

## 2.2 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 sealant manufacturer based on testing and field experience.
- B. **Colors of Exposed Joint Sealants:** As selected by Engineer from manufacturer's full range for this characteristic.

## 2.3 ELASTOMERIC JOINT SEALANTS

- A. **Elastomeric Sealant Standard:** Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant, including those referencing ASTM C 920 classifications for type, grade, class, and uses.
- B. **Single-Component Nonsag Urethane Sealant:** Where joint sealants of this type are indicated, provide products complying with the following:
  - 1. **Products:** Provide one of the following:
    - a. Vulkem 116; Mameco International.
    - b. Vulkem 230; Mameco International.
    - c. Sikaflex - 1a; Sika Corporation.
    - d. NP 1; Sonneborn Building Products Div., ChemRex Inc.
    - e. Dymonic; Tremco.
  - 2. **Type and Grade:** S (single component) and NS (nonsag).
  - 3. **Class:** 25.
  - 4. **Applications:**
    - a. Metal flashing joints.
    - b. Joints between exterior metal frames and adjacent Work.
    - c. Under exterior door thresholds.
- C. **Mildew Resistant Silicone Sealant:** Where joint sealants of this type are indicated provide products complying with the following:
  - 1. **Products:** Provide one of the following:
    - a. 786; Dow Corning
    - b. Sanitary 1700; GE Silicones.
    - c. 898 Silicone Sanitary Sealant; Pecora Corporation.
    - d. PSI-611; Polymeric Systems, Inc.
    - e. Tremsil 600 White; Tremco.
  - 2. **Type and Grade:** S (single component), and NS (nonsag).
  - 3. **Class** 25
  - 4. **Additional Movement Capability:** 50 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement.
  - 5. **Applications:**
    - a. Use for sealing interior joints with non-porous substrates in wet areas with ceramic tile or epoxy paint around sinks, and between equipment or counters and non-porous walls.
- D. **Multicomponent Fourable Urethane Sealant:** Where joint sealants of this type are indicated, provide products complying with the following:
  - 1. **Products:** Provide one of the following:
    - a. Chem-Calk 550; Bostik Inc.
    - b. Vulkem 245; Mameco International.

- c. NR-200 Urexpan; Pecora Corporation.
  - d. Sikaflex - 2c SL; Sika Corporation.
  - e. SL 2; Sonneborn Building Products Div., ChemRex Inc.
  - f. THC-900; Tremco.
2. Type and Grade: M (multicomponent) and P (pourable).
  3. Class: 25.
  4. Applications:
    - a. Joints in exterior and interior concrete slabs on grade.
    - b. Joints in existing concrete slabs on grade.
    - c. At penetrations to new and existing slabs on grade.

## 2.4 LATEX JOINT SEALANTS

- A. Latex Sealant Standard: Comply with ASTM C 834 for each product of this description indicated.
- B. Latex Sealant: Where joint sealants of this type are indicated, provide products complying with the following:
  1. Products: Provide one of the following.
    - a. Chem-Calk 600; Bostik Inc.
    - b. NuFlex 330; NUCO Industries, Inc.
    - c. LC 160 All Purpose Acrylic Caulk; Ohio Sealants, Inc.
    - d. AC-20; Pecora Corporation.
    - e. PSI-701; Polymeric Systems, Inc.
    - f. Sonolac; Sonneborn Building Products Div., ChemRex, Inc.
    - g. Tremflex 834; Tremco.
  2. Applications: Interior joints in field painted vertical and overhead joints not indicated otherwise below.

## 2.5 JOINT-SEALANT BACKING

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

## 2.6 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 with joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 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, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
    - a. Metal.
    - b. Glass.
    - c. Glazed surfaces of ceramic tile.
- B. Joint Priming: Prime joint substrates where indicated and recommended in writing by joint sealant manufacturer, based on 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.
  - 1. Apply primer on all porous surfaces such as exterior masonry, granite or precast concrete.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.2 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 of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type 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 bond-breaker tape behind sealants where sealant backings are not used between sealants and back of joints.
- E. Install sealants by proven techniques to 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 provided for each joint configuration.
  3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified 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 sealants from surfaces adjacent to joint.
  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 configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
    - a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

### 3.3 CLEANING

- A. Clean off excess sealants 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.

### 3.4 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 the original work.

END OF SECTION

SECTION 08110

STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Steel doors.
2. Steel door frames.
3. Fire-rated door and frame assemblies.

