

PROJECT MANUAL

Fitness Centers

Prepared for:



Air Force Center for Engineering and the Environment

3300 Sidney Brooks, Bldg 532
Brooks City-Base, TX 78235

and



U.S. AIR FORCE

by:

JACOBS™

911 Central Parkway North
Suite 425
San Antonio, Texas 78232

16 November 2011

TABLE OF CONTENTS

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

NOT APPLICABLE

DIVISION 01 - GENERAL REQUIREMENTS

NOT APPLICABLE

DIVISION 02 - EXISTING CONDITIONS

NOT APPLICABLE

DIVISION 03 - CONCRETE

SECTION 033000 - CAST-IN-PLACE CONCRETE

DIVISION 04 - MASONRY

SECTION 042000 - UNIT MASONRY

DIVISION 05 - METALS

SECTION 054000 - COLD-FORMED METAL FRAMING

SECTION 055000 - METAL FABRICATIONS

SECTION 055100 - METAL STAIRS

SECTION 055213 - PIPE AND TUBE RAILINGS

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

SECTION 061000 - ROUGH CARPENTRY

SECTION 062023 - INTERIOR FINISH CARPENTRY

SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

SECTION 079200 - JOINT SEALANTS

DIVISION 08 - OPENINGS

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

SECTION 081416 - FLUSH WOOD DOORS

SECTION 083113 - ACCESS DOORS AND FRAMES

SECTION 085113 - ALUMINUM WINDOWS

SECTION 087100 - DOOR HARDWARE

SECTION 087111 - DOOR HARDWARE (SCHEDULED BY DESCRIBING PRODUCTS)

SECTION 088000 - GLAZING

SECTION 088300 - MIRRORS

DIVISION 09 - FINISHES

SECTION 092216 - NON-STRUCTURAL METAL FRAMING
SECTION 092900 - GYPSUM BOARD
SECTION 093000 - TILING
SECTION 096513 - RESILIENT BASE AND ACCESSORIES
SECTION 096813 - TILE CARPETING
SECTION 099123 - INTERIOR PAINTING

DIVISION 10 - SPECIALTIES

SECTION 101400 - SIGNAGE
SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES
SECTION 104413 - FIRE EXTINGUISHER CABINETS
SECTION 104416 - FIRE EXTINGUISHERS
SECTION 105500 - POSTAL SPECIALTIES

DIVISION 11 - EQUIPMENT

SECTION 113100 - RESIDENTIAL APPLIANCES

DIVISION 12 - FURNISHINGS

SECTION 123530 - RESIDENTIAL CASEWORK

DIVISION 13 - SPECIAL CONSTRUCTION

NOT APPLICABLE

DIVISION 14 - CONVEYING EQUIPMENT

NOT APPLICABLE

DIVISION 21 - FIRE SUPPRESSION

NOT APPLICABLE

DIVISION 22 - PLUMBING

NOT APPLICABLE

DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

NOT APPLICABLE

DIVISION 26 - ELECTRICAL

NOT APPLICABLE

DIVISION 27 - COMMUNICATIONS

NOT APPLICABLE

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

NOT APPLICABLE

DIVISION 31 - EARTHWORK

NOT APPLICABLE

DIVISION 32 - EXTERIOR IMPROVEMENTS

NOT APPLICABLE

DIVISION 33 - UTILITIES

NOT APPLICABLE

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Footings.
 - 2. Slabs-on-grade.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specifications for Structural Concrete," [Sections 1 through 5.] [Sections 1 through 5 and Section 7, "Lightweight Concrete."]
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- B. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than **1 inch** to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes no larger than **1 inch** in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Limit water-soluble, chloride-ion content in hardened concrete to **[0.06] [0.15] [0.30] [1.00]** percent by weight of cement.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Construct forms tight enough to prevent loss of concrete mortar.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Install keyways, reglets, recesses, and the like, for easy removal.
 - 2. Do not use rust-stained steel form-facing material.
- E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- G. exterior corners and edges of permanently exposed concrete.
- H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates,

diagrams, instructions, and directions furnished with items to be embedded.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than **50 deg F** for **[24] <Insert number>** hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved[**at least 70 percent of**] its 28-day design compressive strength.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

- A. Comply with **ACI 318** and ACI 301 for design, installation, and removal of shoring and reshoring.
 - 1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.
- C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least **6 inches** into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When average high and low temperature is expected to fall below **40 deg F** for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- F. Hot-Weather Placement: Comply with ACI 301 and as follows:
 - 1. Maintain concrete temperature below **90 deg F** at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.6 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

3.7 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a **No. 16** sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than **1/2 inch** in any dimension to solid concrete. Limit cut depth to **3/4 inch**. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of **0.01 inch** wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 - 2. After concrete has cured at least 14 days, correct high areas by grinding.
 - 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 - 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 - 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of **1/4 inch** to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to

manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

6. Repair defective areas, except random cracks and single holes **1 inch** or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a **3/4-inch** clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes **1 inch** or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

END OF SECTION 033000

SECTION 042000 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Concrete masonry units.
2. Pre-faced concrete masonry units.
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry joint reinforcement.
6. Ties and anchors.
7. Embedded flashing.
8. Miscellaneous masonry accessories.
9. Cavity-wall insulation.

- B. Related Sections:

1. Division 03 Section "Cast-in-Place Concrete" for[**installing**] dovetail slots for masonry anchors.
2. Division 05 Section "Metal Fabrications" for furnishing steel [**lintels**] [**and**] [**shelf angles**] for unit masonry.
3. Division 07 Section "Sheet Metal Flashing and Trim" for[**exposed**] sheet metal flashing and for furnishing manufactured reglets installed in masonry joints.
4. Division 08 Section "Louvers and Vents" for wall vents (brick vents).

1.3 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

- A. Provide[**structural**] unit masonry that develops indicated net-area compressive strengths at 28

days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

1.5 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

1. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C 140 for compressive strength.
2. Mortar Test (Property Specification): For each mix required, according to ASTM C 109/C 109M for compressive strength[, **ASTM C 1506 for water retention, and ASTM C 91 for air content**].
3. Mortar Test (Property Specification): For each mix required, according to ASTM C 780 for compressive strength.
4. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.
5. Prism Test: For each type of construction required, according to ASTM C 1314.

1.6 SUBMITTALS

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement." [**Show elevations of reinforced walls.**]
3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

- C. Samples for Initial Selection:

1. Decorative CMUs, in the form of small-scale units.

- D. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

- E. Material Certificates: For each type and size of the following:
1. Masonry units.
 - a. For masonry units[used in structural masonry], include data and calculations establishing average net-area compressive strength of units.
 2. Grout mixes. Include description of type and proportions of ingredients.
- F. Mix Designs: For each type of mortar[and grout]. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
 2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

1.7 QUALITY ASSURANCE

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockups for [each type of exposed unit masonry construction] [typical exterior wall] [typical interior wall] [typical exterior and interior walls] in sizes approximately [48 inches] [60 inches] [72 inches] [96 inches] <Insert size> long by [36 inches] [48 inches] [60 inches] [72 inches] <Insert size> high by full thickness, including face and backup wythes and accessories.
 - a. Include a sealant-filled joint at least 16 inches long in [each] [exterior wall] mockup.
 - b. Include through-wall flashing installed for a 24-inch length in corner of exterior wall mockup approximately 16 inches down from top of mockup, with a 12-inch length of flashing left exposed to view (omit masonry above half of flashing).

2. Clean[one-half of] exposed faces of mockups with masonry cleaner as indicated.
 3. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
 4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 1. Extend cover a minimum of **24 inches** down both sides of walls and hold cover securely in place.
 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes,

secure cover a minimum of **24 inches** down face next to unconstructed wythe and hold cover in place.

- B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 - 2. Protect sills, ledges, and projections from mortar droppings.
 - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is **40 deg F** and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

- A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.
- B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

- A. Regional Materials: Provide CMUs that have been manufactured within **500 miles** of Project site from aggregates[**and cement**] that have been extracted, harvested, or recovered, as well as manufactured, within **500 miles** of Project site.
- B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 2. Provide [**square-edged**] [**bullnose**] units for outside corners unless otherwise indicated.
- C. Integral Water Repellent: Provide units made with integral water repellent [for exposed units] [and] [where indicated].
1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
 - a. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - 1) ACM Chemistries; RainBloc.
 - 2) BASF Aktiengesellschaft; Rheopel Plus.
 - 3) Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block.
 - 4) <Insert manufacturer's name; product name or designation>.
- D. CMUs: ASTM C 90.
1. Density Classification: [**Lightweight**] [**Medium weight**] [**Normal weight**][**unless otherwise indicated**].
 2. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
 3. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
 4. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.
- E. Pre-faced CMUs: Lightweight solid concrete units complying with ASTM C 90, with manufacturer's standard smooth resinous facing complying with ASTM C 744.
1. Products: Subject to compliance with requirements, [**provide the following**] [**provide one of the following**] [**available products that may be incorporated into the Work include, but are not limited to, the following**]:
 - a. <Insert, in separate subparagraphs, manufacturer's name; product name or

designation>.

2. Size: Manufactured to dimensions specified in "CMUs" Paragraph but with pre-faced surfaces having **1/16-inch-** wide returns of facing to create **1/4-inch-** wide mortar joints with modular coursing.
3. Colors and Patterns: [**As indicated by manufacturer's designations**] [**Match Architect's samples**] [**As selected by Architect from manufacturer's full range**].

2.3 MASONRY LINTELS

- A. General: Provide one of the following:
- B. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.4 MORTAR AND GROUT MATERIALS

- A. Regional Materials: Provide aggregate for mortar and grout[, **cement, and lime**] that have been extracted, harvested, or recovered, as well as manufactured, within **500 miles** of Project site.
- B. Masonry Cement: ASTM C 91.
 1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Capital Materials Corporation; Flamingo Color Masonry Cement.
 - b. Cemex S.A.B. de C.V.; [Brikset Type N] [Citadel Type S] [Dixie Type S] [Kosmortar Type N] [Richmortar] [Victor Plastic Cement].
 - c. Essroc, Italcementi Group; [Brixment] [or] [Velvet].
 - d. Holcim (US) Inc.; [Mortamix Masonry Cement] [Rainbow Mortamix Custom Buff Masonry Cement] [White Mortamix Masonry Cement].
 - e. Lafarge North America Inc.; [Magnolia Masonry Cement] [Lafarge Masonry Cement] [Trinity White Masonry Cement].
 - f. Lehigh Cement Company; [Lehigh Masonry Cement] [Lehigh White Masonry Cement].
 - g. National Cement Company, Inc.; Coosa Masonry Cement.
 - h. <Insert manufacturer's name; product name or designation>.
- C. Aggregate for Mortar: ASTM C 144.
 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 2. For joints less than **1/4 inch** thick, use aggregate graded with 100 percent passing the

- No. 16 sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
- D. Aggregate for Grout: ASTM C 404.
- E. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
- a. Euclid Chemical Company (The); Accelguard 80.
 - b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
 - c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.
 - d. <Insert manufacturer's name; product name or designation>.
- F. Water: Potable.
- 2.5 REINFORCEMENT
- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, **Grade 60**.
- B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
- 1. Exterior Walls: [Hot-dip galvanized, carbon] [Stainless] steel.
 - 2. Wire Size for Side Rods: [0.148-inch] [0.187-inch] diameter.
 - 3. Wire Size for Cross Rods: [0.148-inch] [0.187-inch] diameter.
 - 4. Wire Size for Veneer Ties: [0.148-inch] [0.187-inch] diameter.
 - 5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than **16 inches** o.c.
 - 6. Provide in lengths of not less than **10 feet**[, with prefabricated corner and tee units].
- C. Masonry Joint Reinforcement for Multiwythe Masonry:
- 1. Ladder type with 1 side rod at each face shell of hollow masonry units more than **4 inches** wide, plus [1 side rod] [2 side rods] at each wythe of masonry **4 inches** wide or less.
- D. Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single **0.187-inch**- diameter, [hot-dip galvanized, carbon] [stainless]-steel continuous wire.
- 2.6 TIES AND ANCHORS
- A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.

- B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least **5/8-inch** cover on outside face. Outer ends of wires are bent 90 degrees and extend **2 inches** parallel to face of veneer.

- C. Individual Wire Ties: Rectangular units with closed ends and not less than **4 inches** wide.
 1. Where wythes [do not align] [are of different materials], use adjustable ties with pintle-and-eye connections having a maximum adjustment of **1-1/4 inches**.

- D. Adjustable Masonry-Veneer Anchors:
 1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
 - a. Structural Performance Characteristics: Capable of withstanding a **100-lbf** load in both tension and compression without deforming or developing play in excess of **0.05 inch**.

 2. Slip-in, Masonry-Veneer Anchors: Units consisting of a wire tie section and an anchor section designed to interlock with metal studs and be slipped into place as sheathing is installed.
 - a. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - 1) Hohmann & Barnard, Inc.; AA308.
 - 2) <Insert manufacturer's name; product name or designation>.

 3. Seismic Masonry-Veneer Anchors: Units consisting of a metal anchor section and a connector section designed to engage a continuous wire embedded in the veneer mortar joint.
 - a. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - 1) Dayton Superior Corporation, Dur-O-Wal Division; D/A 213S.
 - 2) Hohmann & Barnard, Inc.; DW-10-X-Seismiclip.
 - 3) Wire-Bond; RJ-711 with Wire-Bond clip.
 - 4) <Insert manufacturer's name; product name or designation>.

2.7 MISCELLANEOUS ANCHORS

- A. Anchor Bolts: [Headed] [or] [L-shaped] steel bolts complying with **ASTM A 307, Grade A**; with **ASTM A 563** hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.
- B. Postinstalled Anchors: [Torque-controlled expansion anchors] [or] [chemical anchors].
 - 1. Load Capacity: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy [Group 1] [Group 2] stainless-steel bolts, **ASTM F 593**, and nuts, **ASTM F 594**.

2.8 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing complying with [SMACNA's "Architectural Sheet Metal Manual"] [Division 07 Section "Sheet Metal Flashing and Trim"] and as follows:
 - 1. Copper: ASTM B 370, Temper H00, cold-rolled copper sheet, **16-oz./sq. ft.** weight or **0.0216 inch** thick or ASTM B 370, Temper H01, high-yield copper sheet, **12-oz./sq. ft.** weight or **0.0162 inch** thick.
 - 2. Fabricate continuous flashings in sections **96 inches** long minimum, but not exceeding **12 feet**. Provide splice plates at joints of formed, smooth metal flashing.
 - 3. Fabricate through-wall metal flashing embedded in masonry from [stainless steel] [copper], with ribs at **3-inch** intervals along length of flashing to provide an integral mortar bond.
 - a. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - 1) Cheney Flashing Company; [Cheney Flashing (Dovetail)] [or] [Cheney 3-Way Flashing (Sawtooth)].
 - 2) Keystone Flashing Company, Inc.; Keystone 3-Way Interlocking Thruwall Flashing.
 - 3) Sandell Manufacturing Co., Inc.; Mechanically Keyed Flashing.
 - 4) <Insert manufacturer's name; product name or designation>.
 - 4. Fabricate through-wall flashing with drip edge [where] [unless otherwise] indicated. Fabricate by extending flashing **1/2 inch** out from wall, with outer edge bent down 30 degrees [and hemmed].
 - 5. Fabricate through-wall flashing with sealant stop [where] [unless otherwise] indicated. Fabricate by bending metal back on itself **3/4 inch** at exterior face of wall and down into

joint **1/4 inch** to form a stop for retaining sealant backer rod.

B. Flexible Flashing: Use[one of] the following unless otherwise indicated:

1. Copper-Laminated Flashing: **[5-oz./sq. ft.] [7-oz./sq. ft.]** copper sheet bonded between 2 layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.
 - a. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - 1) Advanced Building Products Inc.; [Copper Fabric Flashing] [Copper Sealtite 2000].
 - 2) Dayton Superior Corporation, Dur-O-Wal Division; Copper Fabric Thru-Wall Flashing.
 - 3) Hohmann & Barnard, Inc.; H & B C-Fab Flashing.
 - 4) Phoenix Building Products; Type FCC-Fabric Covered Copper.
 - 5) Sandell Manufacturing Co., Inc.; Copper Fabric Flashing.
 - 6) York Manufacturing, Inc.; Multi-Flash 500.
 - 7) <Insert manufacturer's name; product name or designation>.

C. Application: Unless otherwise indicated, use the following:

1. Where flashing is indicated to receive counterflashing, use metal flashing.
2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
3. Where flashing is partly exposed and is indicated to terminate at the wall face, use metal flashing [with a drip edge] [with a sealant stop] [or flexible flashing with a metal drip edge] [or elastomeric thermoplastic flashing with drip edge] [or flexible flashing with a metal sealant stop].
4. Where flashing is fully concealed, use [metal flashing] [or] [flexible flashing].

D. Solder and Sealants for Sheet Metal Flashings:[As specified in Division 07 Section "Sheet Metal Flashing and Trim."]

1. Solder for Copper: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead.
2. Elastomeric Sealant: ASTM C 920, chemically curing [urethane] [polysulfide] [silicone] sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from [neoprene] [urethane] [or] [PVC].
- B. Preformed Control-Joint Gaskets: Made from [styrene-butadiene-rubber compound, complying

with ASTM D 2000, Designation M2AA-805] [or] [PVC, complying with ASTM D 2287, Type PVC-65406] and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

- C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- D. Weep/Vent Products: Use[one of] the following unless otherwise indicated:
1. Wicking Material: Absorbent rope, made from [cotton] [or] [UV-resistant synthetic fiber], 1/4 to 3/8 inch in diameter, in length required to produce 2-inch exposure on exterior and 18 inches in cavity. Use only for weeps.
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Advanced Building Products Inc.; [Mortar Break] [Mortar Break II].
 - b. Archovations, Inc.; CavClear Masonry Mat.
 - c. Dayton Superior Corporation, Dur-O-Wal Division; PolyLite MortarStop.
 - d. Mortar Net USA, Ltd.; Mortar Net.
 - e. <Insert manufacturer's name; product name or designation>.
 2. Provide one of the following configurations:
 - a. Strips, full-depth of cavity and 10 inches high, with dovetail shaped notches 7 inches deep that prevent clogging with mortar droppings.
- F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
 - b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
 - c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
 - d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.
 - e. <Insert manufacturer's name; product name or designation>.

2.10 CAVITY-WALL INSULATION

- A. Extruded-Polystyrene Board Insulation: ASTM C 578, [Type IV] [Type X], closed-cell product extruded with an integral skin.
- B. Adhesive: Type recommended by insulation board manufacturer for application indicated.

2.11 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
 - 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.
 - d. <Insert manufacturer's name>.

2.12 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
 - 2. Use masonry cement mortar unless otherwise indicated.
 - 3. For exterior masonry, use masonry cement mortar.
 - 4. For reinforced masonry, use [portland cement-lime] [masonry cement] [or] [mortar cement] mortar.
 - 5. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Mortar for Unit Masonry: Comply with ASTM C 270, [**Proportion**] [**Property**] Specification. Provide the following types of mortar for applications stated unless another type is indicated[**or needed to provide required compressive strength of masonry**].
 - 1. For masonry below grade or in contact with earth, use [**Type M**] [**Type S**].
 - 2. For reinforced masonry, use [**Type S**] [**Type N**].
 - 3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for

- interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
4. For interior non-load-bearing partitions, Type O may be used instead of Type N.
- C. Grout for Unit Masonry: Comply with ASTM C 476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476, [Table 1] [or] [paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi].
 3. Provide grout with a slump of [8 to 11 inches] [10 to 11 inches] as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install

cut units with cut surfaces and, where possible, cut edges concealed.

- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.
 - 1. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

- 1. For dimensions in cross section or elevation do not vary by more than plus **1/2 inch** or minus **1/4 inch**.
- 2. For location of elements in plan do not vary from that indicated by more than plus or minus **1/2 inch**.
- 3. For location of elements in elevation do not vary from that indicated by more than plus or minus **1/4 inch** in a story height or **1/2 inch** total.

B. Lines and Levels:

- 1. For bed joints and top surfaces of bearing walls do not vary from level by more than **1/4 inch in 10 feet**, or **1/2 inch** maximum.
- 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than **1/8 inch in 10 feet**, **1/4 inch in 20 feet**, or **1/2 inch** maximum.
- 3. For vertical lines and surfaces do not vary from plumb by more than **1/4 inch in 10 feet**, **3/8 inch in 20 feet**, or **1/2 inch** maximum.
- 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than **1/8 inch in 10 feet**, **1/4 inch in 20 feet**, or **1/2 inch** maximum.
- 5. For lines and surfaces do not vary from straight by more than **1/4 inch in 10 feet**, **3/8 inch in 20 feet**, or **1/2 inch** maximum.
- 6. For vertical alignment of exposed head joints, do not vary from plumb by more than **1/4 inch in 10 feet**, or **1/2 inch** maximum.
- 7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than **1/16 inch** except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

- 1. For bed joints, do not vary from thickness indicated by more than plus or minus **1/8 inch**, with a maximum thickness limited to **1/2 inch**.
- 2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than **1/8 inch**.
- 3. For head and collar joints, do not vary from thickness indicated by more than plus **3/8 inch** or minus **1/4 inch**.

4. For exposed head joints, do not vary from thickness indicated by more than plus or minus **1/8 inch**. [Do not vary from adjacent bed-joint and head-joint thicknesses by more than **1/8 inch**.]

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in [**running bond**] [**stack bond**] [**one-third running bond**] [**Flemish bond**] [**English bond**] [**bond pattern indicated on Drawings**]; do not use units with less than nominal **4-inch** horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than [**2 inches**] [**4-inches**]. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal **4-inch** horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- G. Fill cores in hollow CMUs with grout **24 inches** under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
 1. Install compressible filler in joint between top of partition and underside of structure above.
 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide **1/2-inch** clearance between end of anchor rod and end of tube. Space anchors [**48 inches**] <Insert spacing> o.c. unless otherwise indicated.
 3. Wedge non-load-bearing partitions against structure above with small pieces of tile, slate, or metal. Fill joint with mortar after dead-load deflection of structure above approaches final position.
 4. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Division 07 Section "Fire-Resistive Joint Systems."

3.5 MORTAR BEDDING AND JOINTING

- A. Lay hollow CMUs as follows:
1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.
1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
 2. Allow cleaned surfaces to dry before setting.
 3. Wet joint surfaces thoroughly before applying mortar.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.6 COMPOSITE MASONRY

- A. Bond wythes of composite masonry together using one of the following methods:
1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for [4.5 sq. ft.] [2.67 sq. ft.] [1.77 sq. ft.] of wall area spaced not to exceed [36 inches] [24 inches] [16 inches] o.c. horizontally and 16 inches o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.
 - a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
 2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Where bed joints of both wythes align, use [ladder-type reinforcement extending

- across both wythes] [tab-type reinforcement].
 - b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement[with continuous horizontal wire in facing wythe attached to ties].
 - 3. Header Bonding: Provide masonry unit headers extending not less than **3 inches** into each wythe. Space headers not over [**8 inches**] [**12 inches**] clear horizontally and **16 inches** clear vertically.
- B. Bond wythes of composite masonry together using bonding system indicated on Drawings.
- C. Collar Joints: Solidly fill collar joints by parging face of first wythe that is laid and shoving units of other wythe into place.
- D. Corners: Provide interlocking masonry unit bond in each wythe and course at corners unless otherwise indicated.
- E. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, bond walls together as follows:
 - 1. Provide individual metal ties not more than [**8 inches**] [**16 inches**] o.c.

3.7 CAVITY WALLS

- A. Bond wythes of cavity walls together using one of the following methods:
 - 1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for [**4.5 sq. ft.**] [**2.67 sq. ft.**] [**1.77 sq. ft.**] of wall area spaced not to exceed [**36 inches**] [**24 inches**] [**16 inches**] o.c. horizontally and **16 inches** o.c. vertically. Stagger ties in alternate courses. Provide additional ties within **12 inches** of openings and space not more than **36 inches** apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than **24 inches** o.c. vertically.
 - a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
 - b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type ties to allow for differential movement regardless of whether bed joints align.
 - 2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.
 - a. Where bed joints of both wythes align, use [ladder-type reinforcement extending across both wythes] [tab-type reinforcement].
 - b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement[with continuous horizontal wire in facing wythe attached to ties].
 - c. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type reinforcement[with continuous horizontal wire in facing wythe attached to ties] to allow for differential movement regardless of whether bed joints align.

