortar boxes to close off interior of openings.
- E. Supports and Anchors: Not less than 0.042-inch-thick zinc-coated steel sheet. 1. Masonry Wall Anchors: 0.177-inch diameter, steel wire complying with ASTM A 510(ASTM A 51 OM) may be used
- F. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Zinc-coat items that are to be built into exterior walls according to ASTM A 153/A 153M, Class C or D as applicable.

### 2.5 FABRICATION

- A. General: Fabricate steel door and frame units to comply with ANSI A250.8 free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant.
- B. Exterior Doors; Fabricate doors, panels, and frames from metallic-coated steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053-inch- (1.3-mm-) thick, metallic-coated steel channels with channel webs placed even with top and bottom edges.
- C. Interior Door Faces: Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from cold-rolled steel sheet.
- D. Core Construction: Manufacturer's standard core construction that produces a door complying with SDI standards.
- E. Clearances for Non-Fire-Rated Doors: Not more than 1/8 inch at jambs and heads, except not more than 1/4 inch between pairs of doors. Not more than 3/4 inch at bottom.
- F. Clearances for Fire-Rated Doors: As required by NFPA 80.
- G. Door-Edge Profile: Beveled edge. H. Tolerances: Comply with SDI 117.
- 1. Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A 115 Series specifications for door and frame preparation for hardware.
- 1. Fabricate frames with mitered or coped and continuously welded corners and seamless face joints. Provide temporary
- 2. Fabricate knock-down frames with mitered or coped corners, for field assembly.
- 3. Fabricate knock-down, drywall slip-on frames for in-place gypsum board partitions.
- 4. Provide terminated stops where indicated.
- K. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be
- L. Locate hardware as indicated or, if not indicated, according to ANSI A250.8 M. Glazing Stops: Manufacturer's standard,
- 1. Provide nonremovable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and
- 2. Provide screw-applied, removable, glazing stops on inside of glass, louvers, and other panels in doors. M. Astragals: As required by NFPA 80 to provide fire ratings indicated.

### 2.6 FINISHES

A. Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250. 10 for acceptance criteria.

### PART 3 -EXECUTION

### 3.1 INSTALLATION

- A. Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
- 1. Wall Anchors: Provide at least three anchors per jamb. For openings 90 inches or more in height, install an additional anchor at hinge and strike jambs.
- 2. Gypsum Board Partitions: For in-place partitions, install knock-down, drywall slip-on frames.

- 3. Fire-Rated Frames: Install according to NFPA 80.
- B. Door Installation: Comply with ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A 115.1 G.
- 1. Fire-Rated Doors: Install within clearances specified in NFPA 80.
- 2. Smoke Control Doors: Install to comply with NFPA 105.
- C. After installation, remove protective wrappings from doors and frames and touch up prime coat with compatible air-drying

#### END OF SECTION 08110

#### SECTION 08211 - FLUSH WOOD DOORS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. This Section includes solid and hollow core doors as follows:
- Doors with wood-veneer faces.
- B. Product Data: For each type of door
- C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details; location and extent of hardware blocking; fire ratings; and other pertinent data.
- D. Samples: For each face material and finish upon request of the Architect.

#### 1.3 QUALITY ASSURANCE

- A. Quality Standard: Comply with NWWDA I.S.1-A, "Architectural Wood Flush Doors." Delete paragraph and subparagraph
- B. Fire-Rated Wood Doors: Doors that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated.

#### PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be
- incorporated into the Work include, but are not limited to, the following: Ampco Products, Inc.
- Marlite.
- 3. Mohawk Flush Doors, Inc.

### Weyerhaeuser Company

A. Doors for Opaque Finish:

2.2 DOOR CONSTRUCTION

- Grade: Custom. 2. Faces for Exterior Doors: Medium-density overlay
- 3. Faces for Interior Doors: Any closed-grain hardwood of mill option.
- B. Hollow-Core Doors:
- 1. Core: Institutional hollow core. 2. Finish: Prefinished factory
- Frame: Prehung C. Blocking. For hollow-core doors, provide blocking as needed to eliminate through-bolting hardware.

A. Fabricate doors in sizes indicated for Project-site fitting.

#### 2.3 FABRICATION

D. Provide doors with glued-block

- B. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard
- C. Factory machine doors for hardware that is not surface applied.
- PART 3 EXECUTION
- A. Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated. B. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

C. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

# END OF SECTION 08211

3.1 INSTALLATION

# SECTION 08311 - ACCESS DOORS AND FRAMES

- PART 1 GENERAL 1.1 SUMMARY
- A. This Section includes the following:

Access doors and frames.

## 1.2 SUBMITTALS

- A. Product Data: For each type of access door indicated.
- B. Samples: For each exposed finish upon request of Architect.

### PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. Steel plates, shapes, and Bars: ASTMA 36/A 36M
- 1. Hot-Dip Galvanized Steel: Coat to comply with ASTM A 123/A 123M for steel and iron products and ASTM A
- 153/A 153M for steel and iron hardware B. Steel Sheet:
- 1. Metallic Coated: ASTM A 653/A 653M, Commercial Steel (CS), Type B, with A60) zinc-iron-alloy (galvannealed) coating or G60 mill-phosphatized zinc coating; stretcher-leveled standard of flatness.
- C. Drywall Beads: Edge trim formed from 0.0299-inch zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum panels indicated.
- D. Plaster Bead: Casing bead formed from 0.0299-inch zinc-coated steel sheet with flange formed out of expanded metal lath and in size to suit thickness of plaster. E. Paint: 1. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying

with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion,

compatibility with finish paint systems indicated, and capability to provide sound foundation for field-applied

topcoats despite prolonged exposure. 2. Shop Primer for Metallic-Coated Steel: Organic zinc-rich primer complying with SSPC-Paint 20 and compatible with

## 2.2 ACCESS DOORS AND FRAMES

Cesco Products.

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Elmdor/Stoneman; Div. of Acorn Engineering Co. MIFAB Manufacturing, Inc

Milcor Limited Partnership.

- B. Flush Access Doors and Frames with Exposed Trim: Material: Prime-painted steel sheet.
- 2. Surface Type: Masonry, Finish on gypsum substrate, or as indicated on Drawings. 3. Locations: Ceilings or as indicated on Drawings

- 4. Door: Minimum 0.060-inch- thick sheet metal, set flush with exposed face flange of frame
- 5. Frame: Minimum 0.060-inch-thick sheet metal with 1-inch-wide, surface-mounted trim.
- 6. Hinges: Spring-loaded concealed pin type.
- Latch: Screwdriver.

## PART 3 - EXECUTION

- A. Advise installers of other work about specific requirements relating to access door and floor door installation including
- sizes of openings to receive access door and frame, as well as locations of supports, inserts, and anchoring devices. B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish
- C. Adjust doors and hardware after instalation for proper operation.

#### END OF SECTION 08311

#### SECTION 08410 - ALUMINUM ENTRANCES AND STOREFRONTS

### PART 1 - GENERAL

C. Structural Loads:

#### 1.1 SUMMARY

- A. This Section includes the following: Exterior entrance systems.
- Exterior storefront systems.
- 1.2 PERFORMANCE REQUIREMENTS A. Provide systems, including anchorage, capable of withstanding loads and thermal and structural movements indicated
- without failure when supporting full dead loads and without framing members transferring stresses to glazing. B. Structural-Silicone-Sealant Joints: Less than 20-psi tensile and shear stress in joints.

1. Wind Load: As indicated on Drawings or required by authority having jurisdiction.

deformation of main framing members exceeding 0.2 percent of clear span.

I. Condensation Resistance Factor (CRF): Not less than 45 per AAMA 1503.1.

C. Samples: For each exposed finish and for each color required upon request of Architect.

- 2. Seismic Load: As indicated on Drawings or required by authority having jurisdiction D. Structural Performance: Provide systems, including anchorage, capable of withstanding loads indicated.
- 1. Deflection Normal to Glazing Plane: Limited to 1/175 of clear span or 3/4 inch, whichever is smaller. 2. Deflection Parallel to Glazitag Plane: When carrying full dead load, not to exceed amount that reduces glazing bite

below 75 percent of design dimension and that which reduces edge clearance between framing members and glazing

- or other fixed components to less than 1/8 inch. E. Structural Testing: ASTM E 330 at 150 percent of inward and outward wind-load design pressures for duration required by design wind velocity without system evidencing material failures, structural distress, deflection failures, or permanent
- F. Air Infiltration: Limited to 0.06 cfr isq. ft. of system surface area when tested according to ASTM E 283 at a static-air-pressure difference of 1.57 lb/sq. ft.
- G. Water Penetration: No water leakage when tested according to ASTM E 331 at minimum differential pressure of 20 percent of inward acting wind-load design pressure but not less than 6.24 lb/sq. ft... H. Temperature Change (Range): Accommodate 120 deg F ambient and 180 deg F material surfaces.