1.2 SUBMITTALS

- A. Product Data: For each type of door and frame indicated, include door designation, type, level and model, material description, core description, construction details, label compliance, sound and fire-resistance ratings, and finishes.
- B. Shop Drawings: Show the following:
1. Elevations of each door design.
  2. Details of doors including vertical and horizontal edge details.
  3. Frame details for each frame type including dimensioned profiles.
  4. Details and locations of reinforcement and preparations for hardware.
  5. Details of each different wall opening condition.
  6. Details of anchorages, accessories, joints, and connections.
  7. Coordination of glazing frames and stops with glass and glazing requirements.
- C. Door Schedule: Use same reference designations indicated on Drawings in preparing schedule for doors and frames.

1.3 QUALITY ASSURANCE

- A. Steel Door and Frame Standard: Comply with ANSI A 250.8, unless more stringent requirements are indicated.
- B. Source Limitations: Obtain steel doors and frames from the same manufacturer.
- C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

- B. Inspect doors and frames on delivery for damage, and notify shipper and supplier if damage is found. Minor damages may be repaired provided refinished items match **NEW WORK** and are acceptable to Architect. Remove and replace damaged items that cannot be repaired as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4-inch- (100-mm-) high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If door packaging becomes wet, remove cartons immediately. Provide minimum 1/4-inch (6-mm) spaces between stacked doors to permit air circulation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Steel Doors and Frames:
    - a. Ceco Door Products; a United Dominion Company.
    - b. Curries Company.
    - c. Steelcraft; a division of Ingersoll-Rand.

### 2.2 MATERIALS

- A. Cold-Rolled Steel Sheets: ASTM A 366/A 366M, Commercial Steel (CS), or ASTM A 620/A 620M, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness.
- B. Metallic-Coated Steel Sheets (Galvanized): ASTM A 653/A 653M, Commercial Steel (CS), Type B, with an A60 (ZF180) zinc-iron-alloy (galvannealed) coating; stretcher-leveled standard of flatness.
- C. Electrolytic Zinc-Coated Steel Sheet: ASTM A 591/A 591M, Commercial Steel (CS), Class B coating; mill phosphatized; suitable for unexposed applications; stretcher-leveled standard of flatness where used for face sheets.

### 2.3 DOORS

- A. General: Provide doors of sizes, thicknesses, and designs indicated.
- B. Interior Doors: Provide doors complying with requirements indicated below by referencing ANSI 250.8 for level and model and ANSI A250.4 for physical-endurance level:
  - 1. Level 2 (18 gage) and Physical Performance Level B (Heavy Duty), Model 2 (Seamless).
- C. Exterior Doors: Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:
  - 1. Level 3 (16 gage) and Physical Performance Level A (Extra Heavy Duty), Model 2 (Seamless).
- D. Vision Lite Systems: Manufacturer's standard kits consisting of glass lite moldings to accommodate glass thickness and size of vision lite indicated.

## 2.4 FRAMES

- A. General: Provide steel frames for doors, transoms, sidelights, borrowed lights, and other openings that comply with ANSI A250.8 and with details indicated for type and profile. Conceal fastenings, unless otherwise indicated.
- B. Frames of 0.053-inch- (1.3-mm-) (16 gage) thick steel sheet for:
1. Door openings wider than 48 inches (1220 mm)
  2. Level 2 steel doors.
  3. Wood doors.
- C. Frames of 0.067-inch- (1.7-mm-) (14 gage) thick steel sheet for:
1. Exterior, Level 3 steel doors.
- D. Door Silencers: Except on weather-stripped frames, fabricate stops to receive three silencers on strike jambs of single-door frames and two silencers on heads of double-door frames.
- E. Plaster Guards: Provide 0.016-inch- (0.4-mm-) thick, steel sheet plaster guards or mortar boxes to close off interior of openings; place at back of hardware cutouts where mortar or other materials might obstruct hardware operation.
- F. Supports and Anchors: Fabricated from not less than 0.042-inch- (1.0-mm-) thick, electrolytic zinc-coated or metallic-coated steel sheet.
1. Wall Anchors in Masonry Construction: 0.177-inch- (4.5-mm-) diameter, steel wire complying with ASTM A 510 (ASTM A 510M) may be used in place of steel sheet.
- G. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where zinc-coated items are to be built into exterior walls, comply with ASTM A 153/A 153M, Class C or D as applicable.

## 2.5 STOPS AND MOLDINGS

- A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as door face sheet in which they are installed.
- B. Fixed Frame Moldings: Formed integral with standard steel frames, minimum 5/8 inch (16 mm) high, unless otherwise indicated.
- C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as frames in which they are installed.
- D. Provide nonremovable stops on outside of exterior doors and on the outside of any locked room for interior windows and interior doors for glass, louvers, and other panels in doors.

## 2.6 FABRICATION

- A. General: Fabricate steel door and frame units to comply with ANSI A250.8 and to be rigid, neat in appearance, and free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site.