3. Header Bonding: Provide masonry unit headers extending not less than **3 inches** into each wythe. Space headers not over [**8 inches**] [**12 inches**] clear horizontally and **16 inches** clear vertically.
 4. Masonry Veneer Anchors: Comply with requirements for anchoring masonry veneers.
- B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.
- C. Apply air barrier to face of backup wythe to comply with Division 07 Section "[Modified Bituminous Sheet Air Barriers] [Fluid-Applied Membrane Air Barriers]."
- D. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately **12 inches** o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.8 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of **5/8 inch** on exterior side of walls, **1/2 inch** elsewhere. Lap reinforcement a minimum of **6 inches**.
1. Space reinforcement not more than **16 inches** o.c.
 2. Space reinforcement not more than **8 inches** o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than **8 inches** above and below wall openings and extending **12 inches** beyond openings[in addition to continuous reinforcement].
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at corners by using prefabricated L-shaped units.
- D. Cut and bend reinforcing units as directed by manufacturer for continuity at[corners,] returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.9 ANCHORING MASONRY VENEERS

- A. Anchor masonry veneers to [wall framing] [and] [concrete and masonry backup] with[seismic] masonry-veneer anchors to comply with the following requirements:
1. Fasten [screw-attached] [and] [seismic] anchors [through sheathing to wall framing] [and] [to concrete and masonry backup] with metal fasteners of type indicated. Use two

- fasteners unless anchor design only uses one fastener.
2. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 3. Space anchors as indicated, but not more than **18 inches** o.c. vertically and **24 inches** o.c. horizontally, with not less than 1 anchor for each **2 sq. ft.** of wall area. Install additional anchors within **12 inches** of openings and at intervals, not exceeding **8 inches**, around perimeter.

3.10 CONTROL AND EXPANSION JOINTS

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
- B. Form control joints in concrete masonry [**as follows**] [**using one of the following methods**]:
 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
 2. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.
- C. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Division 07 Section "Joint Sealants," but not less than [**3/8 inch**] <**Insert minimum width**>.
 1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.11 LINTELS

- A. Install steel lintels where indicated.
- B. Provide concrete[masonry lintels where shown and where openings of more than **12 inches** for brick-size units and **24 inches** for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of **8 inches** at each jamb unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

- A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.[Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.]

- B. Install flashing as follows unless otherwise indicated:
1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
 2. At multiwythe masonry walls, including cavity walls, extend flashing through outer wythe, turned up a minimum of [4 inches] [8 inches], and through inner wythe to within 1/2 inch of the interior face of wall in exposed masonry. Where interior face of wall is to receive furring or framing, carry flashing completely through inner wythe and turn flashing up approximately 2 inches on interior face.
- C. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:
1. Use specified weep/vent products to form weep holes.
 2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
 3. Space weep holes 24 inches o.c. unless otherwise indicated.
 4. Trim wicking material flush with outside face of wall after mortar has set.
- D. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.
- E. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products open head joints to form vents.

3.13 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
2. Limit height of vertical grout pours to not more than [60 inches] [12.67 ft.] <Insert height>.

3.14 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
- C. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
- D. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.15 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by

rinsing surfaces thoroughly with clear water.

5. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.

3.16 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 1. Crush masonry waste to less than **4 inches** in each dimension.
 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Division 31 Section "Earth Moving."
 3. Do not dispose of masonry waste as fill within **18 inches** of finished grade.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- 2. Shelf angles.
- 3. Fabricated closet organizers.

- B. Products furnished, but not installed, under this Section:

- 1. Loose steel lintels.
- 2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
- 3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

- C. Related Sections:

- 1. Division 03 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
- 2. Division 04 Section "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
- 3. Division 05 Section "Metal Stairs."
- 4. Division 05 Section "Pipe and Tube Railings."

1.3 SUBMITTALS

- A. Product Data: For the following:

- 1. Paint products.
- 2. Grout.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.6 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.3 NONFERROUS METALS

- A. Bronze Plate, Sheet, Strip, and Bars: ASTM B 36/B 36M, Alloy UNS No. C28000 (muntz metal, 60 percent copper).

2.4 CLOSET ORGINIZERS

- A. At Owner's opinion, provide and install prefabricated vinyl-coated wire shelves, tubular rods and accessories where indicated.
 - 1. Secure entire assembly to concealed solid wood blocking as directed by manufacturer.
- B. Manufacturers:
 - 1. ClosetMaid.
 - 2. Another manufacturer may be considered if that manufacturer can demonstrate the capability to provide products that comply with the requirements and is approved as equal to the above by the Architect.

2.5 FASTENERS

- A. General: Unless otherwise indicated, provide [**Type 304**] [**Type 316**] stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or **ASTM F 1941**, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, **ASTM A 307, Grade A**; with hex nuts, **ASTM A 563**; and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, **ASTM A 325, Type 3**; with hex nuts, **ASTM A 563, Grade C3**; and, where indicated, flat washers.
- D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, **ASTM F 593**; with hex nuts, **ASTM F 594**; and, where indicated, flat washers; Alloy [**Group 1**] [**Group 2**].
- E. Eyebolts: ASTM A 489.
- F. Machine Screws: **ASME B18.6.3**.
- G. Lag Screws: **ASME B18.2.1**.
- H. Wood Screws: Flat head, ASME B18.6.1.
- I. Plain Washers: Round, **ASME B18.22.1**.
- J. Lock Washers: Helical, spring type, **ASME B18.21.1**.

2.6 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

- B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.7 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 inch** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing[**and contour of welded surface matches that of adjacent surface**].
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
 - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, **1/8 by 1-1/2 inches**, with a minimum **6-inch** embedment and **2-inch** hook, not less than **8 inches** from ends and corners of units and **24 inches** o.c., unless otherwise indicated.

2.8 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
- C. Prime miscellaneous framing and supports with where indicated.

2.9 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.
- C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.10 STEEL AND IRON FINISHES

- A. Shop prime iron and steel items[**not indicated to be galvanized**] unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with unless indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

- C. Field Welding: Comply with the following requirements:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

END OF SECTION 055000

SECTION 055100 - METAL STAIRS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Industrial-type stairs with steel floor plate grating treads.
2. [Steel tube]railings attached to metal stairs.
3. [Steel tube]handrails attached to walls adjacent to metal stairs.
4. Railing gates at the level of exit discharge.

- B. Related Sections include the following:

1. Division 05 Section "Metal Fabrications" for metal treads and nosings not installed in metal stairs.
2. Division 05 Section "Pipe and Tube Railings" for pipe and tube railings.
3. Division 05 Section "Pipe and Tube Railings" for pipe and tube railings not attached to metal stairs or to walls adjacent to metal stairs.
4. Division 06 Section "" for wood blocking for anchoring railings.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Stairs: Provide metal stairs capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform Load: 100 lbf/sq. ft..
2. Concentrated Load: 300 lbf applied on an area of 4 sq. in..
3. Uniform and concentrated loads need not be assumed to act concurrently.
4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
5. Limit deflection of treads, platforms, and framing members to [L/240] [L/360] <Insert deflection ratio> or 1/4 inch, whichever is less.

- B. Seismic Performance: Provide metal stairs capable of withstanding the effects of earthquake motions determined according to [ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."] <Insert applicable code

requirement.>

1.4 SUBMITTALS

- A. Product Data: For metal stairs and the following:
 - 1. Abrasive nosings.
 - 2. Metal floor plate treads.
 - 3. Grout.
- B. LEED Submittal:
 - 1. Product Data for Credit MR 4.1[**and Credit MR 4.2**]: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content.
 - a. Include statement indicating costs for each product having recycled content.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - 1. Provide templates for anchors and bolts specified for installation under other Sections.
 - 2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Welding certificates.
- E. Qualification Data: For professional engineer .
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for .
 - 1. Test railings according ASTM E 894 and ASTM E 935.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.
 - 1. Preassembled Stairs: class.
- C. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.6 COORDINATION

- A. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- B. Coordinate locations of hanger rods and struts with other work so that they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Products: Subject to compliance with requirements, provide one of the products specified.
 3. 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.
 4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than [25] <Insert number> percent.

2.3 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Tubing: [ASTM A 500 (cold formed)] [or] [ASTM A 513, Type 5 (mandrel drawn)].
- C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.
- D. Abrasive-Surface Floor Plate: Steel plate [with abrasive granules rolled into surface] [or] [with abrasive material metallurgically bonded to steel by a proprietary process].
 - 1. [Available]Products:
 - a. IKG Industries, a Harsco company; Mebac.
 - b. W. S. Molnar Company; SlipNOT.
 - c. <Insert manufacturer's name; product name or designation.>
- E. Steel Bars for Grating Treads: ASTM A 36/A 36M.
- F. Wire Rod for Grating Crossbars: ASTM A 510.
- G. Iron Castings: Either gray or malleable iron, unless otherwise indicated.
 - 1. Gray Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.
 - 2. Malleable Iron: ASTM A 47/A 47M.

2.4 NONFERROUS METALS

- A. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.
- B. Bronze Castings: ASTM B 584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).
- C. Nickel Silver Castings: ASTM B 584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.5 ABRASIVE NOSINGS

- A. Cast-Metal Units: Cast [gray iron, Class 20] [aluminum] [bronze (leaded red or semired brass)] [nickel silver (leaded nickel bronze)], with an integral abrasive finish consisting of aluminum oxide, silicon carbide, or a combination of both. Fabricate units in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions.
 - 1. Configuration: Cross-hatched angle-shaped units, same depth as bar-grating treads and 1 to 1-1/2 inches wide.

- B. Extruded Units: Extruded-units with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Fabricate units in sizes and configurations indicated and in lengths necessary to accurately fit openings or conditions.
 - 1. Provide ribbed units, with abrasive filler strips projecting **1/16 inch** above aluminum extrusion.
 - 2. Provide solid-abrasive-type units without ribs.
 - 3. Nosings: Square-back units, [**1-7/8 inches**] [**3 inches**] [**4 inches**] wide, without lip.
 - 4. Nosings: Two-piece units, **3 inches** wide, with subchannel for casting into concrete.
- C. Apply bituminous paint to concealed bottoms, sides, and edges of cast-metal units set into concrete.

2.6 FASTENERS

- A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 25 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.
- B. Bolts and Nuts: Regular hexagon-head bolts, **ASTM A 307, Grade A**; with hex nuts, **ASTM A 563**; and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36.
 - 1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts for exterior stairs .
- D. Machine Screws: **ASME B18.6.3**.
- E. Lag Bolts: **ASME B18.2.1**.
- F. Plain Washers: Round, **ASME B18.22.1**.
- G. Lock Washers: Helical, spring type, **ASME B18.21.1**.
- H. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 - 1. Material for Anchors in Exterior Locations: Alloy Group **1** stainless-steel bolts complying with **ASTM F 593** and nuts complying with **ASTM F 594**.

2.7 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy

welded.

- B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- C. Welded Wire Fabric: ASTM A 185, 6 by 6 inches--W1.4 by W1.4, unless otherwise indicated.

2.8 FABRICATION, GENERAL

- A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.
 - 1. Join components by welding, unless otherwise indicated.
 - 2. Use connections that maintain structural value of joined pieces.
 - 3. Fabricate treads and platforms of exterior stairs so finished walking surfaces slope to drain.
- B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- E. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- F. Weld connections to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. Weld exposed corners and seams continuously, unless otherwise indicated.
 - 5. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.
- H. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.9 STEEL-FRAMED STAIRS

A. Stair Framing:

1. Fabricate stringers of steel **[plates]** **[channels]** **[plates or channels]** **[tubes]**.
 - a. Provide closures for exposed ends of **[channel]** **[tube]** stringers.
2. Construct platforms of steel tube headers and miscellaneous framing members as **[needed to comply with performance requirements]** **[indicated]**.
3. Weld **[or bolt]** stringers to headers; weld **[or bolt]** framing members to stringers and headers. **[If using bolts, fabricate and join so bolts are not exposed on finished surfaces.]**
4. Where stairs are enclosed by gypsum board **[shaft-wall]** assemblies, provide hanger rods or struts to support landings from floor construction above or below. Locate hanger rods and struts where they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.
5. Where masonry walls support metal stairs, provide temporary supporting struts designed for erecting steel stair components before installing masonry.

B. Metal Floor Plate Stairs: Form treads and platforms to configurations shown from **[rolled-steel]** **[abrasive-surface]** floor plate of thickness **[needed to comply with performance requirements but not less than 1/4 inch]** **[needed to comply with performance requirements but not less than 3/16 inch]** **[needed to comply with performance requirements but not less than 1/8 inch]** **[indicated]**.

1. Form treads with integral nosing and back edge stiffener. Form risers of same material as treads.
2. Form treads with integral nosing and back edge stiffener. Form risers from steel sheet not less than **0.0966 inch** thick, welded to tread nosings and stiffeners and to platforms.
3. Form treads with integral nosing and back edge stiffener, and with open risers.
4. Weld steel supporting brackets to stringers and weld treads to brackets.
5. Fabricate platforms with integral nosings matching treads and weld to platform framing.

C. Metal Bar-Grating Stairs: Form treads and platforms to configurations shown from metal bar grating; fabricate to comply with NAAMM MBG 531, "Metal Bar Grating Manual."

1. Fabricate treads and platforms from welded steel grating with **1-1/4-by-3/16-inch** bearing bars at **15/16 inch** o.c. and crossbars at **4 inches** o.c., NAAMM designation: W-15-4 (1-1/4 x 3/16) STEEL.
2. Surface: **[Plain]** **[Serrated]**.
3. Finish: .
4. Fabricate grating treads with cast abrasive nosing and with steel angle or steel plate carrier at each end for stringer connections. Secure treads to stringers with bolts.
5. Fabricate grating platforms with nosing matching that on grating treads. Provide toeplates at open-sided edges of grating platforms. Weld grating to platform framing.

2.10 STEEL TUBE RAILINGS

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.
1. Configuration: **1-5/8-inch-** diameter top and bottom rails, **1-1/2-inch-** square posts, and **1/2-inch-** square pickets spaced less than **4 inches** clear.
 2. Gates: Form gates from steel tube of same size and shape as top rails, with infill to match guards. Provide with [**cam-type self-closing**] [**spring**] hinges for fastening to wall and overlapping stop with rubber bumper to prevent gate from opening in direction opposite egress.
- B. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
- C. Form changes in direction of railings as follows:
1. As detailed.
- D. Close exposed ends of railing members with prefabricated end fittings.
- E. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is **1/4 inch** or less.
- F. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.
1. Connect posts to stair framing by direct welding, unless otherwise indicated.
 2. For nongalvanized railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors embedded in exterior masonry and concrete construction.

2.11 STAIR RAILINGS

- A. Comply with applicable requirements in Division 05 Section " for railings, and as follows:
1. Fabricate newels of square steel tubing and provide newel caps of [**pressed steel**] [**gray-iron castings**], as shown.
 2. Rails may be bent at corners, rail returns, and wall returns, instead of using prefabricated fittings.
 3. Connect posts to stair framing by direct welding, unless otherwise indicated.

2.12 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal stairs after assembly.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. **Fastening to In-Place Construction:** Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. **Cutting, Fitting, and Placement:** Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.
- C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete, unless otherwise indicated.
- D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- F. **Field Welding:** Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

3.2 INSTALLING METAL STAIRS WITH GROUTED BASEPLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to

improve bond to surfaces. Clean bottom surface of baseplates.

- B. Set steel stair baseplates on wedges, shims, or leveling nuts. After stairs have been positioned and aligned, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.
 - 1. Use nonmetallic, nonshrink grout, unless otherwise indicated.
 - 2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 INSTALLING STEEL TUBE RAILINGS

- A. Attach handrails to wall with wall brackets. Provide bracket with **1-1/2-inch** clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads. Secure wall brackets to building construction as follows:
 - 1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
 - 2. Use type of bracket with predrilled hole for exposed bolt anchorage.
 - 3. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Division 09 painting Sections.

END OF SECTION 055100

SECTION 055213 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel pipe tube railings.
- B. Related Sections:
 - 1. Division 05 Section "Metal Stairs" for steel tube railings associated with metal stairs.
 - 2. Division 05 Section "Decorative Metal Railings" for ornamental railings fabricated from pipes and tubes.
 - 3. Division 06 Section "Rough Carpentry Miscellaneous Rough Carpentry" for wood blocking for anchoring railings.
 - 4. Division 09 Section "Non-Structural Metal Framing" for metal backing for anchoring railings.
 - 5. Division 09 Section "Access Flooring" for railings included with access flooring.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design railings, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:
 - 1. Steel: 72 percent of minimum yield strength.
- C. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Handrails and Top Rails of Guards:
 - a. Uniform load of **50 lbf/ ft.** applied in any direction.
 - b. Concentrated load of **200 lbf** applied in any direction.

- c. Uniform and concentrated loads need not be assumed to act concurrently.
 - 2. Infill of Guards:
 - a. Concentrated load of **50 lbf** applied horizontally on an area of **1 sq. ft.**
 - b. Infill load and other loads need not be assumed to act concurrently.
 - D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: **120 deg F**, ambient; **180 deg F**, material surfaces.
 - E. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- 1.4 SUBMITTALS
- A. Product Data: For the following:
 - 1. Manufacturer's product lines of mechanically connected railings.
 - 2. Railing brackets.
 - 3. Grout, anchoring cement, and paint products.
 - B. LEED Submittals:
 - 1. Product Data for Credit MR 4.1[**and Credit MR 4.2**]: Indicating percentages by weight of postconsumer and preconsumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
 - C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
 - D. Samples for Initial Selection: For products involving selection of color, texture, or design[, **including mechanical finishes on stainless steel**].
 - E. Samples for Verification: For each type of exposed finish required.
 - 1. Sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
 - 2. Fittings and brackets.
 - 3. Assembled Sample of railing system, made from full-size components, including top rail, post, handrail, and infill. Sample need not be full height.
 - a. Show method of [**finishing**] [**connecting**] members at intersections.
 - F. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified

professional engineer responsible for their preparation.

- G. Qualification Data: For qualified professional engineer .
- H. Welding certificates.
- I. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.
- J. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, according to ASTM E 894 and ASTM E 935.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of railing from single source from single manufacturer.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 - 3. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.7 COORDINATION AND SCHEDULING

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.2 STEEL AND IRON

- A. Recycled Content of Steel Products: Provide products with average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than [25] <Insert number> percent.
- B. Tubing: [ASTM A 500 (cold formed)] [or] [ASTM A 513].
- C. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
 - 1. Provide galvanized finish for exterior installations and where indicated.
- D. Woven-Wire Mesh: Intermediate-crimp, square pattern, 2-inch woven-wire mesh, made from 0.135-inch nominal diameter wire complying with ASTM A 510.

2.3 FASTENERS

- A. General: Provide the following:
 - 1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5 for zinc coating.
 - 2. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated[**and capable of withstanding design loads**].
- C. Fasteners for Interconnecting Railing Components:
 - 1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.

2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
 3. Provide **[Phillips]** **[tamper-resistant]** **[square or hex socket]** flat-head machine screws for exposed fasteners unless otherwise indicated.
- D. Post-Installed Anchors: **[Torque-controlled expansion anchors]** **[or]** **[chemical anchors]** capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or **ASTM F 1941**, Class Fe/Zn 5, unless otherwise indicated.
 2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy **[Group 1]** **[Group 2]** stainless-steel bolts, **ASTM F 593**, and nuts, **ASTM F 594**.

2.4 MISCELLANEOUS MATERIALS

- A. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Shop Primers: Provide primers that comply with **[Division 09 painting Sections.] [Division 09 Section "High-Performance Coatings."]** **[Division 09 painting Sections and Division 09 Section "High-Performance Coatings."]**
- D. Intermediate Coats and Topcoats: Provide products that comply with **[Division 09 painting Sections.] [Division 09 Section "High-Performance Coatings."]** **[Division 09 painting Sections and Division 09 Section "High-Performance Coatings."]**
- E. Epoxy Intermediate Coat: Complying with MPI #77 and compatible with primer and topcoat.
1. Products: Subject to compliance with requirements, **[provide the following]** **[provide one of the following]** **[available products that may be incorporated into the Work include, but are not limited to, the following]**:
 - a. **<Insert, in separate subparagraphs, manufacturer's name; product name or designation>**.
- F. Polyurethane Topcoat: Complying with MPI #72 and compatible with undercoat.
1. Products: Subject to compliance with requirements, **[provide the following]** **[provide one of the following]** **[available products that may be incorporated into the Work include, but are not limited to, the following]**:
 - a. **<Insert, in separate subparagraphs, manufacturer's name; product name or**

designation>.

- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- H. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
 - 1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.5 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage[, **but not less than that required to support structural loads**].
- B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately **1/32 inch** unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with either welded or nonwelded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove flux immediately.
 - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

- I. Welded Connections for Aluminum Pipe: Fabricate railings to interconnect members with concealed internal welds that eliminate surface grinding, using manufacturer's standard system of sleeve and socket fittings.
- J. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
 - 1. Fabricate splice joints for field connection using an epoxy structural adhesive if this is manufacturer's standard splicing method.
- K. Form changes in direction as follows:
 - 1. As detailed.
 - 2. .
 - 3. .
- L. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- M. Close exposed ends of railing members with prefabricated end fittings.
- N. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is **1/4 inch** or less.
- O. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
 - 1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers, or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- P. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- Q. For railing posts set in concrete, provide **[steel]** **[stainless-steel]** sleeves not less than **6 inches** long with inside dimensions not less than **1/2 inch** greater than outside dimensions of post, with metal plate forming bottom closure.
- R. Perforated-Metal Infill Panels: Fabricate infill panels from perforated metal made from **[steel]** **[galvanized steel]** **[aluminum]** **[stainless steel]** **[same metal as railings in which they are installed]**.
 - 1. Edge panels with U-shaped channels made from metal sheet, of same metal as perforated metal and not less than **0.043 inch** thick.
 - 2. Orient perforated metal with pattern **[parallel to top rail]** **[perpendicular to top rail]**

[horizontal] [vertical] [as indicated on Drawings].

- S. Woven-Wire Mesh Infill Panels: Fabricate infill panels from woven-wire mesh crimped into **1-by-1/2-by-1/8-inch** metal channel frames. Make wire mesh and frames from same metal as railings in which they are installed.
1. Orient wire mesh with **[diamonds vertical] [wires perpendicular and parallel to top rail] [wires horizontal and vertical].**

2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.

2. Set posts plumb within a tolerance of **1/16 inch in 3 feet**.
 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed **1/4 inch in 12 feet**.
- C. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

- A. Nonwelded Connections: Use mechanical or adhesive joints for permanently connecting railing components. Seal recessed holes of exposed locking screws using plastic cement filler colored to match finish of railings.
- B. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

3.4 ANCHORING POSTS

- A. Use metal sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Cover anchorage joint with flange of same metal as post, [**welded to post after placing anchoring material**] [**attached to post with set screws**].
- C. Leave anchorage joint exposed with [**1/8-inch buildup, sloped away from post**] [**anchoring material flush with adjacent surface**].

3.5 ATTACHING RAILINGS

- A. Attach railings to wall with wall brackets[, **except where end flanges are used**]. Provide brackets with **1-1/2-inch** clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.
1. Use type of bracket with [**flange tapped for concealed anchorage to threaded hanger bolt**] [**predrilled hole for exposed bolt anchorage**].
 2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

- B. Secure wall brackets and railing end flanges to building construction as follows:
 - 1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.

3.6 ADJUSTING AND CLEANING

- A. Clean [**aluminum**] [**and**] [**stainless steel**] by washing thoroughly with clean water and soap and rinsing with clean water.
- B. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum **2.0-mil** dry film thickness.
- C. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in [**Division 09 painting Sections.**] [**Division 09 Section "High-Performance Coatings."**] [**Division 09 painting Sections and Division 09 Section "High-Performance Coatings."**]

3.7 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 055213

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Wood blocking[, cants,] and nailers.
- B. Related Sections include the following:
 - 1. Division 31 Section "Termite Control" for site application of borate treatment to wood framing.

PART 2 - PRODUCTS

2.1 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners[**with hot-dip zinc coating complying with ASTM A 153/A 153M**] [of Type **304 stainless steel**].
- B. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- 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 nailers, blocking, [**grounds**,]and similar supports to comply with requirements for attaching other construction.
- B. Do not splice structural members between supports, unless otherwise indicated.
- C. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 - 2. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in ICBO's Uniform Building Code.
 - 3. Table 2305.2, "Fastening Schedule," in BOCA's BOCA National Building Code.
 - 4. Table 2306.1, "Fastening Schedule," in SBCCI's Standard Building Code.
 - 5. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
 - 6. Table 602.3(1), "Fastener Schedule for Structural Members," and Table 602.3(2), "Alternate Attachments," in ICC's International One- and Two-Family Dwelling Code.
- E. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.
- F. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
 - 1. Comply with [**approved**] [**indicated**] fastener patterns where applicable.[**Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.**]
 - 2. Use finishing nails, unless otherwise indicated. [**Do not countersink nail heads**] [**Countersink nail heads and fill holes with wood filler**].

3.2 PROTECTION

- A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 062023 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior standing and running trim.
 - 2. Interior railings.

1.3 DEFINITIONS

- A. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NHLA: National Hardwood Lumber Association.
 - 3. NLGA: National Lumber Grades Authority.
 - 4. SPIB: The Southern Pine Inspection Bureau.
 - 5. WCLIB: West Coast Lumber Inspection Bureau.
 - 6. WWPA: Western Wood Products Association.
- B. MDF: Medium-density fiberboard.
- C. MDO Plywood: Plywood with a medium-density overlay on the face.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials against weather and contact with damp or wet surfaces. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.

Provide for air circulation within and around stacks and under temporary coverings.

- B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable grading rules of inspection agencies certified by ALSC's Board of Review.
 - 1. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
 - 2. For exposed lumber, mark grade stamp on end or back of each piece[, **or omit grade stamp and provide certificates of grade compliance issued by inspection agency**].