J. Average Thermal Conductance (U-Value): Not more than 0.63 Btu/sq. ft. x h x deg F per AAMA 1503.1.

## 1.3 SUBMITTALS

- Product Data: For each system indicated. B. Shop Drawings: Include plans, e6evations, sections, details of installation and attachments to other Work
- 1. Prepare data based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project 2. For entrance systems, include hardware schedule and locations.

D. Product test reports indicating compliance with applicable wind load provisions required by the authority having

# jurisdiction.

- 1.4 WARRANTY A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace systems that fail i materials and workmanship within two years from date of Substantial Completion. Failure includes, but is not limited to t
  - 1. Structural failures including, but not limited to, excessive deflection. Adhesive or cohesive sealant failures.
- 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering. 4. Failure of operating components to function normally.

### 5. Water leakage through fixed glazing and frame areas. PART 2 - PRODUCTS

- 2.1 MANUFACTURERS
- A. Basis-of-Design Product: The desi for systems is based on Kawneer Tri-Fab 450. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
- Arch Aluminum and Glass Co. YKK AP America Inc.

EFCO Corporation.

- 2.2 MATERIALS
- A. Aluminum: ASTM B 209 sheet; ASTTM B 221 extrusions. B. Finish: Clear Anodic Finish. Class 1, AAMA 607.1.
- C. Glazing: Specified in Division 8 Section "Glazing." D. Glazing Gaskets: Pressure-glazing system of black resilient glazing gaskets with sealed corners, setting blocks, and shims
- E. Structural-Sealant-Glazing System: 1. Spacers, Setting Blocks, Gaskets, and Bond Breakers: Permanent, nonmigrating types in hardness recommended in
- writing by manufacturer, and compatible with sealant. 2. Structural Silicone Sealant: ASTM C 1184, recommended in writing by sealant and system manufacturers for
- application indicated, and compatible with system components with which it comes in contact. a. Color: As selected from manufacturer's full range

b. Tensile Strength: 100 psi minimum.

c. Modulus of Elasticity: Allows maximum movement of 25 percent of joint width, unless less movement is required by system design. 3. Secondary Sealant (Weathers,al): ASTM C 920, compatible with structural silicone sealant and other system

components width which it comes in contact, and accommodates 50 percent increase or decrease in joint width at the

time of application when tested according to ASTM C 719. a. Color: As selected from manufacturer's full range. F. Gaskets, Sealants, and Joint Fillers:

1. For joints within framing system, as recommended in writing by manufacturer for joint type indicated.

2. For joints at perimeter of systems as specified in Division 7 Section "Joint Sealants." G. Bituminous Paint: SSPC-Paint 12, except containing no asbestos, cold-applied asphalt mastic paint formulated for 30-mil

# thickness per coat.

2.3 COMPONENTS A. Doors: 1-3/4-inch-thick glazed doors with minimum 0.125-inch-thick, extruded tubular rail and stile members, mechanically fastened corners with reinforcing brackets that are deep penetration and fillet welded or that incorporate

1. Exterior Doors: Provide compression weather stripping at fixed stops. At other locations, provide sliding weather

 Stile Design: Narrow Stile . Hardware: As specified in Division 8 door hardware Section.

concealed tie-rods, and with snap-on extruded-aluminum glazing stops and preformed gaskets.

stripping retained in adjustable strip mortised into door edge.

- B. Fasteners, Flashings, and Accessories: Compatible with adjacent materials, corrosion-resistant, nonstaining, and
- nonbleeding. Use concealed fasteners except for application of door hardware.

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- A. Fabricate framing in profiles indicated for flush glazing (without projecting stops). Provide subframes and reinforcing of types indicated or if not indicated, as required for a complete system.
- B. Fabricate components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.
- C. Doors and Door Framing: Reinforce lo support imposed loads and for hardware indicated. Cut, drill, and tap for factory-installed hardware before finishing components.
- D. Factory assemble framing and components to greatest extent possible. Disassemble components only as

#### PART 3 - EXECUTION

necessary for shipment and installation.

#### 3.1 INSTALLATION

- A. Isolate metal surfaces in contact with incompatible metal or corrosive substrates, including wood, by painting contact surfaces with bituminous paint or primer or by applying sealant or tape recommended by
- B. Install components to drain water passing joints and condensation and moisture occurring or migrating within the system to the exterior.
- C. Install glazing to comply with requirements of Division 8 Section "Glazing."
- Mechanically fasten glazing in place until structural sealant is cured.
- 2. Install secondary sealant (weatherseal) to produce weatherproof joints.
- 3. Remove excess sealant before sealant has cured.
- D. Install sealants at system perimeter to comply with requirements of Division 7 Section "Joint Sealants."
- E. Install framing components true in alignment with established lines and grades to the following tolerances:
- 1. Variation from Plane: Limit to 1 /8 inch in 12 feet; 1 /4 inch over total length.
- 2. Alignment: For surfaces abutting in line, limit offset to 1/16 inch For surfaces meeting at corners, limit
- offset to 1/32 inch. 3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8 inch.
- F. Install doors without warp or rack. Adjust doors and hardware to provide tight fit at contact points and smooth operation

#### END OF SECTION 08410

SECTION 08800 - GLAZING

#### PART 1 - GENERAL

- A. This Section includes glazing for the following products and applications:
- Doors.
- Glazed entrances. Storefront framing.
- B. See Division 8 "Aluminum Entrances and Storefronts".

#### 1.2 PERFORMANCE REQUIREMENTS

- A. Work under this specification includes the furnishing of all labor, material and services necessary and reasonably incidental to the providing and installing of all glazing in sash and doors shown on the drawings.
- B. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and
- airtight; deterioration of glazing materials; or other defects in construction. C. Glass Design: Glass thickness indicated are minimums and are for detailing only. Confirm glass thickness by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thickness indicated, but not less than thickness and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
- 1. Glass Thickness: Select minimum glass thickness to comply with ASTM E 1300, according to the following
- a. Specified Design Wind Loads: As indicated.
- b. Specified Design Snow Loads: As indicated.
- c. Probability of Breakage for Vertical Glazing: 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.1) Load Duration:60 seconds or less.
- d. Minimum Glass Thickness for Exterior Lites: Not less than 1/4 inch tempered. e. Thickness of Tinted and Heat-Absorbing Glass: Trifab 450 "Insulated",1/4 inch tempered inside and
- outside with 1/2 inch airspace.
- D. Thermal Movements: Provide glazing that allows for thermal movements resulting from a maximum change (range) of 120 deg F (67 deg C), in ambient and surface temperatures, respectively, acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to
- both solar heat gain and nighttime-sky heat loss. E. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on
- manufacturer's published test data, as determined according to procedures indicated below: 1. For monolithic-glass lites, properties are based on units with lites'/4 inch thick.
- 2. Center-of-Glass U-Values: National Fenestration Rating Council (NFRC) 100 methodology using LBL-35298
- WINDOW 4.1 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K). 3. Center-of-Glass Solar Heat Gain Coefficient: NFRC 200 methodology using LBL-35298 WINDOW 4.1
- computer program.
- 4. Solar Optical Properties: NFRC 300.

### 1.3 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.
- B. Samples: 12-inch- (300-mm-) square, for tinted glass product indicated upon request of architect.
- C. Glazing Schedule: Use same designations indicated on Drawings. D. Sealant compatibility and adhesion test reports.

### 1.4 QUALITY ASSURANCE

A. Sealant Compatibility and Adhesion Testing: Use sealant manufacturer's standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.

### PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other articles including schedules where subparagraph titles below introduce lists, the following requirements apply for product selections
- 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
- a. ASA Industries, Inc.
- b. Libby-Owens Ford-Glass Company
- c. Mississippi Glass Company d. Pittsburg Plate Glass Company
- 2. Trade names herein denote grade, type and quality of material required.

### 2.2 GLASS MATERIALS

- A. Annealed Float Glass: ASTM C 1036, Type I (transparent glass, flat), Quality q3 (glazing select); thickness: '/S
- B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent glass, flat); Quality q3 (glazing select); thickness:
- Fabrication Process: At manufacturer's option.

### 2.3 GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements: 1. Compatibility: Select glazing sealants that are compatible with one another and with other materials they
- will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- Colors of Exposed Sealants: As indicated.
- B. Elastomeric Glazing Sealant Standard: Comply with ASTM C 920 and other requirements indicated for each liquid-applied, chemically curing sealant in the Glazing Sealant Schedule at the end of Part 3, including those referencing ASTM C 920 classifications for type, grade, class and uses.