- B. Exterior Door Construction: For exterior locations and elsewhere as indicated, fabricate doors, panels, and frames from galvanized steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053-inch- (1.3-mm-) thick, galvanized steel channels with channel webs placed even with top and bottom edges.
- C. Interior Door Faces: Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from the following material:
1. Cold-rolled steel sheet, unless otherwise indicated.
  2. Galvanized sheet where indicated.
- D. Core Construction: Manufacturer's standard core construction that produces a door complying with SDI standards.
1. Polyurethane for exterior doors.
  2. Sound deadened for interior doors.
- E. Clearances for Non-Fire-Rated Doors: Not more than 1/8 inch (3.2 mm) at jambs and heads, except not more than 1/4 inch (6.4 mm) between pairs of doors. Provide 3/4 inch (19 mm) at bottom.
- F. Clearances for Fire-Rated Doors: As required by NFPA 80.
- G. Single-Acting, Door-Edge Profile: Beveled edge.
- H. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- I. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.
1. Door Reinforcement: Lock and hinge stiles shall be reinforced with a one piece, full height, 14-gage steel channel, drilled and tapped for hinges and strike, or the hinge reinforcement shall be 7-gage extra heavy duty steel plate, drilled and tapped for hinge screws. Provide not less than 12-gage channel reinforcement for closers and holders and 14-gage channel for rim exit devices.
  2. Frame Reinforcement: The hinge reinforcement for frames shall be 7-gage steel. Door closer reinforcing shall be 12-gage steel. Lock strike reinforcing shall be 14-gage.
- J. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- K. Thermal-Rated (Insulating) Assemblies: At exterior locations and elsewhere as shown or scheduled, provide doors fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 or ASTM C 976 on fully operable door assemblies.
1. Unless otherwise indicated, provide thermal-rated assemblies with U-value of 0.41 Btu/sq. ft. x h x deg F (2.33 W/sq. m x K) or better.
- L. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.
1. Full hinge cut-outs for non-handed doors will not be acceptable.
  2. For concealed overhead door closers, provide space, cutouts, reinforcement, and provisions for fastening in top rail of doors or head of frames, as applicable.



- M. Frame Construction: Fabricate frames to shape shown.
1. Fabricate frames with mitered or coped and continuously welded corners and seamless face joints.
  2. All welded joints shall be ground and dressed to be smooth, flush and invisible.
  3. Provide welded frames with temporary spreader bars.
- N. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.
- O. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.
- P. Glazing Stops: Manufacturer's standard, formed from 0.032-inch- (0.8-mm-) thick steel sheet.
1. Provide nonremovable stops on outside of exterior doors and on the outside of any locked room for interior windows and interior doors for glass, louvers, and other panels in doors.
  2. Provide screw-applied, removable, glazing stops on inside of glass, louvers, and other panels in doors.
- Q. Astragals: As required by NFPA 80 to provide fire ratings indicated.
- 2.7 ACCESSORY MATERIALS
- A. Bituminous Coating: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements, except containing no asbestos.
- 2.8 FINISHES
- A. Comply with NAAMM's "Metal Finishes Manual" for recommendations relative to applying and designation finishes.
- B. Comply with SSPC-PA1, "Paint Application Specification No. 1" for steel sheet finishes.
- C. Apply primers to doors and frames after fabrication.
- 2.9 GALVANIZED STEEL SHEET FINISHES
- A. Surface Preparation: Clean surfaces with non-petroleum solvent so that surfaces area of oil or other contaminants. After cleaning, apply a conversion coating of the type suited to the organic coating applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.
1. Galvanizing Repair Paint: High-zinc-dust-content paint for re-galvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.
- B. Prime Finish: Manufacturer's standard, factory-applied, baked, coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.
- 2.10 STEEL SHEET FINISHES
- A. Surface Preparation: Solvent-clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel to comply with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).

- B. Pretreatment: Immediately after surface preparation, apply a conversion coating of type suited to organic coating applied over it.
- C. Prime Finish: Manufacturer's standard, factory-applied, baked, coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.
- B. At exterior and masonry walls, coat inside of frame profile with bituminous coating to a thickness of 1/16 inch (1.5 mm).
- C. Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
  - 1. Except for frames located in existing walls or partitions, place frames before construction of enclosing walls and ceilings.
  - 2. In masonry construction, provide at least three wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.
  - 3. In existing concrete or masonry construction, provide at least three completed opening anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices. Provide filler (bondo) over fasteners flush with frame and prime paint.
  - 4. In metal-stud partitions, provide at least three wall anchors per jamb; install adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Attach wall anchors to studs with screws.
  - 5. Install fire-rated frames according to NFPA 80.
  - 6. For openings 90 inches (2286 mm) or more in height, install an additional anchor at hinge and strike jambs.
- D. Door Installation: Comply with ANSI A250.8. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A115.1G.
  - 1. Fire-Rated Doors: Install within clearances specified in NFPA 80.
  - 2. Smoke-Control Doors: Install to comply with NFPA 105.