2.2 STAIRS AND RAILINGS

- A. Treads: **1-1/16-inch**, clear, kiln-dried, edge-glued, [**rift-sawn red oak**] [**red oak**] [**hard maple**] [**poplar**] <Insert species> stepping with half-round nosing.
- B. Finished Stringers: **3/4-inch** finish boards as specified above for interior lumber trim for opaque finish.
- C. Interior Railings: Clear, kiln-dried [**red oak**] [**hard maple**] [**yellow poplar**] <Insert species>, of pattern indicated, either solid or laminated.

- D. Balusters: ~~1-1/16-inch~~- square, clear, kiln-dried [**red oak**] [**hard maple**] [**yellow poplar**] **<Insert species>**.

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
 - 1. Where galvanized finish is indicated, provide fasteners and anchorages with hot-dip galvanized coating complying with ASTM A 153/A 153M.
- B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
 - 1. Use wood glue that has a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturer.

2.4 FABRICATION

- A. Back out or kerf backs of the following members except those with ends exposed in finished work:
 - 1. Interior standing and running trim except shoe and crown molds.
 - 2. Wood board paneling.
- B. Ease edges of lumber less than **1 inch** in nominal thickness to **1/16-inch** radius and edges of lumber **1 inch** or more in nominal thickness to **1/8-inch** radius.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours[**unless longer conditioning is recommended by manufacturer**].

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
 - 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 - 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 2. Countersink fasteners, fill surface flush, and sand where face fastening is unavoidable.
 - 3. Install to tolerance of **1/8 inch in 96 inches** for level and plumb. Install adjoining interior finish carpentry with **1/32-inch** maximum offset for flush installation and **1/16-inch** maximum offset for reveal installation.
 - 4. Install stairs with no more than **3/16-inch** variation between adjacent treads and risers and with no more than **3/8-inch** variation between largest and smallest treads and risers within each flight.
 - 5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 STAIR AND RAILING INSTALLATION

- A. Treads and Risers at Interior Stairs: Secure treads and risers by gluing and nailing to rough carriages.
 - 1. Closed Stringers: [**House treads and risers into wall stringers, glue, and wedge into place**] [**Cope wall stringers to fit tightly over treads and risers**].
 - 2. Open Stringers: Miter risers and stringer at open stringers. Extend tread over open stringers and finish with bullnose edge[**cut from tread stock and fitted to tread with mitered return at nosing**].
- B. Balusters: Dovetail or mortise balusters into treads, glue, and nail in place. Let into railings and glue in place.

- C. Newel Posts: Secure newel posts to stringers, rough carriages, and risers with countersunk-head wood screws and glue.
- D. Railings: Secure wall rails with metal brackets. Fasten freestanding railings to newel posts and to trim at walls with countersunk-head wood screws or rail bolts, and glue. Assemble railings at goosenecks, easements, and splices with rail bolts and glue.

3.5 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.6 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

3.7 PROTECTION

- A. Protect installed products from damage from weather and other causes during remainder of the construction period.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023

SECTION 064023 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Wood ironing board cabinets complete with folding-down ironing board.
 - 2. Solid-surfacing-material countertops.
 - 3. Closet and utility shelving.
 - 4. Shop finishing of interior woodwork.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for wood furring, blocking, shims, and hanging strips required for installing woodwork and concealed within other construction before woodwork installation.
 - 2. Division 06 Section "Wood Paneling."

1.3 DEFINITIONS

- A. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips for installing woodwork items unless concealed within other construction before woodwork installation.

1.4 SUBMITTALS

- A. Product Data: For [panel products] [high-pressure decorative laminate] [adhesive for bonding plastic laminate] [solid-surfacing material] [fire-retardant-treated materials] [cabinet hardware and accessories] [handrail brackets] [and] [finishing materials and processes].

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-

service performance.

- B. Installer Qualifications: .
- C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production of interior architectural woodwork with sequence-matched wood veneers [**and wood doors with face veneers that are sequence matched with woodwork**] [**and transparent-finished wood doors that are required to be of same species as woodwork**].
- D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
 - 1. Provide AWI Quality Certification Program [**labels**] [**and**] [**certificates**] indicating that woodwork[, **including installation,**] complies with requirements of grades specified.
- E. Quality Standard: Unless otherwise indicated, comply with WI's "Manual of Millwork" for grades of interior architectural woodwork indicated for construction, finishes, installation, and other requirements.
 - 1. Provide WI-certified compliance [**labels**] [**and**] [**certificates**] indicating that woodwork[, **including installation,**] complies with requirements of grades specified.
 - 2. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with such selections and requirements in addition to the quality standard.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between **60 and 90 deg F** and relative humidity between [**25 and 55**] [**43 and 70**] [**17 and 50**] <Insert **humidity range**> percent during the remainder of the construction period.
- C. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate

measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.
- B. Hardware Coordination: Distribute copies of approved hardware schedule specified in Division 08 Section "Door Hardware (Scheduled by Describing Products)" to fabricator of architectural woodwork; coordinate Shop Drawings and fabrication with hardware requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials that comply with requirements of quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Wood Species and Cut for Transparent Finish: [**Red oak, plain sawn or sliced**] [**White oak, rift sawn or cut**] [**White ash, plain sawn or sliced**] [**Hickory, plain sawn or sliced**] <Insert species and cut>.
- C. Wood Products: Comply with the following:
 1. Hardboard: AHA A135.4.
 2. Medium-Density Fiberboard: ANSI A208.2, Grade MD.
 3. Particleboard: ANSI A208.1, Grade [**M-2**] [**M-2-Exterior Glue**].
 4. Particleboard: Straw-based particleboard complying with requirements in ANSI A208.1, Grade M-2, except for density.
 5. Softwood Plywood: DOC PS 1[, **Medium Density Overlay**].
 6. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1.
- D. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.
 1. Provide PVC or polyester edge banding complying with LMA EDG-1 on components

with exposed or semiexposed edges.

- E. Decorative Glass for Cabinet Doors: Provide decorative glass complying with Division 08 Section "Decorative Glass Glazing."

2.2 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

2.3 FABRICATION, GENERAL

- A. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.
- B. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 - 1. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members **3/4 Inch** Thick or Less: **1/16 inch**.
 - 2. Corners of Cabinets and Edges of Solid-Wood (Lumber) Members and Rails: **1/16 inch**.
- C. Complete fabrication, including assembly[, **finishing**,] and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Notify Architect seven days in advance of the dates and times woodwork fabrication will be complete.
 - 2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.
- D. Shop-cut openings to maximum extent possible to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

- E. Install glass to comply with applicable requirements in Division 08 Section "Glazing" and in GANA's "Glazing Manual." For glass in wood frames, secure glass with removable stops.

2.4 WOOD CABINETS FOR TRANSPARENT FINISH

- A. Grade: Premium .
- B. Wood Species and Cut for Exposed Surfaces: **[Red oak, plain sawn or sliced]** **[White ash, plain sawn or sliced]** **[White birch, plain sawn or sliced]** **[As indicated]** <Insert species and cut>.
 - 1. Grain Direction: **[Vertically for drawer fronts, doors, and fixed panels]** **[Horizontally for drawer fronts, doors, and fixed panels]** **[As indicated]**.
 - 2. Veneer Matching within Panel Face: **[Running]** **[Balance]** **[Center-balance]** match.
- C. Semiexposed Surfaces: Provide surface materials indicated below:
 - 1. Surfaces Other Than Drawer Bodies: **[Same species and cut indicated for exposed surfaces]** **[Thermoset decorative panels]** **[Compatible species to that indicated for exposed surfaces, stained to match]**.
 - 2. Drawer Sides and Backs: **[Solid-hardwood lumber, same species indicated for exposed surfaces]** **[Solid-hardwood lumber, stained to match species indicated for exposed surfaces]** **[Solid-hardwood lumber]** **[Thermoset decorative panels]**.
 - 3. Drawer Bottoms: **[Hardwood plywood]** **[Thermoset decorative panels]**.
- D. Provide dust panels of **1/4-inch** plywood or tempered hardboard above compartments and drawers, unless located directly under tops.

2.5 LAMINATED-PLASTIC LABORATORY TOPS

- A. Grade: .
- B. High-Pressure Decorative Laminate: .
- C. Colors and Patterns: Provide materials and products that result in colors and patterns of exposed laminate surfaces complying with the following requirements:
 - 1. As indicated by manufacturer's designations.
 - 2. As selected by Architect from manufacturer's full range of **[solid colors]** **[colors and patterns]**.
- D. Core Material: .

2.6 CLOSET AND UTILITY SHELVING

- A. Grade: .
- B. Shelf Material: **3/4-inch** [solid lumber] [veneer-faced panel product with solid-lumber edge] [veneer-faced panel product with veneer edge banding] [thermoset decorative panel with solid-lumber edge] [thermoset decorative panel with PVC or polyester edge banding] [medium-density fiberboard with solid-lumber edge] [particleboard with solid-lumber edge] [medium-density fiberboard with radiused edge] [particleboard with radiused and filled edge].
- C. Cleats: **3/4-inch** [solid lumber] [thermoset decorative panel] [panel product].
- D. Wood Species: [Red oak] [Match species indicated for other types of transparent-finished architectural woodwork located in same area of building, unless otherwise indicated] [Match species indicated for door to closet where shelving is located] [Any closed-grain hardwood] [Eastern white pine, sugar pine, or western white pine] <Insert species>.

2.7 SHOP FINISHING

- A. Shop Priming: Shop apply the prime coat including backpriming, if any, for transparent-finished items specified to be field finished. Refer to Division 09 painting Sections for material and application requirements.
- B. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural woodwork, as applicable to each unit of work.
 - 1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling and to end-grain surfaces. Concealed surfaces of plastic-laminate-clad woodwork do not require backpriming when surfaced with plastic laminate, backing paper, or thermoset decorative panels.
- C. Transparent Finish:
 - 1. Staining: [None required] [Match approved sample for color] [Match Architect's sample].
 - 2. Wash Coat for Stained Finish: Apply wash-coat sealer to woodwork made from closed-grain wood before staining and finishing.
 - 3. Open Finish for Open-Grain Woods: Do not apply filler to open-grain woods.
 - 4. Filled Finish for Open-Grain Woods: After staining (if any), apply paste wood filler to open-grain woods and wipe off excess. Tint filler to match stained wood.
 - a. Apply wash-coat sealer after staining and before filling.
 - 5. Sheen: [Flat, 15-30] [Satin, 31-45] [Semigloss, 46-60] [Gloss, 61-100] gloss units measured on 60-degree gloss meter per ASTM D 523.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.
- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.
- B. Assemble woodwork and complete fabrication at Project site to comply with requirements for fabrication in Part 2, to extent that it was not completed in the shop.
- C. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of **1/8 inch in 96 inches**.
- D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails[**or finishing screws**] for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 064023

SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Fluid-applied membrane air barrier, vapor retarding.
- B. Related Sections include the following:
 - 1. Division 04 Section "Unit Masonry" for embedded flashings.
 - 2. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashings.
 - 3. Division 07 Section "Joint Sealants" for joint-sealant materials and installation.

1.3 DEFINITIONS

- A. ABAA: Air Barrier Association of America.
- B. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Air barrier shall be capable of performing as a continuous vapor- air barrier[**and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration**]. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm experienced in applying air barrier materials similar in

material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance [**and that is an ABAA-licensed contractor, employs certified and registered installers, and complies with ABAA's Quality Assurance Program**] <Insert requirements>.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air barrier manufacturer.
- B. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- C. Store rolls according to manufacturer's written instructions.
- D. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer. Protect substrates from environmental conditions that affect performance of air barrier. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier membrane. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Primer: Liquid [**waterborne**] [**solvent-borne**] primer recommended for substrate by manufacturer of air barrier material.
- C. Counterflashing Strip: Modified bituminous, **40-mil-** thick, self-adhering sheet consisting of **32 mils** of rubberized asphalt laminated to an **8-mil-** thick, crosslaminated polyethylene film with release liner backing.
- D. Butyl Strip: Vapor-retarding, **30- to 40-mil-** thick, self-adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing.
- E. Modified Bituminous Strip: Vapor-retarding, **40-mil-** thick, smooth-surfaced, self-adhering; consisting of **36 mils** of rubberized asphalt laminated to a **4-mil-** thick polyethylene film with release liner backing.

- F. Joint Reinforcing Strip: Air barrier manufacturer's glass-fiber-mesh tape.
- G. Substrate Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- H. Adhesive and Tape: Air barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- I. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, [0.0187 inch] [0.0250 inch] <Insert dimension> thick, and Series 300 stainless-steel fasteners.
- J. Sprayed Polyurethane Foam Sealant: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft density; flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- K. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low-modulus), Grade NS, Use NT related to exposure, and, as applicable to joint substrates indicated, Use O. Comply with Division 07 Section "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
 - 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate patching membrane.
- E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

- F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- G. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.3 TRANSITION STRIP INSTALLATION

- A. Install strips, transition strips, and auxiliary materials according to air barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
 - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 - 2. Install [**butyl**] [**modified bituminous**] strip on roofing membrane or base flashing so that a minimum of **3 inches** of coverage is achieved over both substrates.
- B. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
- C. Connect and seal exterior wall air barrier membrane continuously to roofing membrane air barrier, concrete below-grade structures, floor-to floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials [**as indicated**].
- D. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- E. Apply joint sealants forming part of air barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, and doors, and miscellaneous penetrations of air barrier membrane with foam sealant.
- G. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
- H. Seal top of through-wall flashings to air barrier with an additional **6-inch-** wide, [**modified bituminous**] [**counterflashing**] strip.
- I. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.

- J. Repair punctures, voids, and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending **6 inches** beyond repaired areas in strip direction.

3.4 AIR BARRIER MEMBRANE INSTALLATION

- A. Apply air barrier membrane to form a seal with strips and transition strips and to achieve a continuous air barrier according to air barrier manufacturer's written instructions.
- B. Apply air barrier membrane within manufacturer's recommended application temperature ranges.
- C. Apply primer to substrates at required rate and allow to dry. Limit priming to areas that will be covered by air barrier sheet in same day. Reprime areas exposed for more than 24 hours.
- D. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.
- E. Apply [**strip and transition strip a minimum of 1 inch onto cured air membrane**] [**or**] [**strip and transition strip over cured air membrane overlapping 3 inches onto each surface**] according to air barrier manufacturer's written instructions.
- F. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.
- G. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

3.5 CLEANING AND PROTECTION

- A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - 1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace air barrier exposed for more than **[30] [60]** **<Insert number>** days.
 - 2. Protect air barrier from contact with creosote, uncured coal-tar products, TPO, EPDM, flexible PVC membranes, and sealants not approved by air barrier manufacturer.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.
- C. Remove masking materials after installation.

END OF SECTION 072726

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Silicone joint sealants.
2. Urethane joint sealants.
3. Preformed joint sealants.
4. Acoustical joint sealants.

- B. Related Sections:

1. Division 04 Section "Unit Masonry" for masonry control and expansion joint fillers and gaskets.
2. Division 08 Section "Glazing" for glazing sealants.
3. Division 09 Section "Gypsum Board" for sealing perimeter joints.
4. Division 09 Section "Tiling" for sealing tile joints.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

1.4 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer[**or are below 40 deg F**].
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for

- applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- 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 joint-sealant manufacturer, based on testing and field experience.
- B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
 1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.
- C. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- E. Colors of Exposed Joint Sealants: [**As indicated by manufacturer's designations**] [**Match Architect's samples**] [**As selected by Architect from manufacturer's full range**].

2.2 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 any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, 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 after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
 - d. Exterior insulation and finish systems.
 - e. **<Insert other porous joint substrate>**.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.
 - e. **<Insert other nonporous joint substrate>**.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to

comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer 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.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow 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 materials.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
 - 4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
 - 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.

- a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- F. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
- 1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
 - 2. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than **3/8 inch**. Hold edge of sealant bead **1/4 inch** inside masking tape.
 - 3. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
 - 4. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.
- G. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping. Do not pull or stretch material. Produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures, apply heat to sealant in compliance with sealant manufacturer's written instructions.
- H. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Standard hollow metal doors and frames.
- 2. Stock stile-and-rail hollow metal doors, sidelite and frames.

- B. Related Sections:

- 1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
- 2. Division 08 Section "Door Hardware (Scheduled by Describing Products)" for door hardware for hollow metal doors.
- 3. Division 09 Sections "Exterior Painting" for field painting hollow metal doors and frames.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.
- B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.
- C. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 861.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, [fire-resistance rating,] [temperature-rise ratings,] and finishes.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door design.

2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification:

1. For each type of exposed finish required, prepared on Samples of not less than **3 by 5 inches**.

E. Other Action Submittals:

1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.
- B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at [positive pressure] [as close to neutral pressure as possible] according to [NFPA 252] [UBC Standard 7-2] [or] [UL 10B] [UL 10C].
- C. Preinstallation Conference: Conduct conference at [Project site] <Insert location>.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
 1. Provide additional protection to prevent damage to finish of factory-finished units.
- B. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum **4-inch**-high wood blocking. Do not store in a manner that traps excess humidity.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 COORDINATION

- A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

1. Amweld Building Products, LLC.
2. Benchmark; a division of Therma-Tru Corporation.
3. Ceco Door Products; an Assa Abloy Group company.
4. Curries Company; an Assa Abloy Group company.
5. Deansteel Manufacturing Company, Inc.
6. Firedoor Corporation.
7. Fleming Door Products Ltd.; an Assa Abloy Group company.
8. Habersham Metal Products Company.
9. Karpen Steel Custom Doors & Frames.
10. Kewanee Corporation (The).
11. Mesker Door Inc.
12. Pioneer Industries, Inc.
13. Security Metal Products Corp.
14. Steelcraft; an Ingersoll-Rand company.
15. Windsor Republic Doors.
16. <Insert manufacturer's name>.

2.2 MATERIALS

- A. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- B. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- C. Powder-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 hollow metal frames of type indicated.

- D. Grout: ASTM C 476, except with a maximum slump of 4 inches, as measured according to ASTM C 143/C 143M.
- E. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- F. Glazing: Comply with requirements in Division 08 Section "Glazing."
- G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 HOLLOW METAL DOORS

- A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.
 - 1. Design: Flush panel and stock embossed panels as indicated.
 - 2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.
 - a. Fire Door Core: As required to provide fire-protection[and temperature-rise] ratings indicated.
 - b. Thermal-Rated (Insulated) Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than [4.0 deg F x h x sq. ft./Btu] [6.0 deg F x h x sq. ft./Btu] [12.3 deg F x h x sq. ft./Btu] <Insert R-value> when tested according to ASTM C 1363.
 - 1) Locations: Exterior doors.
 - 3. Vertical Edges for Single-Acting Doors: [Beveled edge] [Square edge] [Manufacturer's standard].
- B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
 - 1. Level 3 and Physical Performance Level A (Extra Heavy Duty), [Model 1 (Full Flush)] [Model 2 (Seamless)] [Model 3 (Stile and Rail)].

2.4 STANDARD HOLLOW METAL FRAMES

- A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.
- B. Exterior Frames: Fabricated from metallic-coated steel sheet.
 - 1. Fabricate frames as [knocked down] [face welded] [full profile welded] unless otherwise indicated.
 - 2. Frames for Level 3 Steel Doors: **0.053-inch-** thick steel sheet.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 - 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than **0.042 inch** thick, with corrugated or perforated straps not less than **2 inches** wide by **10 inches** long; or wire anchors not less than **0.177 inch** thick.
- B. Floor Anchors: Formed from same material as frames, not less than **0.042 inch** thick, and as follows:
 - 1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

2.6 STOPS AND MOLDINGS

- A. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of **5/8 inch** high unless otherwise indicated.
- B. Loose Stops for Glazed Lites in Frames: Minimum **0.032 inch** thick, fabricated from same material as frames in which they are installed.

2.7 ACCESSORIES

- A. Grout Guards: Formed from same material as frames, not less than **0.016 inch** thick.

2.8 FABRICATION

- A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in [**SDI 117**] [**ANSI/NAAMM-HMMA 861**].

- C. Hollow Metal Doors:
1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
 2. Glazed Lites: Factory cut openings in doors.
- D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
 2. [Sidelight] [and] [Transom Bar] Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
 5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
 6. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than **18 inches** from top and bottom of frame. Space anchors not more than **32 inches** o.c. and as follows:
 - 1) Three anchors per jamb from **60 to 90 inches** high.
 7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
- E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
1. Locate hardware as indicated, or if not indicated, according to **[ANSI/SDI A250.8]** **[ANSI/NAAMM-HMMA 861]**.
 2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
 3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
2. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.9 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness,

alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus **1/16 inch**, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 2. Alignment: Plus or minus **1/16 inch**, measured at jambs on a horizontal line parallel to plane of wall.
 3. Twist: Plus or minus **1/16 inch**, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 4. Plumbness: Plus or minus **1/16 inch**, measured at jambs on a perpendicular line from head to floor.
- C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

- A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.
1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. At fire-protection-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install frames with removable glazing stops located on secure side of opening.
 - d. Install door silencers in frames before grouting.
 - e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.
 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.

4. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus **1/16 inch**, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus **1/16 inch**, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus **1/16 inch**, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus **1/16 inch**, measured at jambs at floor.
 - C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
 1. Non-Fire-Rated Standard Steel Doors:
 - a. Jambs and Head: **1/8 inch** plus or minus **1/16 inch**.
 - b. Between Edges of Pairs of Doors: **1/8 inch** plus or minus **1/16 inch**.
 - c. Between Bottom of Door and Top of Threshold: Maximum **3/8 inch**.
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
 - D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.
 1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than **9 inches** o.c. and not more than **2 inches** o.c. from each corner.
- 3.4 ADJUSTING AND CLEANING
- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
 - B. Remove grout and other bonding material from hollow metal work immediately after installation.
 - C. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Solid-core doors and transom panels with wood-veneer medium-density-overlay faces.

1.3 SUBMITTALS

- A. Product Data: For each type of door indicated. Include details of core and edge construction and trim for openings.
- B. LEED Submittals:
 - 1. Certificates for Credit MR 7: Chain-of-custody certificates certifying that flush wood doors comply with forest certification requirements. Include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
 - a. Include statement indicating costs for each certified wood product.
- C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate requirements for veneer matching.
- D. Samples for Initial Selection: For .
- E. Samples for Verification:
 - 1. Corner sections of doors, approximately **8 by 10 inches**, with door faces and edges representing actual materials to be used.

- a. Provide samples for each species of veneer and solid lumber required.
- b. Finish veneer-faced door samples with same materials proposed for factory-finished doors.

F. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.
- B. Source Limitations: Obtain flush wood doors[**and wood paneling**] from single manufacturer.
- C. Preinstallation Conference: Conduct conference at [**Project site**] **<Insert location>**.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in [**plastic bags or cardboard cartons**] [**cardboard cartons and wrap bundles of doors in plastic sheeting**].
- C. Mark each door on[**top and**] bottom rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
- B. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining temperature between **60 and 90 deg F** and relative humidity between [**25 and 55**] [**43 and 70**] [**17 and 50**] **<Insert humidity range>** percent during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 DOOR CONSTRUCTION, GENERAL

- A. Particleboard-Core Doors:

1. Particleboard: ANSI A208.1, [**Grade LD-1**] [**or**] [**Grade LD-2**] [, **made with binder containing no urea-formaldehyde resin**].
2. Particleboard: Straw-based particleboard complying with ANSI A208.1, Grade LD-2 or M-2, except for density.
3. Blocking: Provide wood blocking in particleboard-core doors [**as needed to eliminate through-bolting hardware.**] [**as follows:**]
 - a. **5-inch** top-rail blocking, in doors indicated to have closers.
 - b. **5-inch** bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
 - c. **5-inch** midrail blocking, in doors indicated to have exit devices.
4. Provide doors with [**glued-wood-stave**] [**structural-composite-lumber**] [**either glued-wood-stave or structural-composite-lumber**] cores instead of particleboard cores for doors indicated to receive exit devices.