- Additional Movement Capability: Where additional movement capability is specified in the Glazing Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements in ASMT C 920
- C. Cylindrical Backing: ASTM C 1330, Type 0 (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

- A. Back-Bedding Mastic Glazing Tape: Preformed, butyl-based elastomeric tape with a solids content of 100 percent with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated and complying with ASTM C 1281 and AAMA 800 for products indicated below:
- 1. AAMA 804.3 tape, where indicated.
- 2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
- 3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure. B. Expanded Cellular Glazing Tape: Closed-cell, PVC foam tape; factory coated with adhesive on both surfaces; packaged on rolls with release liner protecting adhesive; and complying with AAMA 800 for the following
- 1. Type 1, for glazing applications in which tape acts as the primary sealant. Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

#### 2.5 GLAZING GASKETS

- A. Compression Gaskets: Molded or extruded gaskets of type and material indicated below and of profile and hardness required to maintain watertight seal:
  - 1. Neoprene or EPDM dense compression gaskets complying with ASTM C 846.
- 2. Silicone dense compression gaskets complying with ASTM C 1115.
- 3. Neoprene, EPDM or Silicone soft compression gaskets complying with ASTM C 509, Type II, black.

### 2.6 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5. D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type 0 (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance G. Perimeter Insulation for Fire-Resistive Glazing: Identical to product used in test assembly to obtain fire

#### 2.7 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.

#### PART 3 - EXECUTION

#### 3.1 GLAZING, GENERAI

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing
- 1. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates
- 2. Protect glass edges from damage during handling and installation. Remove glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance from Project site and legally dispose of off Project site.
- 3. Apply primers to joint surfaces where required for adhesion of sealants, as determined by sealant compatibility and adhesion testing.
- 4. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites. 5. Provide spacers for glass lites where the length plus width is larger than 50 inches (1270 mm) unless
- gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances
- Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface.
- 2. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter.
- B. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged, including natural causes, accidents, and vandalism, during construction period. C. At completion this contractor shall wash and polish all glazing and clean adjacent surfaces soiled by his work.

### END OF SECTION 08800

### SECTION 09220 - PORTLAND CEMENT PLASTER

## PART 1 - GENERAL

#### 1.1 SUMMARY A. This Section includes the following:

- 1. Portland Cement Plaster Finishes: Stucco.
- 2. Non-load-bearing steel framing and furring.
- 3. Metal lath and metal accessories.
- B. See Division 5 Section "Cold-Formed Metal Framing" for load-bearing steel framing.

## 1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Samples: For each exposed finish and for each color and texture required upon request of the Architect.

# 1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Where indicated, provide assemblies identical to those tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

### 1.4 PROJECT CONDITIONS

A. Environmental Requirements, General: Comply with requirements of referenced plaster application standards and recommendations of plaster manufacturer for environmental conditions before, during, and after plaster

### PART 2 - PRODUCTS

### 2.1 NON-LOAD-BEARING STEEL FRAMING

- A. Steel Sheet Components, General: Metal complying with ASTM C 645 requirements. 1. Protective Coating:
  - a. Interior Applications: ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating.
- b. Exterior Applications: ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating. B. Suspended Ceiling and Soffit Framing: Size metal ceiling supports to comply with ASTM C 1063, unless

Hanger Attachments to Concrete: Anchors fabricated from corrosion-resistant materials with holes or

loops for attaching hanger wires and capable of sustaining, without failure, a load equal to 5 times that

a. Cold-Rolled Channels: 0.0538-inch bare steel thickness, with minimum 1/2-inch-wide flange, 3/4

- imposed by construction as determined by testing according to ASTM E 488 by a qualified independent a. Type: Post installed, expansion anchor.
- 2. Wire for Hangers and Ties: ASTM A 64 1/A 641 M, Class I zinc coating, soft temper. 3. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch, a
- minimum 1!2-inch-wide flange, and in depth indicated. 4. Furring Channels (Furring Members):

- C. Partition and Soffit Framing:
- 1. Steel Studs and Runners: ASTM C 645, in depth indicated.
- 2. Cold-Rolled Channels:0.0538-inch bare steel thickness, with minimum 1'2-inch wide flange, and in depth
- 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, in depth indicated.

B. Paper Backing: Factory bonded to back of lath, complying with FS UU-B-790, Type I.

- A. Expanded-Metal Lath: ASTM C 847.
- 1. Material: Zinc-coated (galvanized) steel sheet, structural quality, with coating complying with ASTM A
- 653/A 653M, G60 (Z 180) coating designation. 2. Diamond-Mesh Lath: Self-furring.

1. Vapor-Permeable Paper: Grade D, Style 2.

- a. Weight: 2.5 lb/sq. yd..
- A. General: ASTM C 1063. Coordinate depth of accessories with thicknesses and number of plaster coats
- B. Metal Corner Reinforcement: Expanded, large-mesh, diamond-metal lath fabricated from zinc-alloy or welded-wire mesh fabricated from 0.0475-inch diameter, zinc-coated (galvanized) wire and specially formed to reinforce external corners of portland cement plaster on exterior exposures while allowing full plaster
- 1. Zinc Alloy: Minimum 0.0207 inch thick.
- Aluminum: Minimum 0.050 inch thick.
- C. Corner beads: Small nose corner beads with expanded flanges of large-mesh diamond-metal lath allowing full
- Material: Zinc alloy or aluminum.
- D. Casing Beads: Square-edged style, with expanded flanges. Material: Zinc alloy or aluminum.
- E. Curved Casing Beads: Square-edged style, fabricated from aluminum coated with clear plastic, preformed into curve of radius indicated
- F. Control Joints: Prefabricated with removable protective tape on plaster face of control joints. Material: Zinc alloy or aluminum.

H. Lath Attachment Devices: Material and type required by ASTM C 1063 for installations indicated.

2. Type: 2-piece, casing beads with back flanges formed to produce slip joint action, adjustable for joint widths from 1/8 to 5/8 inch.

## 2.4 PLASTER MATERIALS

- A. Base-Coat Cements: Portland cement, ASTM C 150, Type I.
- B. Job-Mixed Finish-Coat Cement: Portland cement, ASTM C 150, Type I. Cement Color: White.

G. Corner Reinforcement: Special Stucco type woven wire corner reinforcing strips.

C. Stucco Finish Coat: Manufacturer's standard factory-packaged stucco, including portland cement, aggregate, coloring agent, and other proprietary ingredients.

D. Lime: Special hydrated lime for finishing purposes, ASTM C 206, Type S; or special hydrated lime for masonry

- 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- a. Florida Stucco Corp.
- c. IPA Systems, Inc. d. United States Gypsum Co

F Aggregate for finish coats: ASTM C 897 system, manufactured or natural sand, white

purposes, ASTM C 207, Type S. E. Sand Aggregate for Base Coats: ASTM C R97

B. Bonding Agent: ASTM C 932.

E. Steel Drill Screws:

b. Highland Stucco.

- 2.5 MISCELLANEOUS MATERIALS A. Water for Mixing and Finishing Plaster: Potable.
- C. Acid-Etching Solution: Muriatic acid (10 percent solution of commercial hydrochloric acid) mixed 1 part to not less than 6 nor more than 10 parts water.
- D. Dash-Coat Material: 2 parts portland cement to 3 parts fine sand, mixed with water to a mushy-paste
- 1. ASTM C 1002 for fastening metal lath to wood or steel members less than 0.033 inch thick. 2. Steel drill screws complying with ASTM C 954 for fastening metal lath to steel members 0.033 to 0. 112
- 3. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, .,,c following:
- a. ChemRex, Inc., Contech Brands; PL Acoustical Sealant. b. Pecora Corp.; AC-20 FTR Acoustical and Insulation Sealant.
- c. United States Gypsum Co.; SHEETROCK Acoustical Sealant. F. Three-Coat Work over Metal Lath:
- 1. Scratch and Brown Coat Mixes: Scratch, 1 part portland cement, 0 to 3/4 parts lime, 2-1/2 to 4 parts
- aggregate; brown, 1 part portland cement, 0 to 3/4 parts lime, 3 to 5 parts aggregate. G. Two-Coat Work over Concrete Unit Masonry:
- 1. Base Coat Mix: I part portland cement, 3/4 to 1-1/2 parts lime, 3 to 4 parts aggregate. H. Job-Mixed Finish Coats:

# 1. Mixes with Sand Aggregates: 1 part portland cement, 3/4 to 1-1/2 parts lime, 3 parts sand.

- PART 3 EXECUTION
- 3.1 LATH AND FURRING INSTALLATION, GENERAL A. Standards: Comply with ML/SFA 920, "Guide Specifications for Metal Lathing and Furring," and ASTM C 1063.
- B. Install supplementary framing, blocking, and bracing at terminations in work and for support of fixtures, equipment services, heavy trim, grab bars, handrails, furnishings, and similar work to comply with details indicated or, if not otherwise indicated, to comply with applicable written instructions of lath and furring manufacturer. Isolation: Where lathing and metal support system abut building structure horizontally and where partition or wall
- abuts overhead structure, isolate from structural movement to prevent transfer of loading from building structure. 1. Frame both sides of control joints independently and do not bridge joints with furring and lathing or D. Install additional framing, furring, runners, lath, and beads, as required to form openings and frames for other

work as indicated. Coordinate support system for proper support of framed work that is not indicated to be

# supported independently of metal furring and lathing system.

1. Steel Stud Systems to Receive Metal Lath:

otherwise indicated.