#### 3.2 ADJUSTING AND CLEANING

- A Galvanizing Repair Paint: High-zinc-dust-content paint for reglvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.

- B. Prime-Coat Touchup: Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touch up of compatible air-drying primer.
- C. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION

SECTION 08520

ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following types of aluminum-framed windows:
  - 1. Horizontal windows.

1.2 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 test size indicated below:
  - 1. Minimum size required by AAMA/WDMA 101/I.S.2.
- B. AAMA/WDMA Performance Requirements: Provide aluminum windows of the performance class and grade indicated that comply with AAMA/WDMA 101/I.S.2.
  - 1. Performance Class: HC.
  - 2. Performance Grade: 60.
  - 3. Exception to AAMA/WDMA 101/I.S.2: In addition to requirements for performance class and performance grade, design glass framing system to limit lateral deflections of glass edges to less than 1/175 of glass-edge length or 3/4 inch (19 mm), whichever is less, at design pressure based on the following:
    - a. Testing performed according to AAMA/WDMA 101/I.S.2, Uniform Load Deflection Test or structural computations.
- C. Forced-Entry Resistance: Comply with Performance Level 10 requirements when tested according to ASTM F 588.
- D. Thermal Movements: Provide aluminum windows, including anchorage, that accommodate thermal movements of units resulting from the following maximum change (range) in ambient and surface temperatures without buckling, distortion, opening of joints, failure of joint sealants, damaging loads and stresses on glazing and connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C) material surfaces.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, fabrication methods, dimensions of individual components and profiles, hardware, finishes, and operating instructions for each type of aluminum window indicated.

- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other Work, operational clearances, and the following:
1. Mullion details, including reinforcement and stiffeners.
  2. Joinery details.
  3. Expansion provisions.
  4. Flashing and drainage details.
  5. Weather-stripping details.
  6. Thermal-break details.
  7. Glazing details.
  8. Window cleaning provisions.
- C. Samples for Selection: Submit color chips for units with factory-applied color finishes.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type, grade, and size of aluminum window. Test results based on use of down-sized test units will not be accepted.
- E. Maintenance Data: For operable window sash operating hardware weather stripping and finishes to include in maintenance manuals.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.
- B. 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.
- C. Fenestration Standard: Comply with AAMA/WDMA 101/IS.2, "Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors," for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
1. Provide AAMA-certified aluminum windows with an attached label.

#### 1.5 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.

#### 1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
1. Failure to meet performance requirements.
  2. Structural failures including excessive deflection.
  3. Water leakage, air infiltration, or condensation.
  4. Faulty operation of movable sash and hardware.
  5. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  6. Insulting glass failure.
- B. Warranty Period: Two years from date of Substantial Completion.
- C. Warranty Period for Metal Finishes: 15 years from date of Substantial Completion.
- D. Warranty Period for Glass: 10 years from date of Substantial Completion.

## 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:
- a. Kawneer Tri-fab 400

### 2.2 MATERIALS, GENERAL

- A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi (150-MPa) ultimate tensile strength, not less than 16,000-psi (110-MPa) minimum yield strength, and not less than 0.062-inch (1.6-mm) thickness at any location for the main frame and sash members.
- B. Fasteners: Aluminum, nonmagnetic stainless steel, epoxy adhesive, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum window members, trim, hardware, anchors, and other components. Cadmium-plated steel fasteners are not permitted.
1. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125 inch (3.2 mm) thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, splined grommet nuts.
  2. Exposed Fasteners: Unless unavoidable for applying hardware, do not use exposed fasteners. For application of hardware, use fasteners that match finish of member or hardware being fastened, as appropriate.
- C. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated. Cadmium-plated steel anchors, clips, and accessories are not permitted.

D. Reinforcing Members: Aluminum, nonmagnetic stainless steel, nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated. Cadmium-plated steel reinforcing members are not permitted.

E. Compression-Type Weather Stripping: Provide compressible weather stripping designed for permanently resilient sealing under bumper or wiper action, and completely concealed when aluminum window is closed.

1. Weather-Stripping Material: Manufacturer's standard system and materials complying with AAMA/WDMA 101/I.S.2.

F. Sliding-Type Weather Stripping: Provide woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric. Comply with AAMA 701/702.

1. Weather Seals: Provide weather stripping with integral barrier fin or fins of semirigid, polypropylene sheet or polypropylene-coated material.

G. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, nonshrinking, and nonmigrating type recommended by sealant manufacturer for joint size and movement.

## 2.3 GLAZING

A. Glazing System: Manufacturer's standard Low-E, insulated, factory-glazing system that produces weathertight seal.

## 2.4 FABRICATION

A. General: Fabricate aluminum windows, in sizes indicated, that comply with AAMA/WDMA 101/I.S.2 for performance class and performance grade indicated. Include a complete system for assembling components and anchoring windows.