B. Structural-Composite-Lumber-Core Doors:

1. Structural Composite Lumber: WDMA I.S.10.
 - a. Screw Withdrawal, Face: **700 lbf.**
 - b. Screw Withdrawal, Edge: **400 lbf.**

C. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated [**as needed to eliminate through-bolting hardware.**] [**as follows:**]
 - a. **5-inch** top-rail blocking.
 - b. **5-inch** bottom-rail blocking, in doors indicated to have protection plates.
 - c. **5-inch** midrail blocking, in doors indicated to have armor plates.
 - d. [**4-1/2-by-10-inch lock blocks**] [**5-inch midrail blocking**], in doors indicated to have exit devices.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

2.2 VENEERED-FACED DOORS FOR TRANSPARENT FINISH

A. Exterior Solid-Core Doors <**Insert drawing designation**>:

1. Grade: Premium, with Grade AA faces Premium, with Grade A faces Custom (Grade A

- faces) Economy (Grade B faces).
2. Species: [**Anigre**] [**Select white ash**] [**Figured select white ash**] [**Select white birch**] [**Cherry**] [**Select red gum**] [**Figured select red gum**] [**Select white maple**] [**Red oak**] [**Persimmon**] [**Sapele**] [**Sycamore**] [**Walnut**] [**White oak**] [**Ucuuba (Virola Duckei)**] [**Cupiuba (Goupia glabra)**] <Insert species>.
 3. Cut: [**Rotary cut**] [**Plain sliced (flat sliced)**] [**Quarter sliced**] [**Rift cut**].
 4. Match between Veneer Leaves: [**Book**] [**Slip**] [**Pleasant**] match.
 5. Assembly of Veneer Leaves on Door Faces: [**Center-balance**] [**Balance**] [**Running**] match.
 6. Pair and Set Match: Provide for doors hung in same opening[**or separated only by mullions**].
 7. Exposed Vertical[**and Top**] Edges: [**Same species as faces or a compatible species**] [**Same species as faces**] [**Applied wood-veneer edges of same species as faces and covering edges of faces**] [**Applied wood edges of same species as faces and covering edges of crossbands**].
 8. Core: Particleboard Glued wood stave Structural composite lumber Either glued wood stave or structural composite lumber.
 9. Construction: Five Five or seven plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering.[**Faces are bonded to core using a hot press.**]
 10. Adhesives: Type I per WDMA TM-6.

2.3 DOORS FOR OPAQUE FINISH

A. Exterior Solid-Core Doors <Insert drawing designation>:

1. Grade: Premium Custom Economy.
2. Faces: Medium-density overlay Any closed-grain hardwood of mill option.
 - a. Apply medium-density overlay to [**standard-thickness, closed-grain, hardwood face veneers**] [**or**] [**directly to high-density hardboard crossbands**].
3. Exposed Vertical[**and Top**] Edges: Any closed-grain hardwood.
4. Core: Particleboard Glued wood stave Structural composite lumber Either glued wood stave or structural composite lumber.
5. Construction: Five Five or seven plies. Stiles and rails are bonded to core, then entire unit abrasive planed before veneering.[**Faces are bonded to core using a hot press.**]
6. Adhesives: Type I per WDMA TM-6.

2.4 FABRICATION

A. Transom and Side Panels: Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.

1. Fabricate door and transom panels with full-width, solid-lumber[, **rabbeted**,] meeting rails. Provide factory-installed spring bolts for concealed attachment into jambs of metal

door frames.

- B. Openings: Cut and trim openings through doors in factory.
 - 1. Light Openings: Trim openings with moldings of material and profile indicated.
 - 2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 08 Section "Glazing."
- C. Exterior Doors: Factory treat exterior doors with water repellent after fabrication has been completed but before .
 - 1. Flash top of outswinging doors (with manufacturer's standard metal flashing).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames before hanging doors.
 - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Division 08 Section "Door Hardware."
- B. Installation Instructions: Install doors to comply with manufacturer's written instructions and the referenced quality standard, and as indicated.

3.3 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081416

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Access doors and frames for walls and ceilings.

1.3 SUBMITTALS

- A. Product Data: For each type of access door and frame indicated. Include construction details, [**fire ratings,**] materials, individual components and profiles, and finishes.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain [**each type of**] access door(s) and frame(s) through one source from a single manufacturer.
- B. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.5 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

- A. Steel Sheet: [**Uncoated**] [**or**] [**electrolytic zinc-coated, ASTM A 591/A 591M with**] cold-

rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

- B. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
 2. Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating.
 3. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of **2 mils**.
 4. Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than **1.5 mils**. Prepare, treat, and coat metal to comply with resin manufacturer's written instructions.
- 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 board.
- D. Plaster Beads: 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.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- 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:
- C. Flush Access Doors and Trimless Frames: Fabricated from steel sheet.
1. Locations: [**Wall**] [**Ceiling**] [**Wall and ceiling**] surfaces.
 2. Door: Minimum [**0.060-inch-**] <Insert dimension> thick sheet metal, set flush with surrounding finish surfaces.
 3. Frame: Minimum [**0.060-inch-**] <Insert dimension> thick sheet metal with [**drywall**] [**plaster**] bead flange.
 4. Hinges: [**Spring-loaded, concealed-pin type**] [**Continuous piano**].
 5. Lock: [**Cylinder**] [**Mortise cylinder**].
 - a. Lock Preparation: Prepare door panel to accept cylinder specified in Division 08 Section "[**Door Hardware**] [**Door Hardware (Scheduled by Describing Products)**]."

2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
 - 1. For trimless frames with drywall bead, provide edge trim for **[gypsum board] [and] [gypsum base]** securely attached to perimeter of frames.
 - 2. For trimless frames with plaster bead for full-bed plaster applications, provide zinc-coated expanded metal lath and exposed casing bead welded to perimeter of frames.
 - 3. Provide mounting holes in frames for attachment of units to metal or wood framing.
 - 4. Provide mounting holes in frame for attachment of masonry anchors. **[Furnish adjustable metal masonry anchors.]**
- D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.
 - 1. For cylinder lock, furnish two keys per lock and key all locks alike.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

SECTION 085113 - ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes operable aluminum-framed windows for exterior locations.

1.3 DEFINITIONS

- A. Performance class designations according to AAMA/WDMA 101/I.S.2/NAFS:
 - 1. C: Commercial.
- B. Performance grade number according to AAMA/WDMA 101/I.S.2/NAFS:
 - 1. Design pressure number in **pounds force per square foot** used to determine the structural test pressure and water test pressure.
- C. Structural Test Pressure: For uniform load structural test, is equivalent to 150 percent of the design pressure.
- D. Minimum Test Size: Smallest size permitted for performance class (gateway test size). Products must be tested at minimum test size or at a size larger than minimum test size to comply with requirements for performance class.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified, and that are of minimum test size indicated below:
 - 1. Size required by AAMA/WDMA 101/I.S.2/NAFS for **[gateway performance] [optional performance grade] [gateway performance for both gateway performance and optional performance grade]**.
 - 2. Size indicated **[on Drawings] [in a schedule]**.
 - 3. **<Insert size.>**

- B. Windborne-Debris Resistance: Provide glazed windows capable of resisting impact from windborne debris, based on the pass/fail criteria as determined from testing glazed windows identical to those specified, according to [ASTM E 1886 and testing information in ASTM E 1996] [or] [AAMA 506] <Insert test method> and requirements of authorities having jurisdiction.
- C. Thermal Movements: Provide aluminum windows, including anchorage, that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): [120 deg F, ambient; 180 deg F material surfaces] <Insert range>.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.
 - 1. Installer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
 - 2. Engineering Responsibility: Preparation of data for aluminum windows, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by inclusion in lists and by labels, test reports, and calculations.
- C. Source Limitations: Obtain aluminum windows through one source from a single manufacturer.
- D. Product Options: Information on Drawings and in Specifications establishes requirements for aluminum windows' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.
- E. Product Options: Drawings indicate size, profiles, and dimensional requirements of aluminum windows and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements." Do not modify size and dimensional requirements.
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with

Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

- F. Fenestration Standard: Comply with AAMA/WDMA 101/I.S.2/NAFS, "North American Fenestration Standard Voluntary Performance Specification for Windows, Skylights and Glass Doors," for definitions and minimum standards of performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.

- 1. Provide [AAMA] [WDMA]-certified aluminum windows with an attached label.

- G. Glazing Publications: Comply with published recommendations of glass manufacturers and with GANA's "Glazing Manual" unless more stringent requirements are indicated.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify aluminum window openings by field measurements before fabrication and indicate measurements on Shop Drawings.

- 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating aluminum windows without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

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:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide [the product indicated on Drawings] <Insert manufacturer's name; product name or designation> or a comparable product by one of the following:

2.2 WINDOW <Insert drawing designation>

- A. Window Type: .
- B. AAMA/WDMA Performance Requirements: Provide aluminum windows of performance indicated that comply with AAMA/WDMA 101/I.S.2/NAFS[**unless more stringent performance requirements are indicated**].

2.3 GLAZING

- A. Glass **<Insert drawing designation>**: [**Clear, insulating-glass units**] [**Clear, insulating-glass units, with low-E coating pyrolytic on second surface or sputtered on second or third surface,**] [**Clear, insulating-glass units, argon gas filled, with low-E coating pyrolytic on second surface or sputtered on second or third surface,**] **<Insert glass type, description, and performance requirements>** complying with Division 08 Section "Glazing."
- B. Glazing System: [**Manufacturer's standard factory-glazing system that produces weathertight seal.**] [**Manufacturer's standard factory-glazing system that produces weathertight seal and complies with requirements for windborne-debris resistance.**] [**Manufacturer's standard factory-glazing system as indicated in Division 08 Section "Glazing."**] **<Insert glazing requirements.>**

2.4 FABRICATION

- A. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.
- B. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.
- C. Thermally Improved Construction: Fabricate aluminum windows with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.
 - 1. Provide thermal barriers tested according to AAMA 505; determine the allowable design shear flow per the appendix in AAMA 505.
 - 2. Provide hardware with low conductivity or nonmetallic material for hardware bridging thermal breaks at frame or vent sash.
- D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- E. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.
- F. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class I, Color Anodic Finish: AA-M12C22A42/A44 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 611.
- C. High-Performance Organic Finish (3-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion coatings; Organic Coating: manufacturer's standard 3-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA 2605 and with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure a coordinated, weathertight window installation.
 - 1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
 - 2. Wood Frame Walls: Dry, clean, sound, well nailed, free of voids, and without offsets at joints. Ensure that nail heads are driven flush with surfaces in opening and within **3 inches** of opening.
 - 3. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.

4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing windows, hardware, accessories, and other components.
- B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- C. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- D. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Adjust operating sashes and ventilators, screens, hardware, [**operators,**]and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts.
- B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain window operating system. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 085113

SECTION 087111 - DOOR HARDWARE (SCHEDULED BY DESCRIBING PRODUCTS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Commercial door hardware for the following:
 - a. Swinging doors.
 - b. Other doors to the extent indicated.
 - 2. Cylinders for doors specified in other Sections.
- B. Related Sections include the following:
 - 1. Division 08 Section "Hollow Metal Doors and Frames" [for astragals provided as part of fire-rated labeled assemblies] [and] [for door silencers provided as part of hollow-metal frames].
 - 2. Division 08 Section "Flush Wood Doors" for [astragals] [and] [integral intumescent seals] provided as part of fire-rated labeled assemblies.
 - 3. Division 10 Section "Postal Specialties" for mailbox units which require keying.
- C. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.
 - 1. Pivots thresholds weather stripping specified in other Sections.
 - 2. Permanent cores to be installed by Owner.

1.3 SUBMITTALS

- A. Samples for Verification: For exposed door hardware of each type, in specified finish, full size. Tag with full description for coordination with the door hardware sets. Submit Samples before, or concurrent with, submission of the final door hardware sets.
 - 1. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of

operation, be incorporated into the Work, within limitations of keying requirements.

- B. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for locks latches closers.
- C. Other Action Submittals:
 - 1. Keying Schedule: Prepared by or under the supervision of **[Installer]** **[Architectural Hardware Consultant]**, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.
- D. Deliver keys[**and permanent cores**] to Owner by registered mail or overnight package service.

1.5 COORDINATION

- A. Coordinate layout and installation of recessed **[pivots]** **[and]** **[closers]** with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to **[power supplies]** **[fire alarm system and detection devices]** **[access control system]** **[security system]** **[building control system]**.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of operators and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
2. Warranty Period: [**Three**] **<Insert number>** years from date of Substantial Completion, except as follows:
 - a. [**Electromagnetic**] [**Delayed-Egress**] Locks: [**Five**] **<Insert number>** years from date of Substantial Completion.
 - b. Exit Devices: Two years from date of Substantial Completion.
 - c. Manual Closers: [**10**] **<Insert number>** years from date of Substantial Completion.
 - d. Concealed Floor Closers: [**Five**] [**10**] [**25**] **<Insert number>** years from date of Substantial Completion.

1.7 EXTRA MATERIALS

- A. Furnish full-size units of door hardware described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Door Hardware: **<Insert detailed descriptions and specific numbers of units.>**
 2. Electrical Parts: **<Insert detailed descriptions and specific numbers of units.>**

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section[**and door hardware sets indicated in door and frame schedule**] [**and door hardware sets indicated in Part 3 "Door Hardware Sets" Article**].
 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated.
 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 HINGES, GENERAL

- A. Quantity: Provide the following, unless otherwise indicated:
1. Three Hinges: For doors with heights **61 to 90 inches**.
 2. Four Hinges: For doors with heights **91 to 120 inches**.
 3. For doors with heights more than **120 inches**, provide 4 hinges, plus 1 hinge for every **30 inches** of door height greater than **120 inches**.
- B. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- C. Hinge Weight: Unless otherwise indicated, provide the following:
1. Entrance Doors: Heavy-weight hinges.
 2. Doors with Closers: Antifriction-bearing hinges.
 3. Interior Doors: Standard-weight hinges.
- D. Hinge Base Metal: Unless otherwise indicated, provide the following:
1. Interior Hinges: [**Brass, with stainless-steel pin body and brass protruding heads**] [**Steel, with steel pin**] [**Stainless steel, with stainless-steel pin**].
 2. Hinges for Fire-Rated Assemblies: [**Steel, with steel pin**] [**Stainless steel, with stainless-steel pin**].
- E. Hinge Options: Where indicated in door hardware sets or on Drawings:
1. Hospital Tips: Slope ends of hinge barrel.
 2. Decorator Tips: [**Oval**] [**Ball**] [**Steeple**] [**Urn**] [**Acorn**].
 3. Safety Stud: Designed for stud in one leaf to engage hole in opposing leaf.
 4. Maximum Security Pin: Fix pin in hinge barrel after it is inserted.
 5. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for [**outswinging exterior doors**] [**and**] [**outswinging corridor doors with locks**].
 6. Corners: [**Square**] [**5/32-inch radius**] [**1/4-inch radius**] [**5/8-inch radius**].
- F. Electrified Functions for Hinges: Comply with the following:
1. Monitoring: Concealed electrical monitoring switch.
 2. Power Transfer and Monitoring: Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle, and with concealed electrical monitoring switch.
- G. Fasteners: Comply with the following:
1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.

2.3 HINGES

- A. Butts and Hinges: Listed under Category A in BHMA's "Certified Product Directory."
- B. Template Hinge Dimensions: BHMA A156.7.
- C. **[Available]** Manufacturers:
 - 1. Baldwin Hardware Corporation.
- D. Antifriction-Bearing, Swing-Clear, Full-Mortise (Butt) Hinges: BHMA A156.1, **[heavy weight; Grade 1, with 4 ball bearings]** **[standard weight; Grade 2, with 2 ball bearings]**; button tips; nonrising removable pins; reversible; with **3/32-inch** swaging; wrought, forged, or cast steel, or malleable iron.
- E. Plain-Bearing, Swing-Clear, Standard-Weight, Full-Mortise (Butt) Hinges: BHMA A156.1, Grade 3, button tips, nonrising removable pins, reversible; wrought, forged, or cast steel, or malleable iron.
- F. Friction-Type, Heavy-Weight, Full-Mortise (Butt) Hinges: BHMA A156.1, Grade 1, with adjustable friction discs or bearings; wrought, forged, or cast steel, or malleable iron.
- G. Antifriction-Bearing, Swing-Clear, Heavy-Weight, Half-Mortise Hinges: BHMA A156.1, Grade 1, button tips, nonrising removable pins, reversible, equipped with 4 ball bearings; wrought, forged, or cast steel, or malleable iron.
- H. Antifriction-Bearing, Swing-Clear, Heavy-Weight, Full-Surface Hinges: BHMA A156.1, Grade 1, button tips, nonrising removable pins, reversible, equipped with 4 ball bearings; wrought, forged, or cast steel, or malleable iron.
- I. Antifriction-Bearing, Swing-Clear, Heavy-Weight, Half-Surface Hinges: BHMA A156.1, Grade 1, button tips, nonrising removable pins, reversible, equipped with 4 ball bearings; wrought, forged, or cast steel, or malleable iron.
- J. Antifriction-Bearing, Standard-Weight, Pivot Hinges: BHMA A156.1, Grade 2, full mortise, equipped with concealed bearing unit, handed; only knuckle visible when door is closed; wrought steel.
- K. Pocket Hinges: Heavy weight; antifriction bearing; BHMA A156.1, Grade 1; jamb leaf visible when door is closed and both leaves concealed when door is in pocket; type and size required for application indicated; and base metal as follows:
 - 1. Base Metal: **[Cast, forged, or extruded brass or bronze]** **[Stainless steel]** **[Wrought, forged, or cast steel, or malleable iron]**.

2.4 SPRING HINGES

- A. Self-Closing Hinges: Listed under Category A in BHMA's "Certified Product Directory."
- B. **[Available]** Manufacturers:
 - 1. Baldwin Hardware Corporation.
 - 2. Bommer Industries, Inc.
- C. Single-Acting, Full-Mortise, Spring Hinges: BHMA A156.17[, **Grade 1**] [, **Grade 2**], wrought steel, with torsion spring[; **listed for use on fire doors**].
- D. Single-Acting, Half-Surface, Spring Hinges: BHMA A156.17[, **Grade 1**] [, **Grade 2**], wrought steel, with torsion spring[; **listed for use on fire doors**].

2.5 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:
 - 1. Bored Locks: BHMA A156.2.
 - 2. Mortise Locks: BHMA A156.13.
- B. Bored Locks: BHMA A156.2[, **Grade 1**] [, **Grade 2**] [, **Grade 1 unless Grade 2 is indicated**]; Series 4000.[**Listed under Category F in BHMA's "Certified Product Directory."**]
 - 1. **[Available]** Manufacturers:
 - a. Arrow USA; an ASSA ABLOY Group company.
 - b. Best Access Systems; Div. of The Stanley Works.
- C. Push-Pull Latches: Consisting of paddle handles that retract latchbolt; capable of being mounted vertically or horizontally; and as follows:
 - 1. Latch Type: [**Bored**] [**Mortise**].
 - 2. Lettering: Engrave with the words "Pull" and "Push."
 - 3. Lead Lining: **0.047 inch** thick for escutcheon plate.

2.6 AUXILIARY LOCKS AND LATCHES

- A. Auxiliary Locks: BHMA A156.5[, **Grade 1**] [, **Grade 2**] [, **Grade 1 unless Grade 2 is indicated**].[**Listed under Category E in BHMA's "Certified Product Directory."**]

1. **[Available]** Manufacturers:
 - a. ABLOY Security, Inc.; an ASSA ABLOY Group company.
 - b. Accurate Lock & Hardware Co.
2. Mortise Auxiliary Locks:
 - a. Deadlocks: Deadbolt operated by key **[either side]** **[outside and turn inside]** **[one side]**.
 - b. Deadlatches: Latchbolt and auxiliary deadlatch operated by key **[either side]** **[outside and turn inside]**.
 - c. Deadlocks for Sliding Doors: Expanding- or interlocking-type deadbolt operated by key **[either side]** **[outside and turn inside]** **[one side]**.
 - d. Deadlatches for Sliding Doors: Hook-type latchbolt operated by key **[either side]** **[outside and handle inside]**.
3. Rim Auxiliary Locks:
 - a. Latchbolt: Operated by key outside and turn inside.
 - b. Deadlocking Latchbolt: Operated by key outside and turn inside.
 - c. Deadbolt: Operated by key outside and turn inside.
 - d. Rotary Deadbolt: Operated by key **[either side]** **[outside and turn inside]** **[outside]**.
 - e. Interlocking Deadbolt: Operated by key **[either side]** **[outside and turn inside]** **[outside]**.

B. Push-Button Combination Locks: BHMA A156.5[, **Grade 1 for cylindrical locks**] [, **Grade 2 for mortise locks**].

1. **[Available]** Manufacturers:
 - a. Kaba Ilco Inc.; a Kaba Group company.
 - b. **<Insert manufacturer's name.>**
2. Lockset Configuration: **[Standard]** **[Privacy with inside push button]**.
3. Auxiliary Lock Configuration: **[Deadbolt]** **[Deadlocking latch]** **[Deadlocking rim latch]**.
4. Provide key override capability by means of cylinder.

2.7 ELECTROMAGNETIC LOCKS

A. General: BHMA A156.23; electrically powered, of strength and configuration indicated; with electromagnet attached to frame and armature plate attached to door. **[Listed under Category E in BHMA's "Certified Product Directory."]**

1. Type: Full exterior or full interior, as required by application indicated.

2. Strength Ranking: [1500 lbf] [1000 lbf] [500 lbf].
 3. Inductive Kickback Peak Voltage: Not more than [53] [0] V.
 4. Residual Magnetism: Not more than [4 lbf] [0 lbf] to separate door from magnet.
- B. Delayed-Egress Locks: BHMA A156.24.[**Listed under Category G in BHMA's "Certified Product Directory."**]
1. Security Grade: Activated from secure side of door by initiating device.
 2. Movement Grade: Activated by door movement as initiating device.
- C. Configuration: Direct-hold type.
1. Mounting: Lock mounted on face of header; strike mounted on pull side of door with angle bracket.
 2. Mounting: Lock mounted on side of jamb; strike mounted flush on push side of door.
- D. Configuration: Shear type.
1. Mounting: Lock mortised in header; strike mortised in top of door.
 2. Mounting: Lock mortised in jamb; strike mortised in edge of door.
 3. Mounting: Lock mortised in bottom of door; strike mortised in floor.
 4. Mounting: Lock mortised in floor; strike mortised in bottom of door.
- E. Optional Features:
1. Magnetic bond sensor.
 2. Continuous housing for full width of door.
 3. Continuous housing for full height of door.
 4. Single LED indicators.
 5. Double LED indicators.
 6. Adjustable time delay with automatic relock.
 7. Integral door position switch.
- F. [**Available**]Manufacturers:
1. Door Controls International.
 2. Doorguard Systems, Inc.

2.8 EXIT DEVICES, GENERAL

- A. Exit Devices: BHMA A156.3[**Grade 1**] [**Grade 2**] [**Grade 1 unless Grade 2 is indicated**].[**Listed under Category G in BHMA's "Certified Product Directory."**]
- B. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with [**the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."**] [ANSI A117.1.] [FED-

STD-795, "Uniform Federal Accessibility Standards."] <Insert local regulation.>

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than **5 lbf**.
 - C. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than **15 lbf** to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
 - D. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
 - E. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
 - F. Fire-Exit Removable Mullions: Provide removable mullions for use with fire exit devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252. Mullions shall be used only with exit devices for which they have been tested.
 - G. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 1. Operation: [**Rigid**] [**Movable**] [**Movable with monitor switch**].
 - H. Outside Trim: [**Lever**] [**Lever with cylinder**] [**Knob**] [**Knob with cylinder**] [**Pull**] [**Pull with cylinder**] [**Thumb turn with cylinder**]; material and finish to match locksets, unless otherwise indicated.
 1. Match design for locksets and latchsets, unless otherwise indicated.
 - I. Through Bolts: For exit devices and trim on [**metal doors**] [**non-fire-rated wood doors**] [**fire-rated wood doors**].
 - J. [**Available**] Manufacturers:
 1. Adams Rite Manufacturing Co.
 2. Arrow USA; an ASSA ABLOY Group company.
- 2.9 LOCK CYLINDERS
- A. Standard Lock Cylinders: BHMA A156.5[, **Grade 1**] [, **Grade 1A**] [, **Grade 2**] [, **Grade 1 unless Grade 1A is indicated**] [, **Grade 1 unless Grade 2 is indicated**].
 - B. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:

1. Number of Pins: [**Five**] [**Six**] [**Seven**].
 2. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
 3. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
- C. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
1. Interchangeable Cores: Core insert, removable by use of a special key; usable with other manufacturers' cylinders.
 2. Removable Cores: Core insert, removable by use of a special key; for use only with core manufacturer's cylinder and door hardware.
- D. Manufacturer: Same manufacturer as for locks and latches.
- E. [**Available**]Manufacturers:
1. ABLOY Security, Inc.; an ASSA ABLOY Group company.
 2. Arrow USA; an ASSA ABLOY Group company.
- 2.10 KEY CONTROL SYSTEM
- A. Key Control Cabinet: BHMA A156.5, Grade [1] [2]; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of [150] <Insert number> percent of the number of locks.
1. Wall-Mounted, Recessed Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.
- B. Cross-Index System: [Multiple] [Single]-index system for recording key information. Include three receipt forms for each key-holding hook. Set up by [key control manufacturer] [Installer].
1. [**Available**]Manufacturers:
 - a. Key Control Systems, Inc.
 - b. Lund Equipment Co., Inc.
 - c. MMF Industries.
 - d. Sunroc Corporation.
 - e. <Insert manufacturer's name.>
- C. Key Lock Boxes: Designed for storage of [two] [10] <Insert number> keys[, with tamper switches to connect to intrusion detection system].
1. [**Available**]Manufacturers:

- a. ABLOY Security, Inc.; an ASSA ABLOY Group company.
- b. Knox Company.
- c. Supra Products.
- d. <Insert manufacturer's name.>

2.11 ACCESSORIES FOR PAIRS OF DOORS

- A. Carry-Open Bars: Provide carry-open bars for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.
- B. Rigid, Housed Astragals: Gasket material held in place by metal housing; fastened to face of door with screws.
 1. Housing Material: [**Aluminum**] [**Copper alloy (brass or bronze)**].
- C. Overlapping-with-Gasket Astragals: T-shaped metal, surface mounted on edge of door with screws; with integral gasket and base metal as follows:
 1. Gasket Material: [**Vinyl**] [**Silicone**] [**Sponge neoprene**] [**Brush pile**] [**Polypropylene**].