3.2 NON-LOAD-BEARING FRAMING INSTALLATION

Lathing and Furring."

- A. Ceiling Suspension Systems 1. Preparation and Coordination: Coordinate installation of ceiling suspension system with installation of overhead structural systems to ensure inserts and other structural anchorage provisions have been installed to receive ceiling hangers in a manner that will develop their full strength and at spacings
- required to support ceiling. 2. Hanger Installation: Comply with ML/SFA 920, "Guide Specifications for Metal Lathing and Furring," and with referenced standards
- a. Do not attach hangers to metal deck tabs. Install ceiling suspension system components of sizes and spacings indicated, but not in smaller sizes or greater spacings than those required by referenced lathing and furring installation standards. B. Partition Framing and Furring: Comply with ASTM C 754 and ML/SFA 920, "Guide Specifications for Metal
- a. Extend and attach partition support systems to structure above suspended ceilings, unless otherwise

b. Extend partition support systems to finish ceilings and attach to ceiling suspension members, unless

#### 3.3 LATHING

- Install where plaster base coats are required. Provide appropriate type, configuration, and weight of metal lath selected from materials indicated that comply with referenced ML'SFA specifications and ASTM lathing
- 1. Suspended and Furred Ceilings: Use flat, diamond-mesh lath.

required for plaster thickness.

- 2. Vertical Metal Framing and Furring: Use flat, diamond-mesh lath and cold-rolled channel stud' framing.
- 3. Exterior Sheathed Wall Surfaces: Use paper-faced, self-furring, diamond-mesh lath 4. Monolithic Surfaces: Use [[self-furring, diamond-mesh lath or vertical metal framing and furring as

#### 3.4 PREPARATIONS FOR PLASTERING

- A. Protect contiguous Work from damage and deterioration caused by plastering with temporary covering and other provisions necessary.
- B. Clean plaster bases and substrates for direct application of plaster, removing loose material and substances

if necessary, to obtain adequate suction and mechanical bond of plaster (where dash coat, bonding agent, or

- C. Etch concrete and concrete unit masonry surfaces indicated for direct plaster application. Scrub with acid-etching solution on previously wetted surface and rinse thoroughly with clean water. Repeat application,
- D. Apply bonding agent on concrete and concrete unit masonry surfaces indicated for direct plaster application.
- E. Apply dash coat on concrete surfaces indicated for direct plaster application. Moist-cure dash coat for at least 24 hours after application and before plastering. F. Install temporary grounds and screeds to ensure accurate rodding of plaster to true surfaces; coordinate with
- scratch-coat work G. Refer to Division 6 Sections for installing permanent wood grounds.
- Refer to Division 7 Sections for installing flashing. I. Surface Conditioning: Immediately before plastering, dampen concrete and concrete unit masonry substrates,

except where a bonding agent has been applied, to produce optimum suction for plastering.

### 3.5 PLASTERING ACCESSORIES INSTALLATION

- A. General: Comply with referenced lathing and furring installation standards for provision and location of plaster accessories. Miter or cope accessories at comers; install with tight joints and in alignment. Attach accessories securely to plaster bases to hold accessories in place and in alignment during plastering.
- External Corners: Install corner reinforcement at external corners. Terminations of Plaster: Install casing beads, unless otherwise indicated
- criteria and approved by Architect a. Where an expansion or contraction joint occurs in surface of construction directly behind plaster

3. Control Joints: Install at locations indicated or, if not indicated, at locations complying with the following

- b. Distance between Control Joints: Not to exceed 18 feet in either direction or a length-to-width ratio
- c. Wall Areas: Not more than 144 sq. ft. d. Horizontal Surfaces: Not more than 100 sq. ft. in area.

plaster manufacturer's written instructions for location of sealant beads.

C. Install sound attenuation blankets within stud cavities where indicated.

B. Where sound-rated plaster work is indicated by STC ratings or other notation, seal work at perimeters, control joints, openings, and penetrations with a continuous bead of acoustical sealant. Comply with ASTM C 919 and

e. Where plaster panel sizes or dimensions change, extend joints full width or height of plaster

- 3.6 PLASTER APPLICATION A. Plaster Application Standard: Comply with ASTM C 926.
- 1. Mixing: Mechanically mix cementitious and aggregate materials for plasters to comply with applicable referenced application standard and with recommendations of plaster manufactures 2. Do not use materials that are frozen, caked, lumpy, dirty, or contaminated by foreign materials
- deviate more than plus or minus 1/8 inch in 10 feet from a true plane in finished plaster surfaces, as measure=d by a 10-foot straightedge placed at any location on surface. B. Grout hollow-metal frames, bases, and similar work occurring in plastered areas, with base-coat plaster

3. Do not use excessive water in mixing and applying plaster materials. Flat Surface Tolerances: Do not

material, and before lathing where necessary. Except where full grouting is indicated or required for fire resistance rating, grout at least 6 inches at each jamb anchor. C. Sequence plaster application with installation and protection of other work so that neither will be damaged

D. Plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground

F. Corners: Make internal corners and angles square; finish external corners flush with corner beads on interior

- unless otherwise indicated. Where interior plaster is not terminated at metal frame by casing beads, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
- G. Number of Coats:
- Metal Lath: Three coats. 2. Concrete Unit Masonry: Two coats.

work, square and true with plaster faces on exterior work.

- plaster bonded to solid base. H. Finish Coats: 1. Float Finish: Apply finish coat to a minimum thickness of 1 /8 inch to completely cover base coat,
- uniformly floated to a true even plane with fine-textured finish matching sample. 2. Trowel-Textured Finish: Apply finish coat with hand-troweled-textured finish matching sample. 3. Moist-cure plaster base and finish coats to comply with ASTM C 926, including written instructions for

3. Concrete, Cast-in-Place or Precast: Two coats when surface condition complies with ASTM C 926 for

# time between coats and curing in "Annex A2 Design Considerations."

- 3.7 CUTTING, PATCHING, AND CLEANING A. Cut, patch, replace, repair, and point up plaster as necessary to accommodate other work. Repair cracks and ndented surfaces. Point-up finish plaster surfaces around items that are built into or penetrate plaster surfaces. Repair or replace work to eliminate blisters, buckles, check cracking, dry outs, efflorescence,
- excessive pinholes, and similar defects. Repair or replace work as necessary to comply with required visual B. Remove temporary covering and other provisions made to minimize spattering of plaster on other work. Promptly remove plaster from door frames, windows, and other surfaces not to be plastered. Repair surfaces stained,

# marred or otherwise damaged during plastering work.

1.1 SUMMARY

### END OF SECTION 09220 SECTION 09260 - GYPSUM BOARD ASSEMBLIES

- PART 1 GENERAL
- A. This Section includes the following: Interior gypsum wallboard.

Non-load-bearing steel framing.

2. Exterior gypsum board panels for ceilings and soffits.

1.2 SUBMITTALS A. Product Data: For each product indicated.

B. Samples: For each textured finish indicated and on same backing indicated for Work upon request of

### Architect.

- 1.3 QUALITY ASSURANCE A. Fire-Test-Response Characteristics For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E'119 by an independent
- testing and inspecting agency acceptable to authorities having jurisdiction. B. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

### PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for
- 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.

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OF.

- B. Joint Tape:
- Interior Gypsum Wallboard: Paper.
- 2. Exterior Gypsum Soffit Board: Paper.
- 3. Glass-Mat Gypsum Sheathing Board:10-by-10 glass mesh
- Joint compound for interior gypsum wallboard: for each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
- 1. Prefilling: At open joints and damaged surface areas, use setting type taping compound.
- 2. Embedding and First Coat: For embedding tape and first coat on joints, flanges of trim accessories,
- and fasteners, use setting-type taping compound.
- 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
- 4. Finish Coat: For third coat, use setting -type, sandable topping compound. 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.
- D. Joint Compound for Exterior Applications:
- 1. Exterior Gypsum Soffit Board: Use setting-type taping and setting-type, sandable topping
- 2. Glass-Mat Gypsum Sheathing Board: As recommended by manufacturer. E. Joint Compound for Tile Backing Panels:
- 1. Water-Resistant Gypsum Backing Board: Use setting-type taping and setting -type, sandable topping
- 2. Glass-Mat, Water-Resistant Backing Panel: As recommended by manufacturer.
- 3. Cementitious Backer Units: As recommended by manufacturer.