B. General: Fabricate aluminum windows, in sizes indicated, that comply with requirements and that meet or exceed AAMA/WDMA 101/I.S.2 performance requirements for the following window type and performance class. Include a complete system for assembling components and anchoring windows.

1. Horizontal-Sliding Windows: HC.

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-break construction that has been in use for not less than three years and has been tested to demonstrate resistance to thermal conductance and condensation and to show adequate strength and security of glass retention.
2. Provide thermal barriers tested according to AAMA 505; determine the allowable design shear flow per the appendix in AAMA 505.
3. 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. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.
- G. Subframes: Provide subframes with anchors for window units as shown, of profile and dimensions indicated but not less than 0.062-inch- (1.6-mm-) thick extruded aluminum. Miter or cope corners, and weld and dress smooth with concealed mechanical joint fasteners. Finish to match window units. Provide subframes capable of withstanding design loads of window units.
- H. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 8 Section "Glazing" and with AAMA/WDMA 101/I.S.2.
- I. Glazing Stops: Provide snap-on glazing stops coordinated with Division 8 Section "Glazing" and glazing system indicated. Provide glazing stops to match sash and ventilator frames.

## 2.5 FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 1. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight, complying with AAMA 2605.
    - a. Color and Gloss: As selected by Architect from manufacturer's full range.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components; Drawings; and Shop Drawings.



- 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. Metal Protection: Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in "Dissimilar Materials" Paragraph in Appendix B in AAMA/WDMA 101/I.S.2.

### 3.2 PROTECTION AND CLEANING

- A. 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.
- B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- C. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.
- D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION

## SECTION 08711

### DOOR HARDWARE

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following:
1. Commercial door hardware for the following:
    - a. Swinging doors.
    - b. Other doors to the extent indicated.
  - B. Products furnished, but not installed, under this Section include the following. Coordinating, purchasing, delivering, and scheduling remain requirements of this Section.
    1. Cylinders for locks on overhead coiling doors, and sectional overhead doors.

##### 1.2 SUBMITTALS

- A. **Product Data:** Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. **Samples for Selection:** Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of door hardware indicated.
- C. **Door Hardware Schedule:** Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. **Format:** Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  2. **Organization:** Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.
    - a. Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.
  3. **Content:** Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

- 1) Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.
4. Submittal Sequence: Submit initial draft of final schedule along with essential Product Data to facilitate the fabrication of other work that is critical in the Project construction schedule. Submit the final Door Hardware Schedule after Samples, Product Data, coordination with Shop Drawings of other work, delivery schedules, and similar information has been completed and accepted.
- D. Keying Schedule: Prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
- E. Product Certificates: Signed by manufacturers of electrified door hardware certifying that products furnished comply with requirements.
  1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.
- F. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, indicating current products comply with requirements.
- G. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 1.
- H. Warranties: Special warranties specified in this Section.

### 1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
  1. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- C. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
- D. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
- E. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

- F. Keying Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
  2. Preliminary key system schematic diagram.
  3. Requirements for key control system.
  4. Address for delivery of keys.

#### 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 Schedule, and include basic installation instructions with each item or package.
- C. Deliver keys to Owner by registered mail or overnight package service.

#### 1.5 COORDINATION

- A. Templates: Obtain and distribute to the parties involved 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.

#### 1.6 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
  1. Structural failures including excessive deflection, cracking, or breakage.
  2. Faulty operation of operators and door hardware.
  3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- C. Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Warranty Period for Manual Closers: 10 years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section and the Door Hardware Schedule at the end of Part 3.
1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturer's products.
  2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Schedule at the end of Part 3. Products are identified by using door hardware designations, as follows:
1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
  2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

### 2.2 HINGES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Hinges:
    - a. Hager Companies (HAG).
    - b. McKinney Products Company; Div. of ESSEX Industries, Inc. (MCK).
    - c. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
  2. Continuous Geared Hinges:
    - a. Hager Companies (HAG).
    - b. McKinney Products Company; Div. of ESSEX Industries, Inc. (MCK).
    - c. Pemko Manufacturing Co., Inc. (PEM).
    - d. Zero International, Inc. (ZRO).
- B. Quantity: Provide the following, unless otherwise indicated.
1. Two Hinges: For doors with heights up to 60 inches (1524 mm).
  2. Three Hinges: For doors with heights 61 to 90 inches (1549 to 2286 mm).
  3. Four Hinges: For doors with heights 91 to 120 inches (2311 to 3048 mm).
  4. For doors with heights more than 120 inches (3048 mm), provide 4 hinges, plus 1 hinge for every 30 inches (750 mm) of door height greater than 120 inches (3048 mm).
- C. The following is a guide for hinge size and type required for this project.
- |                  | Manufacturer | Interior:        |
|------------------|--------------|------------------|
| 1-3/4" Doors     | Stanley      | FBB179-4 1/2"    |
| up to 3'-0" wide | Hager        | BB1279-4 1/2"    |
|                  | McKinney     | TA-TB2714-4 1/2" |