2.12 CLOSERS, GENERAL

- A. Accessibility Requirements: Where handles, pulls, latches, locks, and other operating devices are indicated to comply with accessibility requirements, comply with [**the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."] [ANSI A117.1.] [FED-STD-795, "Uniform Federal Accessibility Standards."] <Insert local regulation.>
 1. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: **5 lbf** applied perpendicular to door.
 - b. Sliding or Folding Doors: **5 lbf** applied parallel to door at latch.**
- B. Hold-Open Closers/Detectors: Coordinate and interface integral smoke detector and closer device with fire alarm system.
- C. Flush Floor Plates: Provide finish cover plates for floor closers unless thresholds are indicated. Match door hardware finish, unless otherwise indicated.
- D. Recessed Floor Plates: Provide recessed floor plates with insert of floor finish material for floor closers unless thresholds are indicated. Provide extended closer spindle to accommodate thickness of floor finish.
- E. Power-Assist Closers: As specified in Division 08 Section "Automatic Door Operators" for access doors for people with disabilities or where listed in door hardware sets.

- F. Surface Closers: BHMA A156.4[**Grade 1**] [**Grade 2**] [**Grade 1 unless Grade 2 is indicated**].[**Listed under Category C in BHMA's "Certified Product Directory."**]
Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.

1. [Available]Manufacturers:

- a. Arrow USA; an ASSA ABLOY Group company.
- b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.

2.13 STOPS AND HOLDERS, GENERAL

- A. Stops and Bumpers: BHMA A156.16[**Grade 1**] [**Grade 2**] [**Grade 1 unless Grade 2 is indicated**].

1. Provide floor stops for doors unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.

- B. Mechanical Door Holders: BHMA A156.16[**Grade 1**] [**Grade 2**] [**Grade 1 unless Grade 2 is indicated**].

- C. Silencers for Wood Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum **5/8 by 3/4 inch**; fabricated for drilled-in application to frame.

- D. Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter **1/2 inch**; fabricated for drilled-in application to frame.

- E. [Available]Manufacturers:

1. Architectural Builders Hardware Mfg., Inc.
2. Baldwin Hardware Corporation.

2.14 THRESHOLDS, GENERAL

- A. Standard: BHMA A156.21.[**Listed under Category J in BHMA's "Certified Product Directory."**]

- B. Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with [the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."] [ANSI A117.1.] [FED-STD-795, "Uniform Federal Accessibility Standards."] <Insert local regulation.>

1. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more

than [1/2 inch high] [3/4 inch high for exterior sliding doors].

- C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch high.
- D. [Available]Manufacturers:
 - 1. Hager Companies.
 - 2. M-D Building Products, Inc.

2.15 SLIDING DOOR HARDWARE, GENERAL

- A. General: BHMA A156.14; consisting of complete sets including rails, hangers, supports, bumpers, floor guides, and accessories indicated.
 - 1. Exterior Door Hardware: Galvanized steel or anodized aluminum.
- B. Horizontal Sliding Door Hardware: Grade 1; rated for minimum door weight of [240 lb] [320 lb] [450 lb] [560 lb] [640 lb] [800 lb] [1000 lb] [1500 lb].
- C. [Available]Manufacturers:
 - 1. Cox, Arthur & Sons, Inc.
 - 2. Hager Companies.

2.16 FOLDING DOOR HARDWARE, GENERAL

- A. General: BHMA A156.14; consisting of complete sets including overhead rails, hangers, supports, bumpers, floor guides, and accessories indicated.
 - 1. Interior Doors: Provide door hardware for interior bifolding doors when not furnished as part of door package.
- B. Bifolding Door Hardware: Rated for door panels weighing up to [125 lb] [50 lb].
- C. [Available]Manufacturers:
 - 1. Cox, Arthur & Sons, Inc.
 - 2. Hager Companies.

2.17 MISCELLANEOUS DOOR HARDWARE, GENERAL

- A. Boxed Power Supplies: Modular unit in NEMA ICS 6, Type 4 enclosure; filtered and regulated; voltage rating and type matching requirements of door hardware served; and listed and labeled for use with fire alarm systems.

- B. Auxiliary Hardware: BHMA A156.16[, **Grade 1**] [, **Grade 2**] [, **Grade 1 unless Grade 2 is indicated**] [, **Grade 3**].
 - 1. [**Available**] Manufacturers:
 - a. Baldwin Hardware Corporation.
 - b. Cal-Royal Products, Inc.

2.18 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.
 - 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2. Steel Machine or Wood Screws: For the following fire-rated applications:
 - a. Strike plates to frames.
 - 3. Steel Through Bolts: For the following fire-rated applications unless door blocking is provided:
 - a. Closers to doors and frames.
 - 4. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 - 5. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 Series.
- B. Wood Doors: Comply with DHI A115-W Series.

3.3 FIELD QUALITY CONTROL

- A. Independent Architectural Hardware Consultant: Owner will engage a qualified independent Architectural Hardware Consultant to perform inspections and to prepare inspection reports.
 - 1. Independent Architectural Hardware Consultant will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.4 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
 - 2. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
 - 3. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point **3 inches** from the latch, measured to the leading edge of the door.
- B. Occupancy Adjustment: Approximately [**three**] [**six**] <Insert number> months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust, including adjusting operating forces, each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes. Refer to Division 01 Section "Demonstration and Training."

3.7 DOOR HARDWARE SETS

- A.

Item	Description	Finish
------	-------------	--------
- B.

Specifier's Note: The above items, their descriptions and finishes are to be scheduled by the Architect-of-Record and shall include, at a minimum and where required, peepholes, closers, locksets with integrated deadbolt and master entry capability.

 - 1. Note: Although residential in nature, it is the design intent that the door hardware employed in the Work shall be commercial quality, BHMA Grade 1.

END OF SECTION 087111

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.
- C. Interspace: Space between lites of an insulating-glass unit.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved[**and certified**] by coated-glass manufacturer.
- B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- C. Sealant Testing Agency Qualifications: An independent testing agency qualified according to

ASTM C 1021 to conduct the testing indicated.

- D. Source Limitations for Glass: Obtain [**ultraclear float glass**] [**tinted float glass**] [**coated float glass**] [**laminated glass**] [**and**] [**insulating glass**] from single source from single manufacturer for each glass type.
- E. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.
- F. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.
 - 1. GANA Publications: [**GANA's "Laminated Glazing Reference Manual"** **and**]GANA's "Glazing Manual."
 - 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
 - 3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
 - 4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- G. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.
1. Minimum Glass Thickness for Exterior Lites: Not less than **[6.0]** <Insert thickness designation> mm.
 2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.
- B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass[**as needed to comply with "Performance Requirements" Article**]. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass[**as needed to comply with "Performance Requirements" Article**]. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.
- C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites **[6.0 mm thick]** [of thickness indicated].
 2. For laminated-glass lites, properties are based on products of construction indicated.
 3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
 4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as **Btu/sq. ft. x h x deg F**.
 5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
 6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

- A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.
- B. Film-Faced Polished Wired Glass: ASTM C 1036, Type II, Class 1 (clear), Form 1, Quality-Q6 and complying with testing requirements in 16 CFR 1201 for Category II materials.
1. Products: Subject to compliance with requirements, **[provide the following]** **[provide one of the following]** **[available products that may be incorporated into the Work include, but are not limited to, the following]**:
 - a. <Insert, in separate subparagraphs, manufacturer's name; product name or designation>.
 2. Mesh: **[M1 (diamond)]** **[M2 (square)]**.

2.3 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, Type A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions of 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 O (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: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.4 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit 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 publications, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.
- C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
- B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

- 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 publications.
- B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.
- C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass lites where length plus width is larger than **50 inches**.
 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and

glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide **1/8-inch** minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
 - I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
 - J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

3.4 CLEANING AND PROTECTION

- A. 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. Remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.
- E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes the following types of silvered flat glass mirrors:
 - 1. Glass mirrors qualifying as safety glazing.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.
- B. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.
- C. Source Limitations for Mirror Accessories: Obtain mirror glazing accessories from single source.
- D. Glazing Publications: Comply with the following published recommendations:
 - 1. GANA's "Glazing Manual" unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
 - 2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."
- E. Safety Glazing Products: For mirrors, provide products complying with testing requirements in 16 CFR 1201 for Category II materials.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect mirrors according to mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.

- B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.5 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

PART 2 - PRODUCTS

2.1 SILVERED FLAT GLASS MIRRORS

- A. Glass Mirrors, General: ASTM C 1503[; **manufactured using copper-free, low-lead mirror coating process**].

2.2 FABRICATION

- A. Mirror Sizes: To suit Project conditions, cut mirrors to final sizes and shapes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.
- B. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 INSTALLATION

- A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

- B. Provide a minimum air space of **1/8 inch** between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.
- C. Wall-Mounted Mirrors: Install mirrors with [**mastic and**] mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

3.3 CLEANING AND PROTECTION

- A. Protect mirrors from breakage and contaminating substances resulting from construction operations.
- B. Do not permit edges of mirrors to be exposed to standing water.
- C. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.
- D. Wash exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash mirrors as recommended in writing by mirror manufacturer.

END OF SECTION 088300

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes non-load-bearing steel framing members for the following applications:
 - 1. Interior suspension systems (e.g., supports for ceilings, suspended soffits, etc.).

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

PART 2 - PRODUCTS

2.1 NON-LOAD-BEARING STEEL FRAMING, GENERAL

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal, unless otherwise indicated.
 - 2. Protective Coating: [ASTM A 653/A 653M, G40] [ASTM A 653/A 653M, G60] [Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40], hot-dip galvanized, unless otherwise indicated.

2.2 SUSPENSION SYSTEM COMPONENTS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, **0.0625-inch-** diameter wire, or double strand of **0.0475-inch-** diameter wire.
- B. Hanger Attachments to Concrete:
1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to **[5]** **<Insert number>** times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.
 - a. Type: **[Cast-in-place anchor, designed for attachment to concrete forms]** **[Postinstalled, chemical anchor]** **[Postinstalled, expansion anchor]**.
 2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to **[10]** **<Insert number>** times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.
- C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, **0.162-inch** diameter.
- D. Flat Hangers: Steel sheet, **[in size indicated on Drawings]** **[1 by 3/16 inch by length indicated]** **<Insert size>**.
- E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of **0.0538 inch** and minimum **1/2-inch-** wide flanges.
 1. Depth: **[As indicated on Drawings]** **[2-1/2 inches]** **[2 inches]** **[1-1/2 inches]**.
- F. Furring Channels (Furring Members):
1. Cold-Rolled Channels: **0.0538-inch** bare-steel thickness, with minimum **1/2-inch-** wide flanges, **3/4 inch** deep.
 2. Steel Studs: ASTM C 645.
 - a. Minimum Base-Metal Thickness: **[As indicated on Drawings]** **[0.0179 inch]** **[0.0312 inch]** **<Insert thickness>**.
 - b. Depth: **[As indicated on Drawings]** **[1-5/8 inches]** **[2-1/2 inches]** **[3-5/8 inches]** **<Insert depth>**.
 3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, **7/8 inch** deep.
 - a. Minimum Base Metal Thickness: **[As indicated on Drawings]** **[0.0179 inch]** **[0.0312 inch]** **<Insert thickness>**.

4. Resilient Furring Channels: **1/2-inch-** deep members designed to reduce sound transmission.
 - a. Configuration: [**Asymmetrical or hat shaped**] [**Asymmetrical**] [**Hat shaped**].

G. Grid Suspension System for Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Armstrong World Industries, Inc.; Drywall Grid Systems.
 - b. Chicago Metallic Corporation; 640-C Fire Front 650-C 660-C Fire Front 670-C Drywall Furring System.
 - c. USG Corporation; Drywall Suspension System.
 - d. **<Insert manufacturer's name; product name or designation.>**

2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
 1. Furnish concrete inserts and other devices indicated to other trades for installation in

advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than **24 inches** o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components in sizes and spacings indicated on Drawings, but not less than those required by referenced installation standards for assembly types and other assembly components indicated.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
 1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. 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 locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

- a. Size supplemental suspension members and hangers to support ceiling loads within **[performance limits established by referenced installation standards]** **<Insert deflection limit>**.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 5. Do not attach hangers to steel roof deck.
 6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 8. Do not connect or suspend steel framing from ducts, pipes, or conduit.
- D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.
- E. Seismic Bracing: Sway-brace suspension systems **[with hangers used for support]** **<Insert requirements>**.
- F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.
- G. Installation Tolerances: Install suspension systems that are level to within **[1/8 inch in 12 feet]** **<Insert tolerance>** measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Interior gypsum board.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For the following products:
 - 1. Trim Accessories: Full-size Sample in **12-inch-** long length for each trim accessory indicated.

1.4 QUALITY ASSURANCE

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
- B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
- C. Mockups: Before beginning gypsum board installation, install mockups of at least **100 sq. ft.** in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install mockups for the following:
 - a. Each level of gypsum board finish indicated for use in exposed locations.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack panels flat to prevent sagging.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install interior products until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or blotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PANELS, GENERAL

- A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

- A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.
 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:

B. Ceiling Type: Manufactured to have more sag resistance than regular-type gypsum board.

1. Thickness: **1/2 inch**.
2. Long Edges: Tapered.

2.3 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.

C. 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[, **rounded or beveled panel edges,**] and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use [**setting-type taping**] [**drying-type, all-purpose**] compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
3. Fill Coat: For second coat, use [**setting-type, sandable topping**] [**drying-type, all-purpose**] compound.
4. Finish Coat: For third coat, use [**setting-type, sandable topping**] [**drying-type, all-purpose**] compound.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames and framing, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than **1/16 inch** of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than **8 sq. ft.** in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow **1/4- to 3/8-inch-** wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide **1/4- to 1/2-inch-** wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
- I. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Ceiling Type: [**As indicated on Drawings**] [**Ceiling surfaces**].

3.4 INSTALLING TRIM ACCESSORIES

- A. General: 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.

3.5 FINISHING GYPSUM BOARD

- A. General: 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. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints[, **rounded or beveled edges,**] and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

3.6 PROTECTION

- A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- B. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093000 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Ceramic tile.
2. Stone thresholds.
3. Waterproof membrane.
4. Crack isolation membrane.

- B. Related Sections:

1. Division 07 Section "Self-Adhering Sheet Waterproofing Elastomeric Sheet Waterproofing Thermoplastic Sheet Waterproofing Hot Fluid-Applied Rubberized Asphalt Waterproofing" Cold Fluid-Applied Waterproofing for waterproofing under thickset mortar beds.
2. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
3. Division 09 Section "Portland Cement Plastering" for portland cement scratch coat over metal lath on wall surfaces.
4. Division 09 Section "Gypsum Veneer Plastering" for cementitious backer units.
5. Division 09 Section "Gypsum Board" for [**cementitious backer units**] [**glass-mat, water-resistant backer board**].

1.3 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."

- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 - 1. Level Surfaces: Minimum **<Insert required static coefficient of friction>**.
 - 2. Step Treads: Minimum **<Insert required static coefficient of friction>**.
 - 3. Ramp Surfaces: Minimum **<Insert required static coefficient of friction>**.

1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. LEED Submittal:
 - 1. Product Data for Credit EQ 4.1: For **[adhesives] [and] [sealants]**, including printed statement of VOC content.
- C. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- D. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.
- E. Samples for Verification:
 - 1. Full-size units of each type and composition of tile and for each color and finish required. **[For ceramic mosaic tile in color blend patterns, provide full sheets of each color blend.]**
 - 2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least **[12 inches square]** **<Insert size>**, but not fewer than 4 tiles. Use grout of type and in color or colors approved for completed Work.
 - 3. Full-size units of each type of trim and accessory **[for each color and finish required]**.
- F. Qualification Data: For qualified Installer.
- G. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

- H. Product Certificates: For each type of product, signed by product manufacturer.
- I. Material Test Reports: For each tile-setting and -grouting product[**and special purpose tile**].

1.6 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain [**tile of each type and color or finish**] [**tile of each type**] [**tile of each color or finish**] [**tile**] from one source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
 - 1. Waterproof membrane.
 - 2. Crack isolation membrane.
 - 3. Joint sealants.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
 - 1. Where tile is indicated for installation [**in swimming pools**] [**on exteriors**] [**or**] [**in wet areas**], do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.
- E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

- A. Tile Type [CT-#]: Factory-mounted [**unglazed**] [**glazed**] ceramic mosaic tile.
 - 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
 - 3. Composition: [**Porcelain**] [**Impervious natural clay or porcelain**] [**Vitreous or impervious natural clay or porcelain**].
 - 4. Module Size: [**1 by 1 inch**] [**1 by 2 inches**] [**2 by 2 inches**] <Insert size>.
 - 5. Thickness: **1/4 inch**.

6. Face: **[Plain]** **[Pattern of design indicated,]** with cushion edges.
7. Surface: **[Smooth, without]** **[Slip-resistant, with]** abrasive admixture.
8. Finish: **[Bright, opaque]** **[Bright, clear]** **[Mat, opaque]** **[Mat, clear]** **[Semimat, opaque]** **[Semimat, clear]** **[Vellum, opaque]** **[Vellum, clear]** **[Crystalline]** **<Insert description>** glaze.
9. Tile Color and Pattern: **[As indicated by manufacturer's designations]** **[Match Architect's sample]** **[As selected by Architect from manufacturer's full range]** **<Insert color and pattern>**.
10. Grout Color: **[As indicated by manufacturer's designations]** **[Match Architect's sample]** **[As selected by Architect from manufacturer's full range]** **<Insert color>**.
11. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable **and matching characteristics of adjoining flat tile**. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base Cove: Cove, module size **[1 by 1 inch]** **[2 by 1 inch]** **<Insert size>**.
 - b. Base Cap for Portland Cement Mortar Installations: Bead (bullnose), module size **[1 by 1 inch]** **[2 by 1 inch]** **<Insert size>**.
 - c. Base Cap for Thin-Set Mortar Installations: Surface bullnose, module size **[1 by 1 inch]** **[2 by 1 inch]** **[2 by 2 inches]** **<Insert size>**.
 - d. Wainscot Cap for Portland Cement Mortar Installations: Bead (bullnose), module size **[1 by 1 inch]** **[2 by 1 inch]** **<Insert size>**.
 - e. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose, module size **[1 by 1 inch]** **[2 by 1 inch]** **[2 by 2 inches]** **<Insert size>**.
 - f. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
 - g. External Corners for Portland Cement Mortar Installations: Bead (bullnose), module size **[1 by 1 inch]** **[2 by 1 inch]** **<Insert size>**.
 - h. External Corners for Thin-Set Mortar Installations: Surface bullnose, module size **[1 by 1 inch]** **[2 by 1 inch]** **[2 by 2 inches]** **<Insert size>**.
 - i. Internal Corners: Cove, module size **[1 by 1 inch]** **[2 by 1 inch]** **<Insert size>**.
 - j. Internal Corners: Field-buttet square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.
 - k. Tapered Transition Tile: Shape designed to effect transition between thickness of tile floor and adjoining floor finishes of different thickness, tapered to provide reduction in thickness from **1/2 to 1/4 inch** across nominal **4-inch** dimension.

B. Tile Type **[CT-<#>]**: Glazed wall tile .

1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] **<Insert manufacturer's name; product name or designation>** or comparable product by one of the following:
3. Module Size: **[4-1/4 by 4-1/4 inches]** **[6 by 4-1/4 inches]** **[6 by 6 inches]** **[200 by 200 mm]** **[250 by 250 mm]** **[200 by 300 mm]** **<Insert size>**.
4. Thickness: **5/16 inch**.

5. Face: [**Plain with modified square edges or cushion edges**] [**Plain with modified square edges**] [**Plain with cushion edges**] [**Pattern of design indicated, with manufacturer's standard edges**].
 6. Finish: [**Bright, opaque**] [**Bright, clear**] [**Mat, opaque**] [**Mat, clear**] [**Semimat, opaque**] [**Semimat, clear**] [**Vellum, opaque**] [**Vellum, clear**] [**Crystalline**] <Insert description> glaze.
 7. Tile Color and Pattern: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**] <Insert color and pattern>.
 8. Grout Color: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**] <Insert color>.
 9. Mounting: Factory, back mounted.
 10. Mounting: Pregrouted sheets of tiles factory assembled and grouted with manufacturer's standard white silicone rubber.
 11. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable[**and matching characteristics of adjoining flat tile**]. Provide shapes as follows, selected from manufacturer's standard shapes:
 - a. Base for Portland Cement Mortar Installations: Coved, module size [4-1/4 by 4-1/4 inches] [6 by 6 inches] [6 by 3-3/4 inches] <Insert size>.
 - b. Base for Thin-Set Mortar Installations: Straight, module size [4-1/4 by 4-1/4 inches] [6 by 6 inches] [6 by 2 inches] <Insert size>.
 - c. Wainscot Cap for Portland Cement Mortar Installations: Bullnose cap, module size [4-1/4 by 4-1/4 inches] [6 by 6 inches] [6 by 2 inches] <Insert size>.
 - d. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose, module size [4-1/4 by 4-1/4 inches] [6 by 6 inches] [6 by 2 inches] <Insert size>.
 - e. Wainscot Cap for Flush Conditions: Regular flat tile for conditions where tile wainscot is shown flush with wall surface above it, same size as adjoining flat tile.
 - f. External Corners for Portland Cement Mortar Installations: Bullnose shape with radius of at least 3/4 inch unless otherwise indicated.
 - g. External Corners for Thin-Set Mortar Installations: Surface bullnose, same size as adjoining flat tile.
 - h. Internal Corners: Field-buttet square corners. For coved base and cap use angle pieces designed to fit with stretcher shapes.
- C. Accessories: Provide vitreous china accessories of type and size indicated, suitable for installing by same method as adjoining wall tile.
1. One soap holder[**with grab handle**] for each shower and tub indicated.
 2. One paper holder at each water closet.
 3. Color and Finish: [**Match adjoining glazed wall tile**] [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**] [**White, bright glaze**] <Insert color and finish>.

2.3 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product[, **selected from the following,**] that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fabric-Reinforced, Modified-Bituminous Sheet: Self-adhering, SBS-modified-bituminous sheet with woven reinforcement facing; **0.040-inch** nominal thickness.
- C. Urethane Waterproofing and Tile-Setting Adhesive: One-part, liquid-applied urethane, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), in a consistency suitable for trowel application and intended for use as both waterproofing and tile-setting adhesive in a two-step process.

2.4 SETTING MATERIALS

- A. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
 - 1. Reinforcing Wire Fabric: Galvanized, welded wire fabric, **2 by 2 inches** by **0.062-inch** diameter; comply with ASTM A 185 and ASTM A 82 except for minimum wire size.
 - 2. Latex Additive: [**Manufacturer's standard**] [**acrylic resin**] [**or**] [**styrene-butadiene-rubber**] water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.
- B. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.
 - 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
 - 3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.
- C. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
 - 3. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to **140 deg F** and **212 deg F**, respectively, and certified by manufacturer for intended use.

- D. Organic Adhesive: ANSI A136.1, Type I, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:

2.5 GROUT MATERIALS

- A. Standard Cement Grout: ANSI A118.6.
1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
- B. Grout for PregROUTed Tile Sheets: Same product used in factory to pregROUT tile sheets.

2.6 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Division 07 Section "Joint Sealants."
1. Use sealants that have a VOC content of [250] <Insert limit> g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
1. Products: Subject to compliance with requirements, [**provide the following**] [**provide one of the following**] [**available products that may be incorporated into the Work include, but are not limited to, the following**]:

- a. DAP Inc.; [**Titanium Enriched Kitchen and Bath Sealant**] [**100 percent Silicone Kitchen and Bath Sealant**].
 - b. Dow Corning Corporation; Dow Corning 786.
 - c. GE Silicones; a division of GE Specialty Materials; Sanitary 1700.
 - d. Laticrete International, Inc.; Latasil Tile & Stone Sealant.
 - e. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
 - f. Tremco Incorporated; Tremsil 600 White.
 - g. <**Insert manufacturer's name; product name or designation**>.
- D. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.
1. Products: Subject to compliance with requirements, [**provide the following**] [**provide one of the following**] [**available products that may be incorporated into the Work include, but are not limited to, the following**]:
 - a. Bostik, Inc.; Chem-Calk 550.
 - b. Degussa Building Systems; Sonneborn Sonolastic SL 2.
 - c. Pecora Corporation; [**Dynatrol II-SG**] [**NR-200 Urexpan**].
 - d. Sika Corporation; Sikaflex-2c SL.
 - e. Tremco Incorporated.; [**THC-900**] [**THC-901**] [**Vulkem 245**].
 - f. <**Insert manufacturer's name; product name or designation**>.
- E. Chemical-Resistant Sealants: For chemical-resistant floors, provide chemical-resistant elastomeric sealant of type recommended and produced by chemical-resistant mortar and grout manufacturer for type of application indicated, with proven service record and compatibility with tile and other setting materials, and with chemical resistance equivalent to mortar/grout.
1. Manufacturers: Subject to compliance with requirements, [**provide products by one of the following**] [**available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**]:
 - a. Atlas Minerals & Chemicals, Inc.
 - b. <**Insert manufacturer's name**>.
- 2.7 MISCELLANEOUS MATERIALS
- A. Temporary Protective Coating: [**Either product**] [**Product**] indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of **120 to 140 deg F** per ASTM D 87.
 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- C. Grout Sealer: Manufacturer's standard[**silicone**] product for sealing grout joints and that does not change color or appearance of grout.