#### 2.6 ALIXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations
- 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
- 2. For fastening cementitious backer units, use screws of type and size recommended by panel

### PART 3 - EXECUTION

### 3.1 NON-LOAD-BEARING STEEL FRAMING INSTALLATION

- A. General: Comply with ASTM C 754, and ASTM C 840 requirements that apply to framing installation.
- B. Suspended Ceiling and Soffit Framing:
- 1. Suspend ceiling hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
- 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
- 3. Attach hangers to structural members. Do not support ceilings from or attach hangers to permanent metal forms, steel deck tabs, steel roof decks, ducts, pipes, or conduit.
- 4. Screw furring to wood framing.

to fit into wall track.

- 5. Wire-tie furring channels to supports, as required to comply with requirements for assemblies
- 6. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and buttcut
- C. Partition and Soffit Framing:
- 1. Where studs are installed directly against exterior walls, install isolation strip between studs and
- 2. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over ames for doors and openings and frame around ducts penetrating partitions above ceiling auprovide support for gypsum board.
- 3. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs. a. Install two studs at each jamb, unless otherwise indicated.
- b. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure
- 4. Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

### 3.2 PANEL PRODUCT INSTALLATION

- A. Gypsum Board: Comply with ASTM C 840 and GA-216.
- Space screws a maximum of 12 inches o.c. for vertical applications.
- 2. On ceilings, apply gypsum panels before wall partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.
- 3. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated
- or required by fire-resistance-rated assembly, and minimize end joints.
- a. Stagger abutting end joints not less than one framing member in alternate courses of board. b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or
- required by fire-resistance-rated assembly. 4. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- 5. Laminating to Substrate: Comply with gypsum board manufacturer's written recommendations and
- temporarily brace or fasten gypsum panels until fastening adhesive has set.
- B. Exterior Ceilings and Soffits: Apply exterior gypsum panels perpendicular to supports, with end joints staggered and located over supports.
- Fasten with corrosion-resistant screws.

### 3.3 FINISHING

- A. Installing Trim Accessories: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Finishing Gypsum board panels: treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.
- 1. Prefill open joints and damaged surface areas.
- 2. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for
- 3. Glass-Mat Gypsum Sheathing Board: Finish according to manufacturer's written instructions for use as exposed soffit board.
- 4. Glass-Mat, Water-Resistant Backing Panels: Finish according to manufacturer's written instructions. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for
- locations indicated:
- 1. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.

### END OF SECTION 09260

### SECTION 09512 - ACOUSTICAL TILE CEILINGS

### PART 1 - GENERAL

### 1.1 SUMMARY

A This Section includes acoustical tiles and concealed suspension systems for ceilings.

#### 1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Samples: For each acoustical tile, for each concealed suspension system member and for each color and texture required.
- C. Product test reports.

#### 1.3 QUALITY ASSURANCE

- A. Acoustical Testing Agency Qualifications: An independent testing laboratory or an NVLAP-accredited
- B. Fire-Test-Response Characteristics:
- 1. Fire-Resistance Ratings: Where indicated, provide acoustical tile ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Ratings are indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
- a. Identify materials with appropriate markings of applicable testing and inspecting agency. 2. Surface-Burning Characteristics: Acoustical tiles complying with ASTM E 1264 for Class A materials,
- when tested per ASTM E 84 a. Smoke-Developed Index: 450 or less.
- C Seismic standard: Comply the following
- ASTM E 580.
- 2. CISCA's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings--Seismic Zones
- 3. Mockups: Build mockups to verify selections made under sample Submittals and to

#### PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product
- 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.

#### 2.2 GENERAL

- A. Acoustical Tile Standard: Comply with ASTM E 1264.
- B. Metal Suspension System Standard: Comply with ASTM C 635.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. 1. Anchors in Concrete: Expansion anchors fabricated from corrosion-resistant materials, with holes or
- loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
- 2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.
- D. Wire Hangers, Braces, and Ties: Zinc-coated carbon-steel wire; ASTM A 641, A 641M, Class 1 zinc coating,
- Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter

### E. Seismic struts and seismic clips.

F. Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical tile edge details and suspension systems indicated; formed from sheet metal of same material and finish as that used for exposed flanges of suspension system runners.

2.3 ACOUSTICAL TILES

- A. General: Acoustical tiles shall be 24" x 48" x 5/8" matte finish mineral fiber ceiling boards and shall conform to Federal Specification SS-S-1 18a, Class 25. Light reflectance shall be no less than 75% and have NRC minimum range of .50 - .60.
- B. Products:
- Armstrong "Cortega" Celotex "Baroque"
- 3. U.S.G. "Omni Fissured"

### 2.4 METAL SUSPENSION SYSTEM

- A. General: The ceiling suspension system shall be an exposed grid system with exposed flanges having a factory applied white enamel finish with roll formed capped edges.
- 1. Main Runner: DX-24 2. Cross Tees: DX-424
- 3. Wall Angle: M6S
- B Products:
- 1. Donn Products, Inc., Westlake, OH.
- 2. Acoustical Tile Supplier Standard Grid System.
- B. Ceiling Suspension System: Direct hung; ASTM C 635, intermediate-duty structural classification.

### PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Install acoustical tile ceilings to comply with AS T M C 636 and seismic requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
- B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite
- edges of each ceiling. Avoid using less-than-half-width tiles at borders. C. Suspend ceiling hangers from building's structural members, plumb and free from contact with insulation or other objects within ceiling plenum. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location
- of hangers, use trapezes or equivalent devices.
- 1. Do not support ceilings directly from permanent metal forms or floor deck; anchor into concrete
- 2. Do not attach hangers to steel deck tabs or to steel roof deck.
- D. Install edge moldings and trim at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical units. Screw attach moldings to substrate with concealed fasteners at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system

to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.

- E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members F. Install acoustical tiles in coordination with suspension system and exposed moldings and trim. Place splines or suspension system flanges into curved edges so tile-to-tile joints are closed by double lap of
- material. Fit adjoining tile to form flush, tight joints. Scribe and cut tile for accurate fit at borders and around penetrations through tile. Hold tile field in compression by inserting leaf-type, spring-steel spacers between tile and moldings, spaced 12 inches o.c.

### END OF SECTION 09512

### **SECTION 10200 - LOUVERS AND VENTS**

### PART 1 - GENERAL

- 1.1 SUMMARY A. This Section includes fixed, extruded-aluminum louvers.
- 1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and wind loads based on a uniform pressure of 20 lb/sq. ft., acting inward or outward, without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors.
- B. Thermal Movements: Provide louvers that allow for thermal movements resulting from a temperature change (range) of 120 deg F, ambient; 180 deg F, material surfaces, by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
- C. Air-Performance, Water-Penetration, and Wind-Driven Rain Ratings: As demonstrated by testing manufacturer's stock units according to AMCA 500-L.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work. 1. Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.
- C. Samples: For each type of finish upon request of Architect.
- D. Product test reports verifying compliance with applicable wind loads by testing methods approved by the authority having jurisdiction..

#### **PRODUCTS**

#### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- Louvers: a. Airline Products Co.
- b. Cesco Products. c. Greenheck.
- d. Vent Products Company, Inc.

#### 2.2 MATERIALS

- A. Aluminum Extrusions: ASTM B 221, alloy 6063-T5 or T-52.
- B. Aluminum Sheet: ASTM B 209, alloy 3003 or 5005.
- C. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel.

### 2.3 FABRICATION, GENERAL

- A. Fabricate frames to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- B. Join frame members to each other and to louver blades with fillet welds concealed from view. C. Join frame members to each other and to louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view.

### 2.4 FIXED, EXTRUDED-ALUMI-NIUM LOUVERS

- A. Horizontal, Nondrainable-Blade Louver:
- 1. Basis-of-Design Product: Greenheck ESU or a comparable product of one of the following:
- a. Airline Products Co. b. Cesco Products.
- c. Vent Products Company, Inc.

2. Blade Profile: Plain blade without center baffle.

- 3. Frame and Blade Nominal Thickness: Not less than 0.080 inch.
- 4. Performance Requirements: a. Free Area: Not less than 7.5 sq. ft. for 48-inch- wide by 48-inch- high louver.

B. Louver Screen Frames: Same kind and form of metal as indicated for louver to which screens are

b. Point of Beginning Water Penetration: Not less than 700 fpm. c. Air Performance: Not more than 0.10-inch wg static pressure drop at free-area velocity.