1-3/4" Doors Stanley FBB168-4 1/2"  
over 3'-0" wide Hager BB1168-4 1/2"  
McKinney T4A-T4B3786-4 1/2"

- D. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- E. Hinge Options: Comply with the following where indicated in the Door Hardware Schedule or on Drawings:
1. 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 the following applications:
    - a. Outswinging exterior doors.
    - b. Outswinging corridor doors with locks.
  2. Corners: Square.
- F. Continuous-Geared Hinges: Minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (100 mm); fabricated to full height of door and frame. Finish components after milling and drilling are complete. Fabricate hinges to template screw locations.
- G. Fasteners: Comply with the following:
1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
  2. Wood Screws: For wood doors and frames.
  3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
  4. Screws: Phillips flat-head screws; machine screws (drilled and tapped holes) for metal doors, wood screws for wood doors and frames. Finish screw heads to match surface of hinges.

## 2.3 MORTISED LOCKS AND LATCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Mechanical Locks and Latches:
    - a. Best Lock Corporation (BLC).
    - b. Corbin Russwin Architectural Hardware; Div. of Yale Security Inc. (CR).
    - c. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
    - d. Schlage Lock Company; an Ingersoll-Rand Company (SCH).
- B. Mortise Locks: Stamped steel case with steel or brass parts; BHMA Grade 1; Series 1000.
1. Provide one of the following manufacturers and designs:
    - a. Best H Series
    - b. Corbin/Russwin ML2200 Series
    - c. Sargent 8200 Series
    - d. Schlage L9000 Series
- C. Lock Trim: Comply with the following:
1. Lever: Cast.
  2. Escutcheon (Kose): Forged.
  3. Dummy Trim: Match lever lock trim and escutcheons.
  4. Lockset Designs: Provide the lockset design designated below or, if sets are provided by another manufacturer, provide designs that match those designated:
    - a. Best, 14 design

- b. Corbin/Russwin, Newport design
- c. Sargent, LNL design
- d. Schlage, 06A design

D. Lock Functions: Lock functions as indicated in the hardware schedule shall be as follows:

| FUNCTION | SARGENT | SCHLAGE | CORBIN/RUSSWIN | BEST |
|----------|---------|---------|----------------|------|
| A        | 04      | 80      | 57             | EW   |
| B        | 05      | 50      | 51             | E    |
| C        | 15      | 10      | 10             | N    |
| D        | 37      | 70      | 55             | J    |
| E        | 16      | 60      | 42             | F    |
| F        | 65      | 40      | 30             | LF   |
| G        | 8241    | 9457    | 2072           | G    |

E. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements, and as follows:

1. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
2. Deadbolts: Minimum 1-inch (25-mm) bolt throw.

F. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

#### 2.4 EXIT DEVICES

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

1. The Dorma Group, North America. (DOR).
2. Precision Hardware, Inc. (PH).
3. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).
4. Von Duprin; an Ingersoll-Rand Company (VD).