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 - 2. Verify that concrete substrates for tile floors installed with [**adhesives**] [**bonded mortar bed**] [**or**] [**thin-set mortar**] comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with **[adhesives]** **[or]** **[thin-set mortar]** with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped **1/4 inch per foot** toward drains.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile swimming pool decks.
 - c. Tile floors in laundries.
 - d. Tile floors composed of tiles **8 by 8 inches** or larger.
 - e. Tile floors composed of rib-backed tiles.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

- D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
1. Glazed Wall Tile: **1/16 inch**.
- F. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
- G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- H. Grout Sealer: Apply grout sealer to **[cementitious]** grout joints **[in tile floors]** according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.
- B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove **[epoxy]** **[and]** **[latex-portland cement]** grout residue from tile as soon as

- possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.
- B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.6 INTERIOR TILE INSTALLATION SCHEDULE

- A. Bathtub/Shower Wall Installations, Metal Studs or Furring:
1. Tile Installation B411: Cement mortar bed (thickset); TCA B411 and ANSI A108.1A.
 - a. Tile Type: **<Insert tile-type designation>**.
 - b. Bond Coat Mortar for Wet-Set Method: Dry-set portland cement mortar.
 - c. Grout: Standard unsanded cement grout.

END OF SECTION 093000

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Resilient base.
 - 2. Resilient molding accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than **50 deg F** or more than **90 deg F**.

1.6 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than **[70 deg F]** <Insert temperature> or more than **[95 deg F]** <Insert temperature>, in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.

2. During installation.
 3. 48 hours after installation.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than [55 deg F] <Insert temperature> or more than [95 deg F] <Insert temperature>.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE <Insert drawing designation>

- A. Resilient Base:
1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Allstate Rubber Corp.; Stoler Industries.
 - b. Armstrong World Industries, Inc.
 - c. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
 - d. Endura Rubber Flooring; Division of Burke Industries, Inc.
 - e. Estrie Products International; American Biltrite (Canada) Ltd.
 - f. Flexco, Inc.
 - g. Johnsonite.
 - h. Mondo Rubber International, Inc.
 - i. Musson, R. C. Rubber Co.
 - j. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
 - k. PRF USA, Inc.
 - l. Roppe Corporation, USA.
 - m. VPI, LLC; Floor Products Division.
- B. Resilient Base Standard: ASTM F 1861.
1. Material Requirement: [Type TV (vinyl, thermoplastic)] [Type TS (rubber, vulcanized thermoset)] [Type TP (rubber, thermoplastic)] [Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic)].
 2. Manufacturing Method: [Group I (solid, homogeneous)] [Group II (layered)] [Group I (solid, homogeneous) or Group II (layered)].
 3. Style: [Cove (base with toe)] [Straight (flat or toeless)] [Butt to (fit-to-floor)] <Insert special style>.
- C. Minimum Thickness: [0.125 inch] [0.080 inch] <Insert thickness>.

- D. Height: [2-1/2 inches] [4 inches] [6 inches] [As indicated on Drawings].
- E. Lengths: Coils in manufacturer's standard length.
- F. Outside Corners: Preformed.
- G. Finish: [Satin] [Matte] [Low luster] [As selected by Architect from manufacturer's full range].
- H. Colors and Patterns: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from full range of industry colors].

2.2 RESILIENT MOLDING ACCESSORY <Insert drawing designation>

- A. Resilient Molding Accessory:
 - 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
 - b. Flexco, Inc.
 - c. Johnsonite.
 - d. R.C.A. Rubber Company (The).
 - e. Roppe Corporation, USA.
 - f. VPI, LLC; Floor Products Division.
 - g. <Insert manufacturer's name>.
- B. Description: Cap for cove carpet .
- C. Material: Rubber.
- D. Profile and Dimensions: [As indicated] <Insert profile and dimensions>.
- E. Colors and Patterns: [As indicated by manufacturer's designations] [Match Architect's sample] [As selected by Architect from full range of industry colors].

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
 - a. Cove Base Adhesives: Not more than 50 g/L.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are same temperature as the space where they are to be installed.
 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

- A. Do not stretch resilient base during installation.
- B. Preformed Corners: Install preformed corners before installing straight pieces.

3.4 RESILIENT ACCESSORY INSTALLATION

- A. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of [carpet] [resilient floor covering] that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products until Substantial Completion.

END OF SECTION 096513

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes modular, [**fusion-bonded**] [**tufted**] <Insert carpet tile construction> carpet tile.
- B. Related Sections include the following:
 - 1. Division 09 Section "[Resilient Base and Accessories] [Resilient Tile Flooring]" for resilient wall base and accessories installed with carpet tile.
 - 2. Division 09 Section "Sheet Carpeting."

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance. Include installation recommendations for each type of substrate.
- B. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
 - 1. Carpet Tile: Full-size Sample.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.
- B. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104, Section 5, "Storage and Handling."

1.6 PROJECT CONDITIONS

- A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."
- B. Environmental Limitations: Do not install carpet tiles until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.7 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, [loss of tuft bind strength,] [dimensional stability,] [excess static discharge,] <Insert failure characteristic> and delamination.
 - 3. Warranty Period: [10] <Insert number> years from date of Substantial Completion.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: Full-size units equal to [5] <Insert number> percent of amount installed for

each type indicated, but not less than **10 sq. yd.**

PART 2 - PRODUCTS

2.1 CARPET TILE <Insert designation>

- A. Products: Subject to compliance with requirements, provide one of the following:
1. **<Insert manufacturer's name; product name or designation.>**
 - a. Color: **[Match Architect's samples] [As selected by Architect from manufacturer's full range] <Insert color>.**
 - b. Pattern: **[Match Architect's samples] <Insert pattern>.**
 - c. Source: **<Insert carpet tile supplier's name and contact information.>**
- B. Fiber Content: [100 percent nylon 6, 6] [100 percent nylon 6] [100 percent polypropylene] [100 percent wool] [80 percent wool; 20 percent nylon 6, 6] [80 percent wool; 20 percent nylon 6] <Insert fiber and content by percentage.>
- C. Fiber Type: <Insert proprietary fiber type.>
- D. Pile Characteristic: Level-loop pile.
- E. Yarn Twist: <Insert twist in **TPI.**>
- F. Yarn Count: <Insert yarn count.>
- G. Density: <Insert **oz./cu. yd.**>
- H. Pile Thickness: <Insert **inches**> for finished carpet tile[per ASTM D 6859].
- I. Stitches: <Insert stitches per **inch.**>
- J. Gage: <Insert gage in ends per **inch.**>
- K. Surface Pile Weight: <Insert **oz./sq. yd.**>
- L. Total Weight: <Insert **oz./sq. yd.**> for finished carpet tile.
- M. Primary Backing/Backcoating: [Manufacturer's standard composite materials] [PVC] [Fiberglass-reinforced PVC] [Fiberglass-reinforced amorphous resin] [Reinforced polyurethane composite cushion] [Reinforced polyurethane composite] [Reinforced thermoplastic copolymer] <Insert specific primary backing materials; consult manufacturers>.
- N. Secondary Backing: [Manufacturer's standard material] <Insert specific secondary backing material>.

- O. Size: [18 by 18 inches] [24 by 24 inches] [18 by 36 inches] [36 by 36 inches] <Insert dimension>.
- P. Applied Soil-Resistance Treatment: [Manufacturer's standard material] <Insert treatment>.
- Q. Antimicrobial Treatment: [Manufacturer's standard material] <Insert treatment>.
- R. Performance Characteristics: As follows:
1. Critical Radiant Flux Classification: Not less than [0.45 W/sq. cm] [0.22 W/sq. cm].
 2. Dry Breaking Strength: Not less than 100 lbf per ASTM D 2646.
 3. Tuft Bind: Not less than [3 lbf] [5 lbf] [6.2 lbf] [8 lbf] [10 lbf] <Insert tuft bind> per ASTM D 1335.
 4. Delamination: Not less than [3.5 lbf/in.] [4 lbf/in.] <Insert force> per ASTM D 3936.
 5. Dimensional Tolerance: Within 1/32 inch of specified size dimensions, as determined by physical measurement.
 6. Dimensional Stability: 0.2 percent or less per ISO 2551 (Aachen Test).
 7. Resistance to Insects: Comply with AATCC 24.
 8. Noise Reduction Coefficient (NRC): <Insert NRC> per ASTM C 423.
 9. Colorfastness to Crocking: Not less than 4, wet and dry, per AATCC 165.
 10. Colorfastness to Light: Not less than 4 after [40] [60] <Insert number> AFU (AATCC fading units) per AATCC 16, Option E.
 11. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria; not less than 1-mm halo of inhibition for gram-negative bacteria; no fungal growth; per AATCC 174.
 12. Electrostatic Propensity: Less than [3.5] [2] <Insert number> kV per AATCC 134.
 13. Environmental Requirements: Provide carpet tile that complies with testing and product requirements of Carpet and Rug Institute's "Green Label Plus" program.

2.2 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
1. VOC Limits: Provide adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
 - 2. Subfloor finishes comply with requirements specified in Division 03 Section "Cast-in-Place Concrete" for slabs receiving carpet tile.
 - 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions **1/8 inch** wide or wider and protrusions more than **1/32 inch**, unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

- A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: As recommended in writing by carpet tile manufacturer.
- C. Maintain dye lot integrity. Do not mix dye lots in same area.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut

edges as recommended by carpet tile manufacturer.

- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.
- G. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.
- B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protection of Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 QUALITY ASSURANCE

- A. MPI Standards:
 - 1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
 - 2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.4 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

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:

- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2.2 PAINT, GENERAL

- A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

- B. Colors: **[As selected by Architect from manufacturer's full range] [Match Architect's samples] [As indicated in a color schedule] <Insert requirements>**.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.
1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions.
1. Use applicators and techniques suited for paint and substrate indicated.
 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Mechanical and Electrical Work: Paint items exposed in equipment rooms and occupied spaces including, but not limited to, the following:
1. Mechanical Work:
 - a. Uninsulated metal piping.
 - b. Uninsulated plastic piping.
 - c. Pipe hangers and supports.
 - d. Tanks that do not have factory-applied final finishes.
 - e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
 - f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
 - h. **<Insert mechanical items to be painted.>**

2. Electrical Work:
 - a. Switchgear.
 - b. Panelboards.
 - c. Electrical equipment that is indicated to have a factory-primed finish for field painting.
 - d. **<Insert electrical items to be painted.>**

3.4 FIELD QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:
 1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
 2. Testing agency will perform tests for compliance with product requirements.
 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION 099123

SECTION 101400 - SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Panel signs.

1.3 DEFINITIONS

- A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details for signs.
 - 1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
 - 2. Provide message list, typestyles, graphic elements[, including tactile characters and Braille,] and layout for each sign.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for the following:
 - 1. Aluminum.
- D. Samples for Verification: For each of the following products and for the full range of color, texture, and sign material indicated, of sizes indicated:
 - 1. Aluminum: For each form, finish, and color, on **6-inch**- long sections of extrusions and squares of sheet at least **4 by 4 inches**.

2. Panel Signs: Not less than **12 inches** square[including border].
3. Accessories: Manufacturer's full-size unit.
4. <Insert Sample and size.>

- E. Sign Schedule: Use same designations indicated on Drawings.
- F. Qualification Data: For [Installer] [and] [fabricator].
- G. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: [**Fabricator of products**] [**An employer of workers trained and approved by manufacturer**] <Insert requirements>.
- B. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- C. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.
- D. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines.

1.6 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when[**existing and forecasted**] weather conditions permit installation of signs in exterior locations to be performed according to manufacturers' written instructions and warranty requirements.
- B. Field Measurements: Verify recess openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 COORDINATION

- A. Coordinate placement of anchorage devices with templates for installing signs.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Deterioration of metal finishes beyond normal weathering.
 - b. Deterioration of embedded graphic image colors.
2. Warranty Period: [Five] <Insert number> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Sheet and Plate: **ASTM B 209**, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 5005-H32.

2.2 PANEL SIGNS

- 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. ACE Sign Systems, Inc.
 2. Advance Corporation; Braille-Tac Division.
 3. Allen Industries Architectural Signage
 4. Allenite Signs; Allen Marking Products, Inc.
 5. APCO Graphics, Inc.
 6. ASI-Modulex, Inc.
 7. Best Sign Systems Inc.
 8. Bunting Graphics, Inc.
 9. Fossil Industries, Inc.
 10. Gemini Incorporated.
 11. Grimco, Inc.
 12. Innerface Sign Systems, Inc.
 13. InPro Corporation
 14. Matthews International Corporation; Bronze Division.
 15. Mills Manufacturing Company.
 16. Mohawk Sign Systems.
 17. Nelson-Harkins Industries.
 18. Seton Identification Products.
 19. Signature Signs, Incorporated.
 20. Supersine Company (The)
 21. <Insert manufacturer's name.>
- B. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus **1/16 inch** measured diagonally from

corner to corner, complying with the following requirements:

1. Aluminum Sheet: [0.050 inch] [0.080 inch] <Insert dimension> thick.
 2. Edge Condition: Square cut.
 3. Corner Condition: Square.
 4. Mounting: [Framed] [Unframed] [As indicated].
 - a. Wall mounted with concealed anchors .
 5. Color: [As indicated] [As selected by Architect from manufacturer's full range] <Insert color>.
 6. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch above surface with contrasting colors.
- C. Changeable Message Inserts: Fabricate signs to allow insertion of changeable messages in the form of [slide-in inserts] [transparent covers with paper inserts printed by Owner] [changeable panel inserts for use in fixed frames] <Insert description>.
1. Furnish insert material and software for creating text and symbols for PC-Windows computers for Owner production of paper inserts.
 2. Furnish insert material cut-to-size for changeable message insert.
- D. Panel Sign Schedule:
1. Sign Type <Insert designation>:
 - a. Sign Size: [As indicated] <Insert dimensions>.
 - b. Message Panel Material: [As indicated] <Insert material>.
 - c. Message Panel Finish/Color: <Insert finish/color.>
 - d. Character Size: [As indicated] <Insert size>.
 - e. Character Finish/Color: <Insert finish/color.>
 - f. Text/Message: [As indicated] <Insert text/message>.
 - g. Location: [As indicated] <Insert designation>.
 - h. Room: <Insert designation.>
 - i. Quantity: <Insert number.>

2.3 ACCESSORIES

- A. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.4 FABRICATION

- A. General: Provide manufacturer's standard signs of configurations indicated.

1. Preassemble signs in the shop to greatest extent possible. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in location not exposed to view after final assembly.
2. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

- A. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of **1.5 mils**, medium gloss.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Verify that items are sized and located to accommodate signs.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.
 - 1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects in appearance.
- B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.
 - 1. Mechanical Fasteners: Use nonremovable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.

3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 101400

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Public-use washroom accessories.
 - 2. Private-use bathroom accessories.
 - 3. Underlavatory guards.
 - 4. Custodial accessories.
- B. Owner-Furnished Material: **<Insert product>**.
- C. Related Sections:
 - 1. Division 08 Section "Mirrors" for frameless mirrors.
 - 2. Division 09 Section "Tiling" for ceramic toilet and bath accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include the following:
 - 1. Construction details and dimensions.
 - 2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
 - 3. Material and finish descriptions.
 - 4. Features that will be included for Project.
 - 5. Manufacturer's warranty.
- B. Samples: Full size, for each accessory item to verify design, operation, and finish requirements.
 - 1. Approved full-size Samples will be returned and may be used in the Work.
- C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.

D. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

E. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

1.5 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: [15] <Insert number> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

C. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

D. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

- E. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- F. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
- G. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - 1. A & J Washroom Accessories, Inc.
 - 2. American Specialties, Inc.
 - 3. Bobrick Washroom Equipment, Inc.
 - 4. Bradley Corporation.
 - 5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
 - 6. Tubular Specialties Manufacturing, Inc.
 - 7. <Insert manufacturer's name>.
- B. Toilet Tissue (Roll) Dispenser <Insert drawing designation>:
 - 1. Description: [Roll-in-reserve dispenser with hinged front secured with tumbler lockset] [Single-roll dispenser] [Double-roll dispenser] [Double-roll dispenser with shelf] <Insert description>.
 - 2. Mounting: [Recessed] [Partition mounted serving two adjacent toilet compartments] [Surface mounted].
 - 3. Operation: [Noncontrol delivery with standard spindle] [Noncontrol delivery with theft-resistant spindle] [Spindleless with tension-spring controlled delivery] [Spindleless with tension-spring controlled delivery and self-locking device extending through core that prevents core removal until roll is empty] [Eccentric-shaped, molded-plastic spindle revolves one-half revolution per dispensing operation for controlled delivery; core cannot be removed until roll is empty] <Insert description>.
 - 4. Capacity: Designed for [4-1/2- or 5-inch-] [5-inch-] <Insert dimension> diameter tissue rolls.
 - 5. Material and Finish: [Stainless steel, No. 4 finish (satin)] [Chrome-plated zinc alloy (zamac) or steel] [Satin-finish aluminum bracket with plastic spindle] [ABS plastic, gray] <Insert material and finish>.
- C. Paper Towel (Folded) Dispenser <Insert drawing designation>:
 - 1. Mounting: [Recessed] [Semirecessed] [Deck mounted, recessed] [Surface mounted].
 - 2. Minimum Capacity: [400 C-fold or 525 multifold towels] [600 C-fold or 800 multifold towels] [400 single-fold towels] <Insert capacity>.
 - 3. Material and Finish: [Stainless steel, No. 4 finish (satin)] [ABS plastic, gray] <Insert material and finish>.

4. Lockset: Tumbler type.
5. Refill Indicators: Pierced slots at sides or front.

D. Waste Receptacle <Insert drawing designation>:

1. Mounting: [Open top, recessed] [Self-closing disposal-opening cover, recessed] [Semirecessed] [Surface mounted] [Wall mounted for corner installation] [Freestanding] [Undercounter] <Insert description>.
2. Minimum Capacity: <Insert gal.>.
3. Material and Finish: [Stainless steel, No. 4 finish (satin)] <Insert material and finish>.
4. Liner: [Reusable vinyl liner] <Insert liner description>.
5. Lockset: Tumbler type for waste-receptacle.

E. Combination Towel (Roll) Dispenser/Waste Receptacle <Insert drawing designation>:

1. Description: Combination unit for dispensing preset length of roll paper towels, with removable waste receptacle.
2. Mounting: Recessed.
3. Minimum Towel-Dispenser Capacity: [~~8-inch-~~ wide, ~~800-foot-~~ long roll] <Insert capacity>.
4. Minimum Waste Receptacle Capacity: [~~8 gal.~~] [~~12 gal.~~] [~~15 gal.~~] <Insert value>.
5. Material and Finish: [Stainless steel, No. 4 finish (satin)] <Insert material and finish>.
6. Liner: [Reusable, vinyl waste-receptacle liner] <Insert liner description>.
7. Lockset: Tumbler type for towel dispenser compartment[and waste receptacle].

F. Liquid-Soap Dispenser <Insert drawing designation>:

1. Description: Designed for dispensing soap in [liquid or lotion] [lather] form.
2. Mounting: [Deck mounted on vanity] [Deck mounted on lavatory] [Horizontally oriented, recessed] [Horizontally oriented, surface mounted] [Vertically oriented, surface mounted].
3. Capacity: <Insert oz.>.
4. Materials: <Insert requirements for valve and reservoir materials and finishes>.
5. Lockset: Tumbler type.
6. Refill Indicator: Window type.

G. Grab Bar <Insert drawing designation>:

1. Mounting: Flanges with [concealed] [exposed] fasteners.
2. Material: Stainless steel, **0.05 inch** thick.
 - a. Finish: Smooth, No. 4 finish (satin)[on ends and slip-resistant texture in grip area].
3. Outside Diameter: [**1-1/4 inches**] [**1-1/2 inches**].
4. Configuration and Length: [As indicated on Drawings] [Straight, **36 inches** long] <Insert configuration and length>.

H. Mirror Unit <Insert drawing designation>:

1. Frame: [Stainless-steel angle, 0.05 inch thick] [Stainless-steel channel] [Stainless steel, fixed tilt] [Stainless steel, adjustable tilt].
 - a. Corners: [Manufacturer's standard] [Mitered and mechanically interlocked] [Welded and ground smooth].
2. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
 - a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
3. Size: [As indicated on Drawings] <Insert dimensions>.

2.3 PUBLIC-USE SHOWER ROOM ACCESSORIES

A. Shower Curtain <Insert drawing designation>:

1. Size: Minimum [6 inches] [12 inches] wider than opening by 72 inches high.
2. Material: [Vinyl, minimum 0.006 inch thick, opaque, matte] [Duck, minimum 8 oz., white, 100 percent cotton] [Nylon-reinforced vinyl, minimum 10 oz. or 0.008-inch-thick vinyl, with integral antibacterial agent] <Insert material>.
3. Color: [White] [Green] [As selected from manufacturer's full range] <Insert color>.
4. Grommets: Corrosion resistant at minimum 6 inches o.c. through top hem.

B. Soap Dish <Insert drawing designation>:

1. Description: [With] [Without] washcloth bar.
2. Mounting: [Recessed] [Surface mounted].
3. Material and Finish: [Stainless steel, No. 4 finish (satin)] <Insert material and finish>.

2.4 PRIVATE-USE BATHROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

1. Basco, Inc.
2. Bobrick Washroom Equipment, Inc.
3. Franklin Brass by Liberty Hardware Manufacturing Corporation; a Masco company.
4. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
5. Ginger; a Masco company.
6. Seachrome Corporation.

7. Tubular Specialties Manufacturing, Inc.
8. <Insert manufacturer's name>.

B. Toilet Tissue Dispenser <Insert drawing designation>:

1. Description: [Single-roll dispenser] [Double-roll dispenser] [Single-roll dispenser with hood] [Double-roll dispenser with hood] <Insert description>.
2. Mounting: [Recessed] [Surface mounted].
3. Capacity: Designed for 4-1/2- or 5-inch- diameter tissue rolls.
4. Material and Finish: [Solid brass, polished] [Polished brass-plated zinc alloy (zamac)] [Polished chrome-plated brass] [Polished chrome-plated zinc alloy (zamac)] [Stainless steel, No. 4 finish (satin)] [Stainless steel, No. 7 finish (polished)] <Insert material and finish>.

C. Shower Curtain Rod <Insert drawing designation>:

1. Outside Diameter: [1 inch] [1-1/4 inches].
2. Mounting: Flanges with [exposed] [concealed] fasteners.
3. Rod Material and Finish: [Solid brass, polished] [Polished chrome-plated brass] [Stainless steel, No. 4 finish (satin)] [Stainless steel, No. 7 finish (polished)] <Insert material and finish>.
4. Flange Material and Finish: [Polished brass-plated zinc alloy (zamac)] [Polished chrome-plated brass] [Polished chrome-plated zinc alloy (zamac)] [Stainless steel, No. 4 finish (satin)] [Stainless steel, No. 7 finish (polished)] <Insert material and finish>.
5. Accessories: Integral chrome-plated brass glide hooks.

D. Soap Dish <Insert drawing designation>:

1. Description: <Insert description>.
2. Mounting: [Recessed] [Surface mounted].
3. Material and Finish: [Solid brass, polished] [Polished brass-plated zinc alloy (zamac)] [Polished chrome-plated brass] [Polished chrome-plated zinc alloy (zamac)] [Stainless steel, No. 4 finish (satin)] [Stainless steel, No. 7 finish (polished)] <Insert material and finish>.

E. Medicine Cabinet <Insert drawing designation>:

1. Mounting: [Recessed, for nominal 4-inch wall depth] [Surface mounted].
2. Size: [12 x 18 by 24 inches] <Insert dimensions>.
3. Door: [Framed mirror door concealing storage cabinet equipped with continuous hinge and spring-buffered, rod-type stop and magnetic door catch] <Insert description>.
4. Shelves: [Three, adjustable] <Insert requirements>.
5. Material and Finish:
 - a. Cabinet: .
 - b. Mirror Frame: <Insert material and finish>.
 - c. Door: <Insert material and finish>.
 - d. Hinge: <Insert material and finish>.

e. Shelves: <Insert material and finish>.

F. Robe Hook <Insert drawing designation>:

1. Description: [Double] [Single]-prong unit.
2. Material and Finish: [Solid brass, polished] [Polished brass-plated zinc alloy (zamac)] [Polished chrome-plated brass] [Polished chrome-plated zinc alloy (zamac)] [Stainless steel, No. 4 finish (satin)] [Stainless steel, No. 7 finish (polished)] <Insert material and finish>.