### 2.5 LOUVER SCREENS

- A. General: Provide screen at interior face of each exterior louver.
- C. Louver Screening:

1. Color and Gloss: As selected from manufacturer's full range.

1. Bird Screening: Aluminum, 1/2-inch- square mesh, 0.063-inch wire.

### 2.6 FINISHES

D. Aluminum, High-Performance Organic Finish: Two-coat thermocured system with fluoropolymer coats containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

## PART 3 - EXECUTION

- 3.1 INSTALLATION A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weather tight connection. C. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- D. Repair damaged finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new E. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy

coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar

# **END OF SECTION 10200**

# SECTION 10801 - TOILET AND BATH ACCESSORIES

# PART 1 - GENERAL

- 1.1 SUMMARY A. This Section includes the following:
- Toilet and bath accessories. Underlavatory guards.

- 1.2 QUALITY ASSURANCE A. Inserts and Anchorage: Furnish inserts and anchoring devices and coordinate delivery with other work to
- B. Provide products of the same manufacturer for each type of accessory unit and for units exposed in the
- C. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace mirrors that develop visible silver spoilage defects within 15 years from date of Substantial Completion.

### PART 2 - PRODUCTS

# 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:1 Toilet and Bath Accessories:
  - a. American Specialties, the.

b. Bobrick Washroom Equipment, Inc.

c. Bradley Corporation. 2. Underlavatory Guards:

- Truebro, Inc.
- b. Plumberex Specialty Products, Inc.

## 2.2 SCHEDULE OF TOILET ACCESSORIES

- Mark Product Bobrick #Bradley #Notes Al Paper Towel Dispenser B-261 250-150000 SS Surface Mounted SS Surface Mad - Single Roll B I Toilet Tissue Dispenser
- F 1 36" Grab Bar B3803-368120-001360 SS Satin Finished F2 42" Grab Bar B3803-428120-001420 SS Satin Finished
- UI Undersink Pipe Protection N/A N/A Truebro "Lav Guard" or Plumberex "Handy-Shield" Note: Contractor to comply with manufacturer's recommendations for anchorage of accessories to substrate.

B-294 740 16" x 30" Tilt, SS Frame

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

K1 Mirror Unit

- A. Install accessories using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated. Provide blocking where required to meet force requirements indicted below. Ensure blocking is Fire retardant in walls that are rated or are otherwise required to be non-combustible
- 1. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method
- 2. Install undersink protection around trap and angle valve assemblies. Secure covers with manufacture's standard fasteners.
- B. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items. Remove temporary labels and protective coatings.

## END OF SECTION 10801

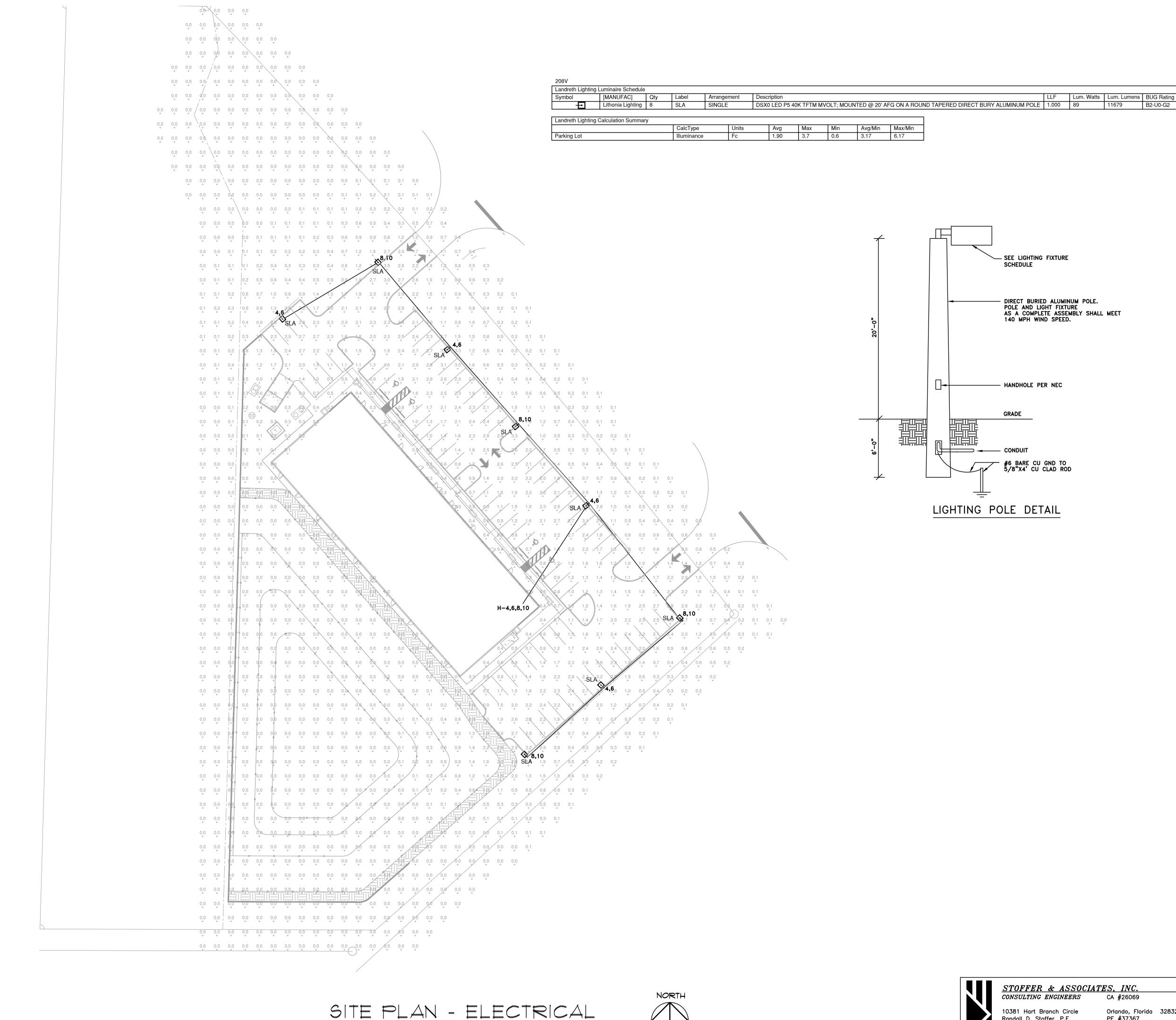
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SIGN/SEAL

OF.



Phone (407) 381-4555 ELECTRICAL - HVAC - PLUMBING

STOFFER & ASSOCIATES, INC. Randall D. Stoffer, P.E.

Orlando, Florida 32832 PE #37367 Fax (407) 249-1520

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DATE

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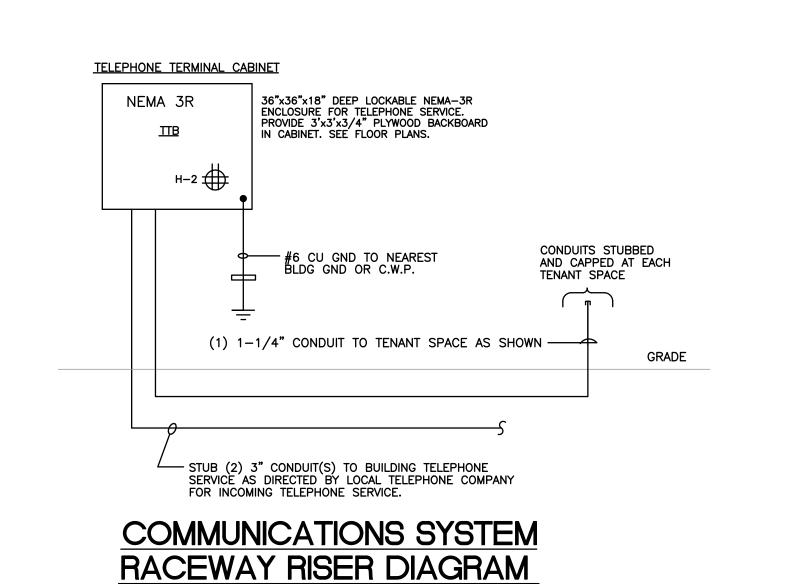
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SCALE: 1/32"= 1'-0"