B. Products: All exit devices for this project shall be one of the following:

1. Precision Olympian Series
2. The 80 Series exit device by Sargent & Co.
3. 98 Series by Von Duprin Division

C. Standard: BHMA A156.3.

1. BHMA Grade: Grade 1.

D. Certified Products: Provide exit devices listed in BHMA's "Directory of Certified Exit Devices."

E. 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.

F. 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.

G. Outside Trim: Pull with cylinder; material and finish to match locksets, unless otherwise indicated.

1. Match design for locksets and latchsets, unless otherwise indicated.

H. Through Bolts: For exit devices and trim on fire-rated wood doors.

I. The following functions shall be required where specified:

| FUNCTION | VON DUPRIN        | SARGENT        | PRECISION                      |
|----------|-------------------|----------------|--------------------------------|
| A        | CD99NL-OP         | 16-8804        | 1103CD x 1123-38               |
| B        | CD99EO            | 16-8810        | 1101CD x 1123-38               |
| C        | 99L               | 8813ET         | 1108 x 39L x 1123-38           |
| D        | 99L-BE            | 8815ET         | 1108A x 39L x 1123-38          |
| E        | 99EO-F            | 12-8810        | FL-1101 x 1123-38              |
| F        | 99L-F             | 12-8813ET      | FL-1108 x 39L x 1123-38        |
| G        | 99L-F-BE          | 12-8815ET      | FL-1108A x 39L x 1123-38       |
| H        | CD9927EO          | 16-8710        | 1201CD x 1123-38               |
| I        | 9927L             | 8713ET         | 1208 x 39L x 1123-38           |
| J        | 9927L-BE          | 8715ET         | 1208A x 39L x 1123-38          |
| K        | CD9927EO x LBR    | 16-PP/PR8710   | 1201CD x 1123-38 x LBR         |
| L        | 9927L x LBR       | PP/PR8713ET    | 1208 x 39L x 1123-38 x LBR     |
| M        | 9927L-BE x LBR    | PP/PR8715ET    | 1208A x 39L x 1123-38 x LBR    |
| N        | 9927EO-F          | 12-8710        | FL-1201 x 1123-38              |
| O        | 9927L-F           | 12-8713ET      | FL-1208 x 39L x 1123-38        |
| P        | 9927L-F-BE        | 12-8715ET      | FL-1208A x 39L x 1123-38       |
| Q        | 9927EO-F x LBR    | 12-PP/PR8710   | FL-1201 x 1123-38 x LBR        |
| R        | 9927L-F x LBR     | 12-PP/PR8713ET | FL-1208 x 39L x 1123-38 x LBR  |
| S        | 9927-L-F-BE x LBR | 12-PP/PR8715ET | FL-1208A x 39L x 1123-38 x LBR |

## 2.5 CYLINDERS AND KEYING

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

1. Cylinders: Same manufacturer as for locks and latches.

B. Standards: Comply with the following:

1. Cylinders: BHMA A156.5.

C. Cylinder Grade: BHMA Grade 1.

D. 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: Six.
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.

E. Construction Keying: Comply with the following:

1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

F. Keying System: Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:

1. Existing System: Master key or grand master key locks to Owner's existing system.



2. Keyed Alike: Key all cylinders to the same change key.
    - a. Cylinders shall be master keyed.
- G. Keys: Provide nickel-silver keys complying with the following:
1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
    - a. Notation: "DO NOT DUPLICATE."
  2. Quantity: In addition to one extra blank key for each lock, provide the following:
    - a. Cylinder Change Keys: Three.
    - b. Master Keys: Five.

## 2.6 STRIKES

- A. Standards: Comply with the following:
1. Strikes for Mortise Locks and Latches: BHMA A156.13.
- B. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
  2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
  3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

## 2.7 OPERATING TRIM

- 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. Baldwin Hardware Corporation (BH).
  2. Burns Manufacturing Incorporated (BM).
  3. Don-Jo Mfg., Inc. (DJO).
  4. Ives; H. B. Ives (IVS).
  5. Rockwood Manufacturing Company (RM).
  6. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
- B. Standard: Comply with BHMA A156.6.
- C. Materials: Fabricate from stainless steel, unless otherwise indicated.
1. Push-Pull Design: Door Pulls: 1 inch diameter by 10 inches long.

### Type A

Rockwood 111  
 Burns 26C  
 Quality 163-10"

Type B  
Rockwood BF157  
Burns 39C  
Quality 521

2. Push/Pull Bars: 1 inch diameter.

Type A (Wide Stile Doors)  
Rockwood BF11147 x T1006 Mounting  
Burns BF26C x 442 x Sim. Mounting as Above  
Quality BF482 x Sim. Mounting as Above

## 2.8 CLOSERS

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

1. Surface-Mounted Closers:
  - a. LCN Closers; an Ingersoll-Rand Company (LCN).
  - b. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT).

B. Standards: Comply with the following:

1. Closers: BHMA A156.4.

C. Surface Closers: BHMA Grade 1.

D. Certified Products: Provide door closers listed in BHMA's "Directory of Certified Door Closers."

E. Size of Units: Unless otherwise indicated, provide the following. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. LCN:
  - a. Exterior: 4140 Series
  - b. Interior: 4010 Series

2. Sargent:
  - a. Exterior: 281
  - b. Interior: 281

## 2.9 PROTECTIVE TRIM UNITS

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. Metal Protective Trim Units:
  - a. Burns Manufacturing Incorporated (BM).
  - b. Hager Companies (HAG).
  - c. Ives: H. B. Ives (IVS).
  - d. Rockwood Manufacturing Company (RM).

B. Standard: Comply with BHMA A156.6.

C. Materials: Fabricate protection plates from the following:

1. Stainless Steel: 0.050 inch (1.3 mm) thick; beveled top and 2 sides.

- D. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine or self-tapping screws.
- E. Fabricate protection plates as follows:
  - 1. Push Plates: 16" high by 8" wide.
  - 2. Kick Plates: 8" high by 1-1/2" less than door width for single doors and 1" less than door width for pairs of doors. Kick plates shall be applied to push side of all doors where noted.