G. Towel Bar <Insert drawing designation>:

1. Description: [~~3/4-inch~~- square tube with rectangular end brackets] [~~3/4-inch~~- round tube with circular end brackets] <Insert description>.
2. Mounting: Flanges with [concealed] [exposed] fasteners.
3. Material and Finish: [Stainless steel, No. 4 finish (satin)] [Stainless steel, No. 7 finish (polished)] [Polished aluminum] <Insert material and finish>.

2.5 UNDERLAVATORY GUARDS

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

1. Plumberex Specialty Products, Inc.
2. Truebro by IPS Corporation.
3. <Insert manufacturer's name>.

B. Underlavatory Guard <Insert drawing designation>:

1. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded plastic, white.

2.6 CUSTODIAL ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.

6. Tubular Specialties Manufacturing, Inc.
7. <Insert manufacturer's name>.

B. Utility Shelf <Insert drawing designation>:

1. Description: With exposed edges turned down not less than **1/2 inch** and supported by two triangular brackets welded to shelf underside.
2. Size: [**16 inches** long by **6 inches** deep] <Insert dimensions>.
3. Material and Finish: Not less than nominal **0.05-inch-** thick stainless steel, No. 4 finish (satin).

C. Mop and Broom Holder <Insert drawing designation>:

1. Description: [Unit with shelf, hooks, holders, and rod suspended beneath shelf] <Insert description>.
2. Length: [**36 inches**] <Insert dimension>.
3. Hooks: [Three] <Insert number>.
4. Mop/Broom Holders: [Four] <Insert number>, spring-loaded, rubber hat, cam type.
5. Material and Finish: Stainless steel, No. 4 finish (satin).
 - a. Shelf: Not less than nominal **0.05-inch-** thick stainless steel.

2.7 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of [**six**] <Insert number> keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.

- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 102800

SECTION 104413 - FIRE EXTINGUISHER CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Fire protection cabinets for the following:
 - a. Portable fire extinguishers.

- B. Related Sections:

- 1. Division 09 painting Sections for field painting fire protection cabinets.
- 2. Division 10 Section "Fire Extinguishers."
- 3. Division 26 Sections for low-voltage wiring for fire protection cabinet alarms.

1.3 UNIT PRICES

- A. Work of this Section is affected by <Insert name of unit price>.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.

- 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
- 2. Show location of knockouts for hose valves.

- B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

- C. Product Schedule: For fire protection cabinets. Coordinate final fire protection cabinet

schedule with fire extinguisher schedule to ensure proper fit and function.[**Use same designations indicated on Drawings.**]

- D. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 COORDINATION

- A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate size of fire protection cabinets to ensure that type and capacity of fire hoses, hose valves, and hose racks indicated are accommodated.
- C. Coordinate sizes and locations of fire protection cabinets with wall depths.

1.7 SEQUENCING

- A. Apply [**decals**] [**vinyl lettering**] on field-painted, fire protection cabinets after painting is complete.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Stainless-Steel Sheet: ASTM A 666, Type 304.
- B. Copper-Alloy Brass Sheet: ASTM B 36/B 36M, alloy UNS No. C26000 (cartridge brass, 70 percent copper).
- C. Copper-Alloy Bronze Sheet: ASTM B 36/B 36M, alloy UNS No. C28000 (muntz metal, 60 percent copper).
- D. Clear Float Glass: ASTM C 1036, Type I, Class 1, Quality q3, [**3**] [**6**] mm thick.
- E. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick,

[**Class 1 (clear)**] [**Class 2 (tinted, heat absorbing, and light reducing), bronze tint**].

- F. Break Glass: Clear annealed float glass, ASTM C 1036, Type I, Class 1, Quality q3, 1.5 mm thick, single strength.
- G. Tempered Break Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 1.5 mm thick.
- H. Wire Glass: ASTM C 1036, Type II, Class 1, Form 1, Quality q8, Mesh m1 (diamond), 6 mm thick.
- I. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), [**1.5**] [**3**] [**6**] mm thick, with [**Finish 1 (smooth or polished)**] [**Finish 2 (patterned, textured)**].
 - 1. <Insert pattern, texture>.
- J. Acrylic Bubble: One piece.

2.2 FIRE PROTECTION CABINET <Insert drawing designation>

- A. Cabinet Type: Suitable for fire extinguisher .
- B. Cabinet Construction: 2-hour fire rated.
 - 1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from **0.0428-inch-** thick, cold-rolled steel sheet lined with minimum **5/8-inch-** thick, fire-barrier material. Provide factory-drilled mounting holes.
- C. Cabinet Material: Stainless-steel sheet.
 - 1. Shelf: Same metal and finish as cabinet.
- D. Semirecessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semirecessed cabinet installation.
 - 1. Square-Edge Trim: **1-1/4- to 1-1/2-inch** backbend depth.
- E. Cabinet Trim Material: Stainless-steel sheet .
- F. Door Material: Stainless-steel sheet .
- G. Door Style: [**Fully glazed, frameless, backless, acrylic panel**] [**Fully glazed panel with frame**] [**Full bubble, frameless**] [**Full bubble with frame**] [**Full bubble with frameless, rotating turntable**] [**Horizontal duo panel with frame**] [**Vertical duo panel with frame**]

[Center glass panel with frame] [Solid opaque panel with frame] [Flush opaque panel, frameless, with no exposed hinges].

H. Door Glazing: [Clear float glass] [Tempered float glass (clear)] [Tempered float glass (bronze tint)] [Break glass] [Tempered break glass] [Wire glass] [Mirror glass] [Acrylic sheet] [Break acrylic bubble] [Molded acrylic bubble].

1. Acrylic Sheet Color: [Clear] [Bronze] transparent acrylic sheet.
2. Acrylic Sheet Color: Clear transparent acrylic sheet painted [white] [red] [black] on unexposed side.
3. Acrylic Bubble Color: [Clear] [Bronze] [Red], transparent.

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide [projecting lever handle with cam-action latch] [projecting door pull and friction latch] [recessed door pull and friction latch] [manufacturer's standard].
2. Provide [continuous hinge, of same material and finish as trim,] [concealed hinge] [pivot hinge] [manufacturer's standard hinge] permitting door to open 180 degrees.

J. Accessories:

1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
2. Break-Glass Strike: Manufacturer's standard metal strike, complete with chain and mounting clip, secured to cabinet.
3. Lettered Door Handle: One-piece, cast-iron door handle with the word "FIRE" embossed into face.
4. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate [as indicated] [as directed by Architect] <Insert location>.

a. Identify fire extinguisher in fire protection cabinet with the words "[FIRE EXTINGUISHER] <Insert identification>."

- 1) Location: Applied to [cabinet door] [cabinet glazing] [location indicated on Drawings].
- 2) Application Process: [Silk-screened] [Engraved] [Etched] [Decals] [Pressure-sensitive vinyl letters].
- 3) Lettering Color: [Red] [Black] [White].
- 4) Orientation: [Vertical] [Horizontal] [As indicated on Drawings].

K. Finishes:

1. Manufacturer's standard baked-enamel paint for the following:
 - a. Exterior of cabinet [door] [trim] [, door, and trim] except for those surfaces

- indicated to receive another finish.
b. Interior of cabinet[**and door**].

2. Stainless Steel: [No. 2B] [No. 4] [No. 6] [No. 7] [No. 8].

2.3 FABRICATION

- A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
1. Weld joints and grind smooth.
 2. Provide factory-drilled mounting holes.
 3. Prepare doors and frames to receive locks.
 4. Install door locks at factory.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum **1/2 inch** thick.
 2. Miter and weld perimeter door frames.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.4 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 STEEL FINISHES

- A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with [SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning"] [or] [SSPC-SP 8, "Pickling"] <Insert surface preparation method>.[After cleaning, apply a conversion coating suited to the organic coating to be applied over it.]

2.6 STAINLESS-STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
 - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - 3. Directional Satin Finish: No. 4.
 - 4. Reflective, Directional Polish: No. 7.
 - 5. Mirrorlike Reflective, Nondirectional Polish: No. 8.
- C. Bright, Cold-Rolled, Unpolished Finish: No. 2B.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for hose [valves] [racks] and cabinets to verify actual locations of piping connections before cabinet installation.
- B. Examine walls and partitions for suitable framing depth and blocking where semirecessed recessed and semirecessed cabinets will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for semirecessed fire protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

- A. General: Install fire protection cabinets in locations and at mounting heights indicated[**or, if not indicated, at heights indicated below:**] [**or, if not indicated, at heights acceptable to authorities having jurisdiction.**]
 - 1. Fire Protection Cabinets: [54 inches] <Insert dimension> above finished floor to top of cabinet.
- B. Fire Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semirecessed fire protection cabinets.
2. Provide inside latch and lock for break-glass panels.
3. Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.
4. Fire-Rated, [**Hose and Valve**] [**Hose-Valve**] Cabinets:
 - a. Install cabinet with not more than **1/16-inch** tolerance between pipe OD and knockout OD. Center pipe within knockout.
 - b. Seal through penetrations with firestopping sealant as specified in Division 07 Section "Penetration Firestopping."

C. Identification: Apply [**decals**] [**vinyl lettering**] at locations indicated.

3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.
- E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
- B. Owner-Furnished Material: fire extinguishers.
- C. Related Sections:
 - 1. Division 10 Section "Fire Extinguisher Cabinets."

1.3 UNIT PRICES

- A. Work of this Section is affected by <Insert name of unit price>.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
- B. Product Schedule: For fire extinguishers. Coordinate final fire extinguisher schedule with fire protection cabinet schedule to ensure proper fit and function. [**Use same designations indicated on Drawings.**]
- C. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
 - 1. Provide fire extinguishers approved, listed, and labeled by FMG.

1.6 COORDINATION

- A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: **[Six]** <Insert number> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each mounting bracket indicated.
 - 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
 - 3. Valves: **[Manufacturer's standard] [Nickel-plated, polished brass body]**.
 - 4. Handles and Levers: **[Manufacturer's standard] [Stainless steel]**.
 - 5. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B[**and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging**].

2.2 MOUNTING BRACKETS <Insert drawing designation>

- A. Mounting Brackets: Manufacturer's standard[**galvanized**] steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or [**red**] [**black**] baked-enamel finish.
 - 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
 - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: [**Vertical**] [**Horizontal**].

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
 - 1. Mounting Brackets: [**54 inches**] <Insert dimension> above finished floor to top of fire extinguisher.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 105500 - POSTAL SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Horizontal apartment mailboxes.
- B. Related Sections include the following:
 - 1. Division 08 Section "Door Hardware" for lock cylinders, keyed to building keying system, for postal specialties.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of postal specialty.
- B. Shop Drawings: For each type of postal specialty. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Include identification sequence for compartments.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of postal specialty manufacturer for installation of units required for this Project.
- B. Source Limitations: Obtain mail chutes and receiving boxes through one source from a single manufacturer to ensure that mail will flow without restriction from chute into box.
- C. Product Options: Drawings indicate size, profiles, and dimensional requirements of postal specialties and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver combination-lock combinations to Owner by registered mail or overnight package service with a record of each corresponding lock and combination.

1.6 COORDINATION

- A. Coordinate layout and installation of postal specialties with wall construction.
- B. Templates: Obtain and distribute to parties involved templates for installing postal specialties.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of postal specialties that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: [Five] <Insert number> years from date of Substantial Completion.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Key Blanks: Furnish not less than [50] <Insert number> for every <Insert number> locks or fraction thereof, of each type of compartment door lock installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

- specified.
3. 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.
 4. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 MATERIALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, and as follows:
 1. Sheet and Plate: **ASTM B 209**.
 2. Extruded Shapes: **ASTM B 221**.
- B. Die-Cast Brass: ASTM B 176, copper alloy UNS No. C85800.
- C. Steel Anchor Bolts, Nuts, and Washers: ASTM F 1554, Grade 36 or 55, hot-dip galvanized.
- D. Stainless-Steel Anchor Bolts, Nuts, and Washers: ASTM A 193/A 193M, Grade B8M, Type 316.
- E. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.3 HORIZONTAL APARTMENT MAILBOXES

- A. USPS-Approved, Front-Loading, Horizontal Apartment Mailboxes <Insert drawing designation>: Consisting of multiple compartments with fixed, solid compartment backs, enclosed within recessed wall box. Provide access to compartments for distributing incoming mail from front of unit by unlocking master lock and swinging side-hinged master door to provide accessibility to entire group of compartments. Provide access to each compartment for removing mail by swinging compartment door. Comply with USPS STD-4B.
 1. Manufacturers: Manufacturers listed on USPS's "Approved Sources List."
 2. Compartments: [Number and size of compartments as follows:] [As indicated on Drawings, of the following sizes:] [As indicated on Drawings.]
 - a. Type A: Inside dimensions not less than **5 inches high by 6 inches wide by 15.5 inches** deep.[Provide <Insert number> compartments.]

2.4 FABRICATION

- A. Preassemble postal specialties in shop to greatest extent possible to minimize field assembly. Form postal specialties to required shapes and sizes, with true lines and angles, square, rigid,

and without warp, with metal faces flat and free of dents or distortion. Make exposed metal edges and corners free of sharp edges and burrs, and safe to touch.

- B. Mill joints to a tight, hairline fit. Cope or miter corner joints. Form joints exposed to weather to exclude water penetration.
- C. Drill or punch holes required for fasteners and remove burrs. Use security fasteners where fasteners are exposed. If used, seal external rivets before finishing.
- D. Comply with AWS for recommended practices in shop welding. Provide welds behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded joints of flux, and dress exposed and contact surfaces.
- E. Fabricate doors of postal specialties to preclude binding, warping, or misalignment.
- F. Fabricate rack ladders to support five to form a column of units.
- G. Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturers of dissimilar metals.

2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish postal specialties after assembly.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

- A. Baked-Enamel Finish: Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 - 1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system with a minimum dry film thickness of **1.5 mils**, medium gloss.

2.7 COPPER-ALLOY FINISHES

- A. Finish designations prefixed by CDA comply with the system established by the Copper

Development Association for designating copper-alloy finish systems.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions[, **with Installer present,**] for compliance with requirements for installation tolerances, roughing-in openings, clearances, and other conditions affecting performance of work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install postal specialties level and plumb, according to manufacturer's written instructions and roughing-in drawings.
 - 1. Metal Protection: Where aluminum and copper alloys will contact grout, concrete, masonry, wood, or dissimilar metals, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturers of dissimilar metals.
 - 2. Final acceptance depends on compliance with USPS requirements.

3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as postal specialties are installed, unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of postal specialty installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace postal specialties that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by postal specialty manufacturer.
- E. Replace postal specialties that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain postal specialties. Refer to Division 01 Section "[**Closeout Procedures**] [**Demonstration and Training**]."

END OF SECTION 105500

SECTION 113100 - RESIDENTIAL APPLIANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Cooking appliances; gas or electric as required by project location.
 - 2. Kitchen exhaust ventilation.
 - 3. Refrigeration appliances.
 - 4. Cleaning appliances; gas or electric as required by project location.
- B. Related Sections:
 - 1. Division 22 Section "Plumbing Fixtures" for waste disposers.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, dimensions, furnished accessories, and finishes for each appliance.
- B. Warranties: Sample of special warranties.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Maintains, within 50 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.
- B. Installer Qualifications: An employer of workers trained and approved by manufacturer for installation and maintenance of units required for this Project.
- C. Source Limitations: Obtain [**residential appliances from single source**] [**and**] [**each type of residential appliance from single manufacturer**].
- D. Regulatory Requirements: Comply with the following:
 - 1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, by a

qualified testing agency, and marked for intended location and application.

1.5 WARRANTY

- A. Special Warranties: Manufacturer's standard form in which manufacturer agrees to repair or replace residential appliances or components that fail in materials or workmanship within specified warranty period[.][**except as qualified below:**]
1. Warranty Period: [Two] [Five] <Insert number> years from date of Substantial Completion.
- B. Electric Range: [Full warranty including parts and labor] [Limited warranty including parts and labor for first year and parts thereafter] <Insert description> for on-site service on surface-burner elements.
1. Warranty Period: [Two] [Five] <Insert number> years from date of Substantial Completion.
- C. Microwave Oven: [Full warranty including parts and labor] [Limited warranty including parts and labor for first year and parts thereafter] for on-site service [on the magnetron tube] <Insert requirement>.
1. Warranty Period: [Two] [Five] <Insert number> years from date of Substantial Completion.
- D. Refrigerator/Freezer , Sealed System: [Full warranty including parts and labor] [Limited warranty including parts and labor for first year and parts thereafter] for on-site service on the product.
1. Warranty Period for [Sealed Refrigeration System] <Insert item>: [Two] [Five] <Insert number> years from date of Substantial Completion.
 2. Warranty Period [for Other Components] <Insert requirement>: [Two] <Insert number> years from date of Substantial Completion.
- E. Dishwasher: [Full warranty including parts and labor] [Limited warranty including parts and labor for first year and parts thereafter] for on-site service on the product.
1. Warranty Period for [Deterioration of Tub and Metal Door Liner] <Insert requirement>: [Three] [Five] [10] <Insert number> years from date of Substantial Completion.
 2. Warranty Period [for Other Components] <Insert requirement>: [Two] <Insert number> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 RANGES

- A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. Amana; a division of Whirlpool Corporation.
 2. BOSCH Home Appliances.
 3. BSH Home Appliances Corporation (Thermador).
 4. Dacor, Inc.
 5. Dynamic Cooking Systems, Inc.; a subsidiary of Fisher & Paykel Appliances Holdings Limited.
 6. Electrolux Home Products (Frigidaire).
 7. Fisher & Paykel.
 8. General Electric Company (GE).
 9. General Electric Company (Hotpoint).
 10. Jade Home Products Company.
 11. Jenn-Air; a division of Whirlpool Corporation.
 12. KitchenAid; a division of Whirlpool Corporation.
 13. LG Appliances.
 14. Maytag; a division of Whirlpool Corporation.
 15. Samsung.
 16. Sears Brands LLC (Kenmore).
 17. Sharp Electronics Corp.
 18. Viking Range Corporation.
 19. Whirlpool Corporation.
 20. Wolf Appliance, Inc.
 21. <Insert manufacturer's name>.
- B. Electric Range [RG #] <Insert drawing designation>: [Freestanding] [Slide-in] [Drop-in] range with [one] [two] oven(s) and complying with AHAM ER-1.
1. Width: [30 inches] [36 inches] <Insert dimension>.
 2. Electric Burner Elements: [Four] [Six] <Insert number>.
 - a. Coil Type: [Manufacturer's standard] [Two 1200 W and two 2200 W] [One 1200 W, one 2200-W dual element, and two 2200 W] <Insert burner combination and power ratings>.
 - b. Radiant Type: [Two 1500 W and two 2000 W] [One 1200-W element, dual 1500-W/1500-W bridge element, and one 1200-W/2500-W expandable element] <Insert burner combination and power ratings>.
 - c. Induction Type: [Manufacturer's standard] [Two 1200 W and two 1800 W] [One 1200 W, one 1800 W, one 2700 W, and one 3300 W] <Insert burner combination and power ratings>.
 - d. Controls: Digital panel controls, located on [front] [left side] [right side] [splash panel at rear of rangetop].
 - e. <Insert feature>.

3. Oven Features:
 - a. Capacity: [3.3 cu. ft.] [and] <Insert capacity for each oven>.
 - b. Operation: [Baking] [convection] [and] [self-cleaning] <Insert requirement>.
 - c. Broiler: Located in [top of oven] [separate roll-out drawer on bottom].
 - d. Oven Door(s): Counterbalanced, removable, with [observation window] [and] [full-width] <Insert type of handle> handle.
 - e. Electric Power Rating:
 - 1) Oven(s): [Manufacturer's standard] [2400 W] [and] <Insert power rating for each oven>.
 - 2) Broiler: [Manufacturer's standard] [3500 W] <Insert power rating>.
 - f. Controls: Digital panel controls and timer display, located on [front] [left side] [right side] [splash panel at rear of rangetop].
 - g. <Insert feature>.
 4. Material: [Porcelain-enameled] [Stainless] steel with [manufacturer's standard] [ceramic-glass] <Insert material> cooktop.
 - a. Color/Finish: [White] [Black] <Insert color or finish>.
- C. Gas Range [RG #] <Insert drawing designation>: [Freestanding] [Slide-in] range with [one] [two] oven(s).
1. Width: [30 inches] [36 inches] <Insert dimension>.
 2. Gas Burners: [Four] [Six] <Insert number>.
 - a. Power Ratings: [Manufacturer's standard] [One 5000 Btu/h, two 9100 Btu/h, and one 12,000 Btu/h] <Insert burner combination and power ratings>.
 - b. Controls: [Digital panel] [Manual-dial] controls, located on [front] [left side] [right side] [splash panel at rear of rangetop].
 - c. Grates: [Individual] [Continuous] <Insert description>.
 - d. Other Feature(s): [Sealed burners] [auto-re-igniting burners] [and] [grill] <Insert feature>.
 3. Oven Features:
 - a. Capacity: [3.3 cu. ft.] [and] <Insert capacity for each oven>.
 - b. Operation: [Baking] [convection] [and] [self-cleaning] <Insert requirement>.
 - c. Broiler: Located in [top of oven] [separate roll-out drawer on bottom].
 - d. Oven Door(s): Counterbalanced, removable, with [observation window] [and] [full-width] <Insert type of handle> handle.
 - e. Gas Power Ratings:
 - 1) Oven(s): [Manufacturer's standard] [9100 Btu/h] [and] <Insert power rating for each oven>.

- 2) Broiler: [Manufacturer's standard] [14,500 Btu/h] <Insert power rating>.
- f. Controls: [Digital panel] [Manual-dial] controls and timer display, located on [front] [left side] [right side] [splash panel at rear of rangetop].
- g. <Insert feature>.
4. Anti-Tip Device: Manufacturer's standard.
5. Electric Power Supply: [120 V, 60 Hz, 1 phase, 15 A] [As indicated on Drawings] <Insert requirement>.
6. Material: [Porcelain-enameled] [Stainless] steel with [manufacturer's standard] [ceramic-glass] <Insert material> cooktop.
 - a. Color/Finish: [White] [Black] <Insert color or finish>.

2.2 MICROWAVE OVENS

- A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

1. Amana; a division of Whirlpool Corporation.
2. BOSCH Home Appliances.
3. BSH Home Appliances Corporation (Gaggenau).
4. BSH Home Appliances Corporation (Thermador).
5. Dacor, Inc.
6. Dynamic Cooking Systems, Inc.; a subsidiary of Fisher & Paykel Appliances Holdings Limited.
7. Electrolux Home Products (Frigidaire).
8. General Electric Company (GE).
9. General Electric Company (Hotpoint).
10. Jenn-Air; a division of Whirlpool Corporation.
11. KitchenAid; a division of Whirlpool Corporation.
12. LG Appliances.
13. Maytag; a division of Whirlpool Corporation.
14. Samsung.
15. Sears Brands LLC (Kenmore).
16. Sharp Electronics Corp.
17. Viking Range Corporation.
18. Whirlpool Corporation.
19. Wolf Appliance, Inc.
20. <Insert manufacturer's name>.

- B. Microwave Oven [MO #] <Insert drawing designation>:

1. Mounting: Wall cabinet.
2. Type: [Conventional] [Convection] <Insert type>.
3. Dimensions:

- a. Width: [24 inches] [30 inches] [As indicated on Drawings] <Insert dimension>.
- b. Depth: [19-1/2 inches] [As indicated on Drawings] <Insert dimension>.
- c. Height: [14 inches] [18 inches] [As indicated on Drawings] <Insert dimension>.
4. Capacity: [Oven Door: Door with observation window [and pull handle] [and push-button latch release] <Insert requirement>.
5. Exhaust Fan: [Variable] [Two] [Four]-speed fan, [vented to outside] [nonvented, recirculating type with charcoal filter] and with [manufacturer's standard] [300-cfm] <Insert value> capacity.
6. Microwave Power Rating: [Manufacturer's standard] [1000 W] <Insert power rating>.
 - a. Convection Element Power Rating: [Manufacturer's standard] [1450 W] <Insert power rating>.
7. Electric Power Supply: [120 V, 60 Hz, 1 phase, 15 A] [As indicated on Drawings] <Insert requirement>.
8. Controls: Digital panel controls and timer display.
9. Other Features: [Turntable] [temperature probe] [and] [lock-out feature] <Insert feature>.
10. Material: [Porcelain-enameled steel] [Stainless steel] [Manufacturer's standard] <Insert material>.
 - a. Color/Finish: [White] [Black] <Insert color or finish>.

2.3 KITCHEN EXHAUST VENTILATION

- A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

1. BOSCH Home Appliances.
2. BSH Home Appliances Corporation (Thermador).
3. Dacor, Inc.
4. Dynamic Cooking Systems, Inc.; a subsidiary of Fisher & Paykel Appliances Holdings Limited.
5. Electrolux Home Products (Frigidaire).
6. Fisher & Paykel.
7. General Electric Company (GE).
8. General Electric Company (Hotpoint).
9. KitchenAid; a division of Whirlpool Corporation.
10. Maytag; a division of Whirlpool Corporation.
11. Miele, Inc.
12. Sears Brands LLC (Kenmore).
13. Sharp Electronics Corp.
14. Viking Range Corporation.
15. Whirlpool Corporation.
16. Wolf Appliance, Inc.
17. <Insert manufacturer's name>.