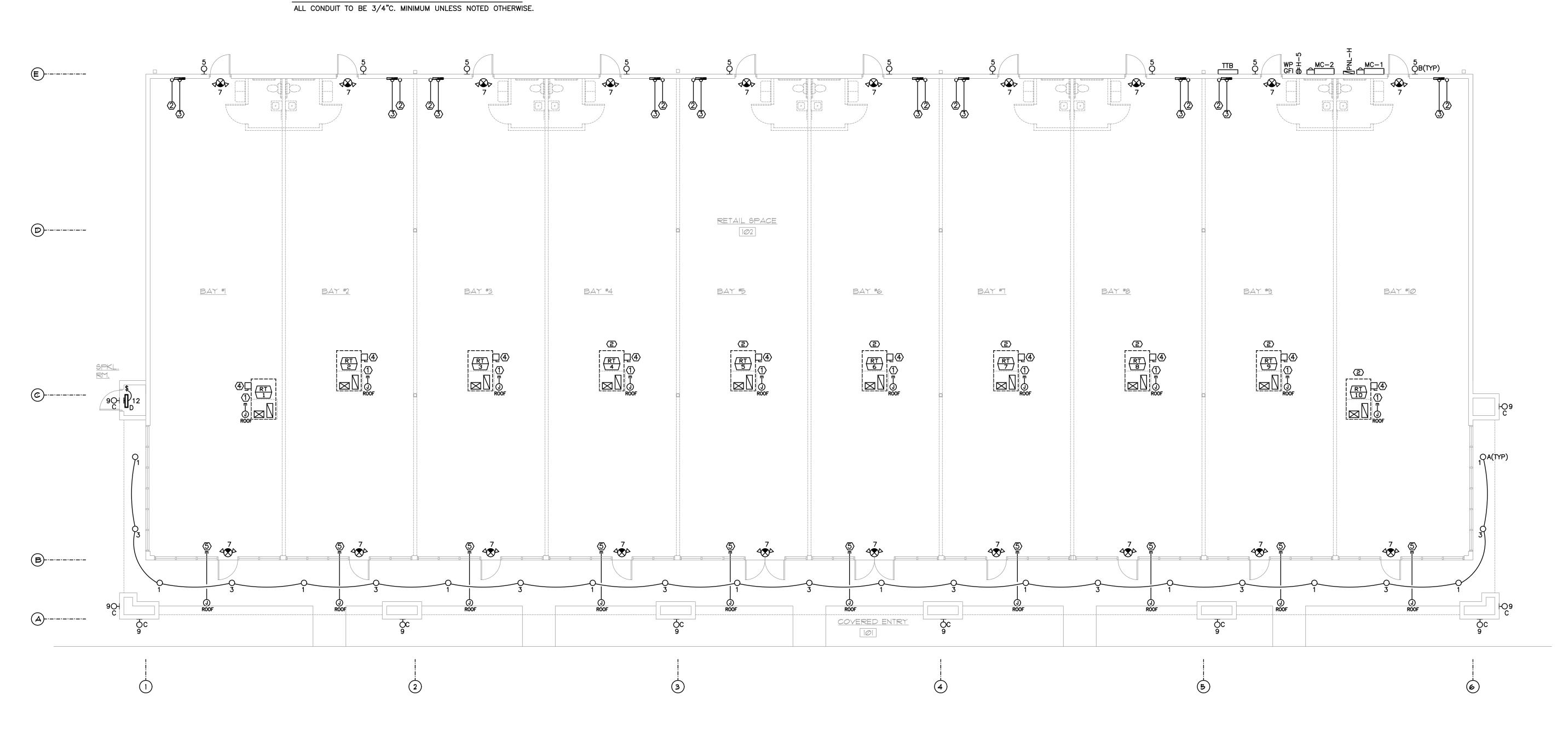


## **KEYED NOTES**

- 1 3/4"C. STUBBED TO TENANT CEILING SPACE FOR FUTURE
- ROOF RECEPTACLE. ② 3-1/2" C. STUBBED AND CAPPED TO TENANT SPACE AS SHOWN FOR FUTURE PANEL FEEDER.
- (3) 1-1/4" C. STUBBED AND CAPPED TO TENANT SPACE AS SHOWN FOR FUTURE TELEPHONE SERVICE.
- 4 PROVIDE NEMA 3R 60A, 3PH D.S.. ROUTE 1"C. STUBBED TO TENANT CEILING SPACE FOR FUTURE RTU CONNECTION.

#### GENERAL ELECTRICAL NOTES

- RECORD DRAWINGS, CONTRACTOR SHALL COMPLY WITH FBC-EC C405.6.4.1 WITHIN 30 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE. MANUALS, CONTRACTOR SHALL COMPLY WITH FBC-EC C405.6.4.2.
- ANY 120V CKT LONGER THAN 75 FEET, INCREASE TO #10 AWG. PROVIDE SERVICE EQUIPMENT AIC MARKING PER NEC 110.24(A) AND 110.24(B) FOR MODIFICATIONS IF REQUIRED.
- CONTRACTOR SHALL PROVIDE A LETTER FROM POWER CO. SHOWING THE AVAILABLE FAULT CURRENT AT THE SECONDARY OF THE TRANSFORMERS. THIS LETTER SHALL BE SUBMITTED TO ORANGE COUNTY PRIOR TO THE 1ST INSPECTION. THIS LETTER SHALL ALSO BE SUBMITTED TO THE ENGINEER OF RECORD DURING SUBMITTAL REVIEW.



FLOOR PLAN - ELECTRICAL SCALE: 1/8"= 1'-0"



Randall D. Stoffer, P.E. Phone (407) 381—4555

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CONSULTING ENGINEERS CA #26069

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- Drawings are diagrammatic and shall not be scaled. Refer to architectural plans and elevations for exact location of all equipment. Electrical contractor shall furnish and install all items required for a complete and acceptable working installation.
- 2. All work shall comply with the 2014 National Electrical Code and shall comply with all local rules and ordinances having jurisdiction.
- Minimum wire size shall be #12 awg. Unless otherwise noted all conductors shall be copper with THWN or THHN insulation.
- . All material shall be new and bear the Underwrites Label (U.L.) where
- The electrical system shall be completely and effectively grounded as required in Article 250 of the National Electrical Code.
- The electrical, telephone, and cable television installations shall meet all requirements by the local utility companies.

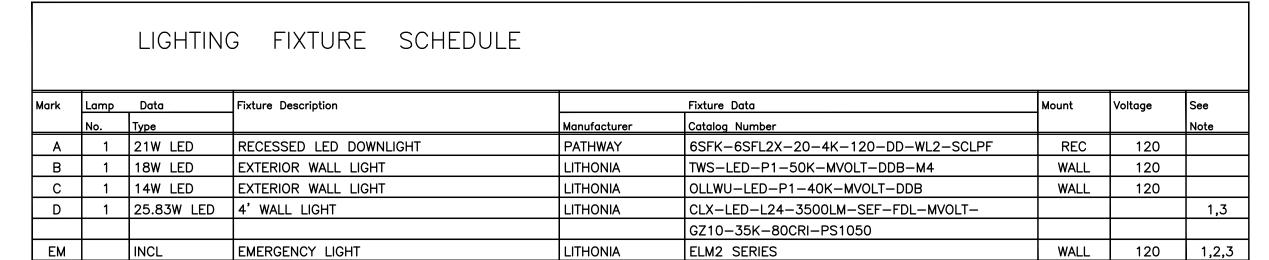
must be approved by the engineer.

- All disconnect switches shall be rated for 100,000 A.I.C. unless otherwise noted. All fuses shall be rated for 200,000 A.I.C. and shall be current limiting.
- 8. All electrical switchgear shall be by Square D, GE, or Siemens. Substitutes
- 9. Outlet boxes shall be pressed steel in dry locations. Plastic boxes may be used in lieu of the steel box where permitted by local codes. In damp or wet locations boxes shall be made from cast alloy with threaded hubs. Special enclosures are required for other classified areas.
- 10. Separate wire and conduit system may be substituted with factory fabricated assembly of insulated conductors in a flexible metallic enclosure where permitted by local codes.
- 11. Motor starters shall be manual or magnetic with overload relays in each hot leg. It shall be the electrical contractor to provide all starters where required.
- 12. Furnish and install disconnect switches, over current protection, and wiring for the air conditioning system as per manufacturer recommendations. Controls are to be supplied by the air conditioning contractor and connected by the electrical contractor.
- 13. All work shall be performed by a licensed electrical contracor in a first class workmanlike manner. The complete system shall be fully operative and accepted by the engineer or architect.
- 14. All work shall be coordinated with other trades to avoid interference with the progress of construction..
- 15. The electrical contractor shall guarantee all materials and workmanship free from defects for a period of not less than (1) one year from the date of acceptance. Correction of any defects shall be completed without additional charge and shall include replacement or repair of any other phase of the installation which may have been damaged thereby.
- 16. All required insurance shall be provided for protection against public liability or property damage for the duration of the work.

ELECTRI	ICAL SYMBOLS
0	LED LIGHTING FIXTURE — RECESSED
OH	LED SCONCE LIGHTING FIXTURE - WALL MOUNTED
	LED WALL LIGHTING FIXTURE - SURFACE
₩-	SINGLE POLE TOGGLE SWITCH — MOUNTED 42" AFF TO CENTERLINE UNLESS OTHERWISE NOTED  (2) 2 POLE HP RATED TYPE  (3) 3 WAY  (4) 4 WAY
<del>-</del> €	DUPLEX RECEPTACLE — MOUNTED 18" AFF TO BOTTOM UNLESS NOTED OTHERWISE  (GFI) GROUND FAULT INTERRUPTING  (REF) REFRIGERATOR  (WP) WEATHERPROOF  (IG) ISOLATED GROUND
<b>&gt;</b>	TELEPHONE/FAX OUTLET - MOUNTED AS REQUIRED
	DISCONNECT SWITCH
<b>②</b>	JUNCTION BOX
	ELECTRICAL PANEL
	METER
4₹	EMERGENCY BATTERY LIGHT & EXIT SIGN UNIT - CEILING MOUNTED
4_4	EMERGENCY BATTERY UNIT LIGHTING FIXTURE - WALL MOUNTED
1	SEE NOTE SYMBOL
	SOLID LINE INDICATES EQUIPMENT ON COMMON CIRCUIT AND/ OR CONTROLLED BY COMMON SWITCH. EACH CIRCUIT SHALL CONSIST OF A PHASE CONDUCTOR, NEUTRAL AND GROUND

NOTE: NOT ALL SYMBOLS MAY BE USED.

INDICATED ON PLANS.



LHQM-S-W-3-R

+ VIA PHOTOCELL FOR CONTACTOR

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GENERAL LIGHTING FIXTURE NOTES:

INCL

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A. CONTRACTOR SHALL COORDINATE FIXTURE MOUNTING WITH ARCHITECTURAL REFLECTED CEILING PLAN(S) AND SHALL

COMBO EXIT SIGN/EMERGENCY LIGHT

- PROVIDE FIXTURE MOUNTING AS REQUIRED TO MATCH CEILING TYPE.
- F. ALL ELECTRICAL FIXTURES MUST BE INDEPENDENTLY SUPPORTED OF CEILING GRID. LIGHT FIXTURES WEIGHTING LESS THAN 10 POUNDS SHALL HAVE AT LEAST ONE 12 GAGE HANGER WIRE CONNECTED FROM THE FIXTURE TO THE STRUCTURE ABOVE. LIGHTS WEIGHTING MORE THAN 10 POUNDS SHALL HAVE AT LEAST TWO 12 GAGE WIRES ATTACHED AT OPPOSING CORNERS OF THE LIGHT FIXTURE.

LIGHTING FIXTURE SCHEDULE NOTES:

- 1. FIXTURES SHALL BE PROVIDED WITH INTEGRAL EMERGENCY BATTERY BACK-UP.
- 2. FIXTURE SHALL BE WALL MOUNTED AT 7'-6" AFF.
- 3. FIXTURES TO BE PROVIDED WITH INTEGRAL EMERGENCY BATTERY BACK-UP.
  FIXTURES SHALL BE CONNECTED TO CONSTANT NORMAL ROOM LIGHTING BRANCH CIRCUIT OF AREA SERVED
  (i,e, LOAD SIDE OF BREAKER, LINE SIDE OF ANY SWITCHING/CONTROLLING DEVICES).
- 4. FIXTURES TO BE PROVIDED WITH INTEGRAL EMERGENCY BATTERY BACK-UP. THE EMERGENCY BALLAST SHALL BE CONNECTED TO CONSTANT NORMAL ROOM LIGHTING BRANCH CIRCUIT OF AREA SERVED
- (i, e, LOAD SIDE OF BREAKER, LINE SIDE OF ANY SWITCHING/CONTROLLING DEVICES). THE LIGHT FIXTURE IS TO BE COMPLETELY SWITCHED AND THE EMERGENCY BALLAST OPERATES ONLY IN THE EVENT OF A BRANCH CIRCUIT POWER FAILURE.

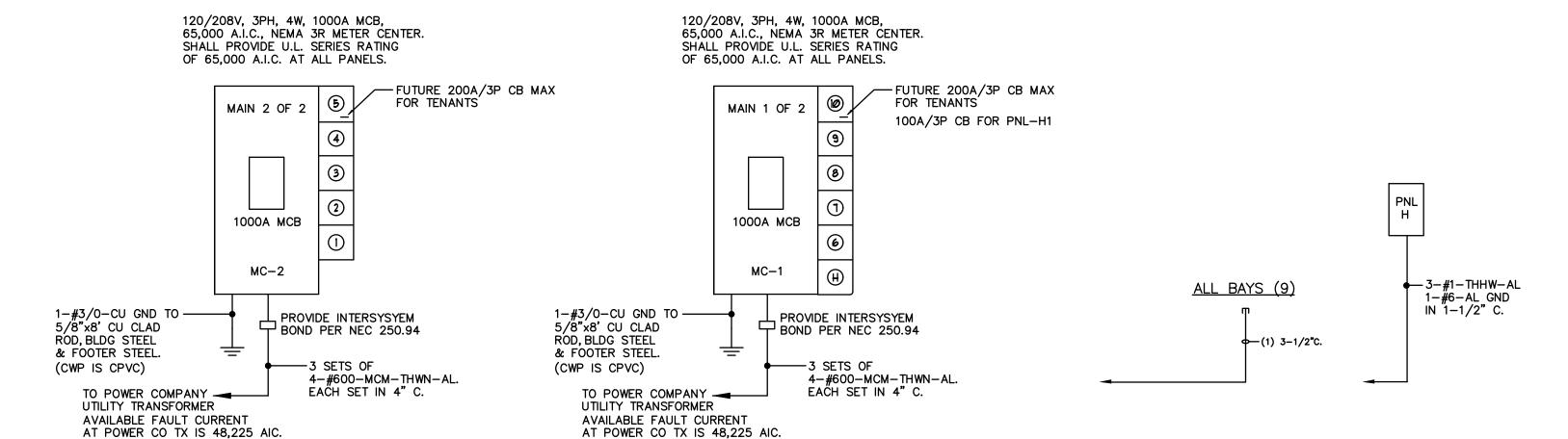
				CIRC	JIT BREAKER PANEL - HOUSE PANEL	"	H <b>"</b>		
	SERVICE:	120/208\	/, 3PH, 4W			100	AMP MLO	NEMA-3R	
	A.I.C. RAT	ING: 10,0	00		SPACES:	24	ŀ	MTG: SURF	ACE
CKT	СВ	WIRE	COND	GND	LOAD DESCRIPTION		PH:A	PH:B	PH:
1	20/1	2#10	1/2"	#10	CANOPY LIGHTING	+	251		
3	20/1	2#10	1/2"	#10	CANOPY LIGHTING	*		231	
5	20/1	2#12	1/2"	#12	REAR WALL LIGHTING	+			
7	20/1	2#12	1/2"	#12	EXIT/EMERG LTG		50		
9	20/1	2#12	1/2"	#12	FRONT COLUMN LTG	*		258	
11	20/1	2#12	1/2"	#12	RECEPTACLE				
13					SPACE				
15			l		SPACE				
17					SPACE				
19					SPACE				
21					SPACE				
23					SPACE				
2	20/1	2#12	1/2"	#12	TELEPHONE RECEPTACLE		360		
4	20/2	2#10	3/4"	#10	SITE LIGHTING	+		178	
6									
8	20/2	2#10	3/4"	#10	SITE LIGHTING	*	178		
10								178	
12	20/1	2#12	1/2"	#12	FIRE SPRINKLER LIGHT				
14					SPACE				
16					SPACE				
18					SPACE				
20			l		SPACE				
22			l I		SPACE				
24					SPACE				
					SUB-TOTAL LOAD		839	845	
					SUB-TOTAL AMPS		7	7	

WALL 120

SERVICE LOAD SUMMARY MC-2 = 324000 VATOTAL LOAD = 324000 VA = 900 A

SERVICE LOAD SUMMARY MC-1 5 BAYS = 324000 VAPANEL H = 2295 VA TOTAL LOAD = 326295 VA = 908 A

CONDUCTOR. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY SWITCH LEGS IN CONDUIT TO ACHIEVE SWITCHING

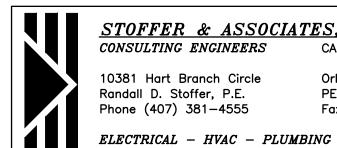


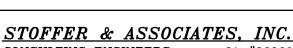
ELECTRICAL RISER DIAGRAM - 120/208V, 3PH, 4W

NTS









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