- B. Overhead Exhaust Hood [EX #] <Insert drawing designation>:
1. Type: [Wall-mounted,] [Suspended-island-canopy,] <Insert requirement> exhaust-hood system.
 2. Dimensions:
 - a. Width: [30 inches] [36 inches] [48 inches] [As indicated on Drawings] <Insert dimension>.
 - b. Depth: [30 inches] [36 inches] [48 inches] [As indicated on Drawings] <Insert dimension>.
 3. Exhaust Fan: [Variable] [Two] [Three]-speed fan [built into hood] [remotely located, with separate housing] and with [manufacturer's standard] [500-cfm] [900-cfm] <Insert value> capacity.
 - a. Venting: [Vented to outside through roof with weatherproof roof cap, backdraft damper, and rodent-proof screening] [Vented to outside through wall with weatherproof wall cap, backdraft damper, and rodent-proof screening] [Nonvented, recirculating type with charcoal filter] [As indicated on Drawings] <Insert requirement>.
 - b. Fan Control: [Hood] [Wall]-mounted[touch-pad to control] fan switch, with separate hood-light control switch.
 4. Duct Type: [Manufacturer's standard] [7-inch- diameter round] [3-1/4 by 10 inches rectangular] [As indicated on Drawings] <Insert requirement>.
 5. Finish: [Baked enamel] [Stainless steel] <Insert finish>.
 - a. Color: [White] <Insert color>.
 6. Features:
 - a. Permanent, washable [aluminum mesh] [stainless-steel mesh] [baffle-type] filter(s).
 - b. Built-in [halogen] [incandescent] [fluorescent] lighting.
 - c. <Insert feature>.

2.4 REFRIGERATOR/FREEZERS

- A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. Amana; a division of Whirlpool Corporation.
 2. BOSCH Home Appliances.
 3. BSH Home Appliances Corporation (Thermador).
 4. Dacor, Inc.
 5. Electrolux Home Products (Frigidaire).

6. Fisher & Paykel.
 7. General Electric Company (GE).
 8. General Electric Company (Hotpoint).
 9. Jenn-Air; a division of Whirlpool Corporation.
 10. KitchenAid; a division of Whirlpool Corporation.
 11. LG Appliances.
 12. Maytag; a division of Whirlpool Corporation.
 13. Samsung.
 14. Sears Brands LLC (Kenmore).
 15. Sub-Zero, Inc.
 16. Viking Range Corporation.
 17. Whirlpool Corporation.
 18. <Insert manufacturer's name>.
- B. Refrigerator/Freezer [RF #] <Insert drawing designation>: [One-door refrigerator with inside freezer compartment] [Two-door, side-by-side refrigerator/freezer] [Two-door refrigerator/freezer with freezer on top] [Two-door refrigerator/freezer with freezer on bottom] <Insert description> and complying with AHAM HRF-1.
1. Type: [Freestanding] [Built in] [Undercounter].
 2. Dimensions:
 - a. Width: [16 inches] [24 inches] [27 inches] [30 inches] [36 inches] [42 inches] [48 inches] [As indicated on Drawings] <Insert dimension>.
 - b. Depth: [24 inches] [27 inches] [33-1/4 inches] [As indicated on Drawings] <Insert dimension>.
 - c. Height: [34-1/2 inches] [70 inches] [73 inches] [84 inches] [As indicated on Drawings] <Insert dimension>.
 3. Storage Capacity:
 - a. Refrigeration Compartment Volume: [15.6 cu. ft.] <Insert volume>.
 - b. Freezer Volume: [5.13 cu. ft.] <Insert volume>.
 - c. Shelf Area: [Three] <Insert number> adjustable [wire] [glass] shelves, [26 sq. ft.] <Insert area>.
 4. Refrigerator Features:
 - a. Interior light in refrigeration compartment.
 - b. Door Storage: [Glazed door without storage] [Modular compartments] [Gallon milk-container storage] <Insert requirement>.
 - c. Temperature-controlled meat/deli bin.
 - d. <Insert feature>.
 5. Freezer Features: [One] [Two] <Insert number> freezer compartment(s) [with door(s)] [configured as pull-out drawer(s)].
 - a. [Automatic] [Manual] defrost.

- b. Interior light in freezer compartment.
 - c. Automatic icemaker and storage bin.
 - d. <Insert feature>.
6. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.
7. Front Panel(s): [Manufacturer's standard] [Wood panel(s) to match kitchen cabinets] [Porcelain enamel] [Stainless steel] [Wood-panel insert(s) specified in Division 06 Section "Interior Architectural Woodwork" to match kitchen cabinets] [Wood-panel insert(s) specified in Division 12 Section "Residential Casework" to match kitchen cabinets] [Reversible panel(s) with choice of colors] <Insert description>.
- a. Panel Color: [White] [Black] <Insert color(s)>.
8. Appliance Color/Finish: [White] [Black] [Stainless steel] <Insert color or finish>.

2.5 DISHWASHERS

- A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
1. Amana; a division of Whirlpool Corporation.
 2. ASKO North America; a division of AM Appliance Group.
 3. BOSCH Home Appliances.
 4. BSH Home Appliances Corporation (Thermador).
 5. Dacor, Inc.
 6. Dynamic Cooking Systems, Inc.; a subsidiary of Fisher & Paykel Appliances Holdings Limited.
 7. Electrolux Home Products (Frigidaire).
 8. Fisher & Paykel.
 9. General Electric Company (GE).
 10. General Electric Company (Hotpoint).
 11. Jenn-Air; a division of Whirlpool Corporation.
 12. KitchenAid; a division of Whirlpool Corporation.
 13. LG Appliances.
 14. Maytag; a division of Whirlpool Corporation.
 15. Miele, Inc.
 16. Sears Brands LLC (Kenmore).
 17. Viking Range Corporation.
 18. Whirlpool Corporation.
 19. <Insert manufacturer's name>.
- B. Dishwasher [DW #] <Insert drawing designation>: Complying with AHAM DW-1 and ASSE 1006.
1. Type: [Built-in undercounter] [Built-in under sink] [Portable] <Insert type>.

2. Dimensions:
 - a. Width: [18 inches] [24 inches] [As indicated on Drawings] <Insert dimension>.
 - b. Depth: [23 inches] [25-3/4 inches] [As indicated on Drawings] <Insert dimension>.
 - c. Height: [34-1/2 inches] [As indicated on Drawings] <Insert dimension>.
3. Capacity:
 - a. Water Consumption for Full Load: [3.2 gal.] <Insert value> per cycle.
4. Sound Level: Maximum [42] [48] <Insert value> dB.
5. Tub and Door Liner: [Manufacturer's standard] [Porcelain-enameled steel] [Stainless steel] [Porcelain-enameled steel tub and molded-plastic door liner] <Insert requirement> with sealed detergent and automatic rinsing-aid dispensers.
6. Rack System: [Nylon] [PVC]-coated sliding dish racks, with [removable cutlery basket] [top cutlery tray] <Insert feature>.
7. Controls: [Touch-pad] [Rotary-dial] <Insert description> controls with [four] <Insert number> wash cycles and hot-air and heat-off drying cycle options.
8. Features:
 - a. Waste food disposer.
 - b. Self-cleaning food-filter system.
 - c. Hot-water booster heater for [140 deg F] [160 deg F] wash water with incoming water at 100 deg F.
 - d. Half-load option.
 - e. Delay-wash option.
 - f. Digital display panel.
 - g. <Insert feature>.
9. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.
10. Front Panel: [Manufacturer's standard] [Wood panel to match kitchen cabinets] [Porcelain enamel] [Stainless steel] [Wood-panel insert specified in Division 06 Section "Interior Architectural Woodwork" to match kitchen cabinets] [Wood-panel insert specified in Division 12 Section "Residential Casework" to match kitchen cabinets] [Reversible panel with choice of colors] <Insert description>.
 - a. Panel Color: [White] [Black] <Insert color(s)>.
11. Appliance Color/Finish: [White] [Black] [Stainless steel] <Insert color or finish>.

2.6 CLOTHES WASHERS AND DRYERS

- A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

1. ASKO North America; a division of AM Appliance Group.
2. BOSCH Home Appliances.
3. Electrolux Home Products (Frigidaire).
4. Fisher & Paykel.
5. General Electric Company (GE).
6. General Electric Company (Hotpoint).
7. KitchenAid; a division of Whirlpool Corporation.
8. LG Appliances.
9. Maytag; a division of Whirlpool Corporation.
10. Miele, Inc.
11. Samsung.
12. Sears Brands LLC (Kenmore).
13. Thor Appliance Company.
14. Whirlpool Corporation.
15. <Insert manufacturer's name>.

B. Clothes Washer [CW #] <Insert drawing designation>: Complying with ASSE 1007.

1. Type: Stacking, [top] [front]-loading unit.
2. Dimensions:
 - a. Width: [23-1/2 inches] [27 inches] [30 inches] [As indicated on Drawings] <Insert dimension>.
 - b. Depth: [24 inches] [29 inches] [31 inches] [As indicated on Drawings] <Insert dimension>.
 - c. Height: [34-1/2 inches] [38 inches] [45 inches] [As indicated on Drawings] <Insert dimension>.
3. Drum: [Manufacturer's standard] [Perforated porcelain-enameled steel] [Perforated stainless steel] <Insert material>.
 - a. Capacity: [2.7 cu. ft.] [3.2 cu. ft.] [3.8 cu. ft.] <Insert volume>.
4. Controls: [Touch-pad] [Rotary-dial] controls for water-fill levels, wash/rinse water temperatures, <Insert function,> and variable-speed and fabric selectors.
 - a. Wash Cycles: [Four] [Six] [10] <Insert number> wash cycles including regular, delicate, and permanent press.
 - b. Wash Temperatures: [Three] <Insert number> settings.
 - c. Speed Combinations: [Two] [Four] [Five].
5. Electrical Power: [120 V, 60 Hz, 1 phase, 15 A] [As indicated on Drawings] <Insert requirement>.
6. Motor: Manufacturer's standard with built-in overload protector.
7. Features:
 - a. Agitator: [Center spindle] [Impeller (without spindle)].

- b. Self-cleaning lint filter.
 - c. Unbalanced-load compensator.
 - d. Inlet Hoses: Minimum length **60 inches**.
 - e. Drain Hoses: Minimum length **48 inches**.
 - f. Self-leveling legs.
 - g. Automatic dispenser for [bleach] [fabric softener] [and] [detergent].
 - h. Spin-cycle safety switch.
 - i. End-of-cycle signal.
 - j. Extra-rinse option.
 - k. Delay-wash option.
 - l. Electronic temperature control.
 - m. Water levels automatically set.
 - n. <Insert feature>.
8. Energy Performance, ENERGY STAR: Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.
9. Water-Efficient Clothes Washer: Provide clothes washer with modified energy factor greater than or equal to 2.0 and water factor less than 5.5.
10. Appliance Finish: [Porcelain enamel on top and lid; baked enamel on front and sides] [Stainless steel] <Insert finish>.
- a. Color: [White] [Almond] <Insert color>.
11. Front-Panel Finish: [Manufacturer's standard] [Wood panel to match kitchen cabinets] [Porcelain enamel] [Stainless steel] [Wood-panel insert specified in Division 06 Section "Interior Architectural Woodwork" to match kitchen cabinets] [Wood-panel insert specified in Division 12 Section "Residential Casework" to match kitchen cabinets] <Insert description>.
- a. Panel Color: [White] [Black] <Insert color(s)>.
- C. Clothes Dryer [CD #] <Insert drawing designation>: Complying with AHAM HLD-1.
- 1. Type: Stacking, frontloading, [gas] [electric] [electric, ventless] unit.
 - 2. Dimensions:
 - a. Width: [**23-1/2 inches**] [**27 inches**] [As indicated on Drawings] <Insert dimension>.
 - b. Depth: [**24 inches**] [**31 inches**] [As indicated on Drawings] <Insert dimension>.
 - c. Height: [**34-1/2 inches**] [**36 inches**] [As indicated on Drawings] <Insert dimension>.
 - 3. Drum: [Manufacturer's standard] [Perforated porcelain-enameled steel] [Perforated stainless steel] <Insert material>.
 - a. Capacity: [**5.7 cu. ft.**] [**7.0 cu. ft.**] <Insert volume>.
 - 4. Controls: [Touch-pad] [Rotary-dial] controls for drying cycle, temperatures, <Insert

- function,> and fabric selectors.
5. Electric-Dryer Power: [240 V, 60 Hz, 1 phase, 30 A] [As indicated on Drawings] <Insert requirement>.
 6. Gas-Dryer Power: [120 V, 60 Hz, 1 phase, 15 A electric; 22,000-Btu/h gas] [As indicated on Drawings] <Insert requirement>.
 7. Features:
 - a. Removable lint filter.
 - b. Electronic temperature and moisture level sensor control.
 - c. End-of-cycle signal.
 - d. Interior drum light.
 - e. Self-leveling legs.
 - f. Antibacterial cycle.
 - g. Built-in electrical power fuse.
 - h. Stacking kit to stack dryer over washer.
 - i. <Insert feature>.
 8. Appliance Finish: [Porcelain enamel on top and lid; baked enamel on front and sides] [Stainless steel] <Insert finish>.
 - a. Color: [White] [Almond] <Insert color>.
 9. Front-Panel Finish: [Manufacturer's standard] [Wood panel to match kitchen cabinets] [Porcelain enamel] [Stainless steel] [Wood-panel insert specified in Division 06 Section "Interior Architectural Woodwork" to match kitchen cabinets] [Wood-panel insert specified in Division 12 Section "Residential Casework" to match kitchen cabinets] <Insert description>.
 - a. Panel Color: [White] [Black] <Insert color(s)>.

2.7 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, power connections, and other conditions affecting installation and

performance of residential appliances.

- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Comply with manufacturer's written instructions.
- B. Built-in Equipment: Securely anchor units to supporting cabinets or countertops with concealed fasteners. Verify that clearances are adequate for proper functioning and that rough openings are completely concealed.
- C. Utilities: See Divisions 22 and 26 for plumbing and electrical requirements.

END OF SECTION 113100

SECTION 123530 - RESIDENTIAL CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Kitchen cabinets.
 - 2. Vanity cabinets.
 - 3. Solid-surfacing-material countertops and 4-inch backsplashes.
 - 4. Full-height backsplashes where indicated.
- B. Related Sections include the following:
 - 1. Division 11 Section "Residential Appliances" for appliances.
 - 2. Division 22 Section "Plumbing Fixtures" for [nonintegral sinks] [sinks] [and] [plumbing fittings].

1.3 DEFINITIONS

- A. Exposed Surfaces of Cabinets: Surfaces visible when doors and drawers are closed, including visible surfaces in open cabinets or behind glass doors.
- B. Semiexposed Surfaces of Cabinets: Surfaces behind opaque doors or drawer fronts, including interior faces of doors and interiors and sides of drawers. Bottoms of wall cabinets are defined as "semiexposed."
- C. Concealed Surfaces of Cabinets: Surfaces not usually visible after installation, including sleepers, web frames, dust panels, bottoms of drawers, and ends of cabinets installed directly against and completely concealed by walls or other cabinets. Tops of wall cabinets and utility cabinets are defined as "concealed."

1.4 SUBMITTALS

- A. Product Data: For the following:

1. Cabinets.
 2. Solid-surfacing-material countertops and sinks.
 3. Cabinet hardware.
- B. Shop Drawings: For cabinets and countertops. Include plans, elevations, details, and attachments to other work. Show materials, finishes, filler panels, hardware, edge and backsplash profiles, methods of joining countertops, and cutouts for plumbing fixtures.
- C. Samples for Initial Selection: For each type of material exposed to view.
- D. Samples for Verification:
1. Solid wood with transparent finish, **50 sq. in.**, for each species.
 2. Solid wood trim with transparent finish, **8 inches** long, for each species.
 3. Solid-surfacing material for countertops, **6 inches** square.
 4. Exposed hardware, for each type of item.
 5. One full-size[, **16 inches wide**], finished base cabinet complete with hardware, doors, and drawers but without countertop. [**Sample will be returned to Contractor for use on Project.**]
 6. One full-size[, **12 inches wide**], finished wall cabinet complete with hardware, doors, and adjustable shelves. [**Sample will be returned to Contractor for use on Project.**]
 7. One full-size solid-surfacing-material countertop, **8 by 10 inches**, of construction and in configuration specified.

1.5 QUALITY ASSURANCE

- A. Source Limitations for Cabinets: Obtain cabinets through one source from a single manufacturer.
- B. Product Options: Drawings indicate size, configurations, and finish material of cabinets by referencing designated manufacturer's catalog numbers. Other manufacturers' cabinets of similar sizes and door and drawer configurations, same finish material, and complying with the Specifications may be considered. Refer to Division 01 Section "Product Requirements."
- C. Quality Standards: Unless otherwise indicated, comply with the following standards:
1. Cabinets: KCMA A161.1.
 - a. KCMA Certification: Provide cabinets with KCMA's "Certified Cabinet" seal affixed in a semiexposed location of each unit and showing compliance with the above standard.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install casework until building is enclosed, wet-

work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

- B. Established Dimensions: Where casework is indicated to fit to other construction, establish dimensions for areas where casework is to fit. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Provide fillers and scribes to allow for trimming and fitting.
- C. Field Measurements: Where casework is indicated to fit to existing construction, verify dimensions of existing construction by field measurements before fabrication and indicate measurements on Shop Drawings. Provide fillers and scribes to allow for trimming and fitting.
- D. Field Measurements for Countertops: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.7 COORDINATION

- A. Coordinate layout and installation of blocking and reinforcement in partitions for support of casework.
- B. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 CABINET MATERIALS

- A. General:
 - 1. Adhesives: Do not use adhesives that contain urea formaldehyde.
 - 2. Hardwood Lumber: Kiln dried to 7 percent moisture content.
 - 3. Softwood Lumber: Kiln dried to 10 percent moisture content.
 - 4. Hardwood Plywood: HPVA HP-1, made with adhesive containing no urea formaldehyde.
- B. Exposed Materials:
 - 1. Exposed Wood Species: **[Oak] [Maple] [Alder] [Birch] [Hickory] [Cherry]** **[Manufacturer's standard domestic hardwood species]** <Insert species>.
 - a. Select materials for compatible color and grain. Do not use two adjacent exposed surfaces that are noticeably dissimilar in color, grain, figure, or natural character markings.
 - b. Staining and Finish: **[As indicated by manufacturer's designations]** **[Match Architect's samples]** **[As selected by Architect from manufacturer's full range]**.

2. Solid Wood: Clear hardwood lumber of species indicated, free of defects.
3. Plywood: Hardwood plywood with face veneer of species indicated, with Grade A faces and Grade C backs of same species as faces.

C. Semiexposed Materials: Unless otherwise indicated, provide the following:

1. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects. Same species as exposed surfaces[**or stained to be compatible with exposed surfaces**].

D. Concealed Materials: Solid wood or plywood, of any hardwood or softwood species, with no defects affecting strength or utility; particleboard; medium-density fiberboard; or hardboard.

2.2 CABINET HARDWARE

A. General: Manufacturer's standard units complying with BHMA A156.9, of type, size, style, material, and finish [**as indicated by manufacturer's designations**] [**matching Architect's samples**] [**as selected by Architect from manufacturer's full range**].

B. Pulls: [**Surface-mounted decorative pulls**] [**Back-mounted decorative pulls**] [**Back-mounted decorative pulls with backing plates**] [**Wire pulls**] [**Back-mounted Knobs**] [**Surface-mounted porcelain knobs**] <Insert description>.

C. Hinges: [**Decorative full-surface hinges**] [**Concealed butt hinges**] [**Semiconcealed (wraparound) butt hinges for overlay doors**] [**Pivot (knife) hinges**] [**Concealed European-style self-closing hinges**].

D. Drawer Guides: Epoxy-coated-metal, self-closing drawer guides; designed to prevent rebound when drawers are closed; with nylon-tired, ball-bearing rollers; and complying with BHMA A156.9, Type B05011 or B05091.

2.3 COUNTERTOP MATERIALS

A. Adhesives: Do not use adhesives that contain urea formaldehyde.

B. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.

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. Avonite, Inc.
- b. E. I. du Pont de Nemours and Company.
- c. Nevamar Company, LLC.

2. Type: Provide Standard Type[**or Veneer Type made from material complying with requirements for Standard Type, as indicated**], unless Special Purpose Type is indicated.
3. Integral Sink Bowls: Comply with ISSFA-2 and ANSI Z124.3, Type 5 or Type 6, without a precoated finish.
4. Colors and Patterns: [**As indicated by manufacturer's designations**] [**Match Architect's samples**] [**As selected by Architect from manufacturer's full range**].

2.4 CABINETS

- A. Available Products: Subject to compliance with requirements, cabinets that may be incorporated into the Work include, but are not limited to, the following:
 1. **<Insert manufacturer's name; product name or designation.>**
- B. Basis of Design Product: The design for cabinets is based on **<Insert manufacturer's name and product>**. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 1. **<Insert manufacturer's name.>**
- C. Face Style: Flush overlay; door and drawer faces cover cabinet fronts with only enough space between faces for operating clearance.
- D. Cabinet Style: Face Frame .
- E. Door and Drawer Fronts: Solid-wood stiles and rails, **5/8 inch** thick, with **3/4-inch-** thick, solid-wood center panels.
- F. Face Frames: **3/4-by-1-5/8-inch** solid wood[**with glued mortise and tenon or doweled joints**].
- G. Exposed Cabinet End Finish: Wood veneer.
- H. Back, Top, and Bottom Rails: **3/4-by-2-1/2-inch** solid wood, interlocking with end panels and rabbeted to receive top and bottom panels. Back rails secured under pressure with glue and with mechanical fasteners.
- I. Wall-Hung-Unit Back Panels: **3/16-inch-** thick plywood fastened to rear edge of end panels and to top and bottom rails.
- J. Base-Unit Back Panels: **3/16-inch-** thick plywood fastened to rear edge of end panels and to top and bottom rails.
- K. Front Frame Drawer Rails: **3/4-by-1-1/4-inch** solid wood mortised and fastened into face frame.

- L. Drawers: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 - 1. Join subfronts, backs, and sides with [**glued rabbeted joints supplemented by mechanical fasteners**] [**or**] [**glued dovetail joints**].
 - 2. Subfronts, Backs, and Sides: [**3/4-inch-**] [**1/2-inch-**] thick solid wood.
 - 3. Bottoms: [**1/4-inch-**] [**3/16-inch-**] thick plywood.
- M. Shelves: **1/2-inch-** thick plywood.
- N. Joinery: Rabbet backs flush into end panels and secure with concealed mechanical fasteners. Connect tops and bottoms of wall cabinets and bottoms and stretchers of base cabinets to ends and dividers with mechanical fasteners. Rabbet tops, bottoms, and backs into end panels.
- O. Factory Finishing: Finish cabinets at factory. Defer only final touchup until after installation.

2.5 SOLID-SURFACING-MATERIAL COUNTERTOPS

- A. Configuration: Provide countertops with the following front and backsplash style:
 - 1. Front: [**Straight, slightly eased at top**] [**Bevel**] [**3/4-inch bullnose**] [**Radius edge with apron, 2 inches high with 3/8-inch radius**] [**1-1/2-inch laminated bullnose**] [**1-inch laminated bullnose**] [**Wood-trimmed edge as indicated**].
 - 2. Endsplash: [**Matching backsplash**] [**None**].
- B. Countertops: [**1/2-inch-**] [**3/4-inch-**] thick, solid-surfacing material with front edge built up with same material.
- C. Fabrication: Fabricate tops in one piece with shop-applied edges, unless otherwise indicated. Comply with solid-surfacing-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
 - 1. Install integral sink bowls in countertops in the shop.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cabinets with no variations in flushness of adjoining surfaces; use concealed shims. Where cabinets abut other finished work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match cabinet face.
- B. Install cabinets without distortion so doors and drawers fit openings and are aligned. Complete installation of hardware and accessories as indicated.

- C. Install cabinets and countertop level and plumb to a tolerance of **1/8 inch in 8 feet**.
- D. Fasten cabinets to adjacent units and to backing.
 - 1. Fasten wall cabinets through back, near top and bottom, at ends and not less than **24 inches** o.c. with No. 10 wafer-head screws sized for **1-inch** penetration into wood framing, blocking, or hanging strips.
 - 2. Fasten wall cabinets through back, near top and bottom, at ends and not less than **24 inches** o.c., with toggle bolts through metal backing behind gypsum board.
- E. Fasten solid-surfacing-material countertops by screwing through corner blocks of base units into underside of countertop. Align adjacent surfaces, and form seams to comply with manufacturer's written instructions using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
 - 1. Install backsplashes and endsplashes to comply with solid-surfacing-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

3.2 ADJUSTING AND CLEANING

- A. Adjust cabinets and hardware so doors and drawers are centered in openings and operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.
- B. Clean casework on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION 123530

- Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
- b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
 3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
 4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
 5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
 6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
- D. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- E. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.
- G. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- H. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

END OF SECTION 283111