## 2.10 STOPS AND HOLDERS

- 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. Stops and Bumpers:
    - a. Burns Manufacturing Incorporated (BM).
    - b. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
    - c. Hager Companies (HAG).
    - d. Ives: H. B. Ives (IVS).
    - e. Rockwood Manufacturing Company (RM).
  - 2. Standards: Comply with the following:
    - 1. Stops and Bumpers: BHMA A156.16.
    - 2. Door Silencers: BHMA A156.16.
  - 3. Wall Stops: BHMA Grade 1. Wall type bumpers with concealed type flange shall be used where ever possible and shall be one of the following:
    - 1. Ives - 407 1/2
    - 2. Door Controls - 3211T
    - 3. Rockwood - 409
  - 4. Floor Stops: Where wall type bumpers cannot be used, provide dome type, floor mounted stops of the proper height as follows:
    - 1. Ives - 436, 438
    - 2. Door Controls - 3310X, 3320X
    - 3. Rockwood - 440, 442
    - 4. Do not mount floor stops where they will impede traffic.
  - 5. Exterior doors striking masonry and doors specified to have door stops and holders, shall have cast bronze wall or floor type door stops with hook or staple type holders to selectively hold doors in open position. The following will be acceptable:
    - 1. Ives - 445, 446
    - 2. Door Controls - 3237X, 3347X
    - 3. Rockwood - 473, 477
- F. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, and except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock set (or push-pull units if no latch-lock sets) for color and texture.

G. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 1/2 inch (13 mm); fabricated for drilled-in application to frame.

## 2.11 DOOR GASKETING

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. Door Gasketing:
  - a. National Guard Products, Inc. (NGP).
  - b. Pemko Manufacturing Co., Inc. (PEM).
  - c. Reese Enterprises, Inc. (RE).
  - d. Zero International, Inc. (ZRO).
2. Door Bottoms:
  - a. National Guard Products, Inc. (NGP).
  - b. Pemko Manufacturing Co., Inc. (PEM).
  - c. Reese Enterprises, Inc. (RE).
  - d. Zero International, Inc. (ZRO).

B. Standard: Comply with BHMA A156.22.

C. Weatherstripping: Provide continuous weather-strip gasketing on exterior doors, No. A626A by National Guard Products or approved substitute. Provide door bottom sweep No. 95WH by National Guard Products or approved substitute. Provide meeting stile gaskets No. 600A by National Guard Products or approved substitute.

1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

## 2.12 DRIP STRIPS

A. Extruded aluminum shape, 1-1/2 inches high by 2-1/2 inches deep, designed to mounted on door frame above door. Provide National Guard No. 16A or approved substitute.

## 2.13 THRESHOLDS

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. Hager Companies (HAG).
2. National Guard Products, Inc. (NGP).
3. Pemko Manufacturing Co., Inc. (PEM).
4. Reese Enterprises, Inc. (RE).
5. Zero International, Inc. (ZRO).

B. Standard: Comply with BHMA A156.21.

C. Provide No. 896 with door bottom sweep No. 95WH by National Guard Products or approved substitute.

2.14 FABRICATION

- A. Manufacturer's Nameplate: Do not provide manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise approved by Architect.
  - 1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- C. 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. 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. Mortise hinges to doors.
    - b. Strike plates to frames.
    - c. Closers to doors and frames.
  - 3. Steel Through Bolts: For the following fire-rated applications, unless door blocking is provided:
    - a. Surface hinges to doors.
    - b. Closers to doors and frames.
    - c. Surface-mounted exit devices.
  - 4. Spacers or Sex Bolts: For through bolting of hollow metal doors.
  - 5. Fasteners for Wood Doors: Comply with requirements of DHI WDHS.2, "Recommended Fasteners for Wood Doors."

2.15 FINISHES

- A. Standard: Comply with BHMA A156.18.
- 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 the following finishes:

- 1. Butts and Hinges: 26D
- 2. Continuous Gear Hinges 28
- 3. Locks & Lock Trim: 26D

- 4. Exit Devices: 32D
- 5. Door Controls - Closers: Sprayed Alum. Finish
- 6. Mortise Locks & Latches: 26D
- 7. Door Stops 26D/32D
- 8. Weatherstripping Aluminum
- 9. Threshold Aluminum
- 10. Kickplates 32D
- 11. Pulls 32D

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

#### 3.2 PREPARATION

- A. Steel Doors and Frames: Comply with DHI A115 series.
  - 1. Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.

#### 3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
  - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
  - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

### 3.4 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.

### 3.5 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. Door Closers: 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 (75 mm) from the latch, measured to the leading edge of the door.
- B. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:
1. Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.
  2. Consult with and instruct Owner's personnel on recommended maintenance procedures.
  3. Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

### 3.6 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 door hardware is without damage or deterioration at time of Substantial Completion.

### 3.7 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.

### 3.8 DOOR HARDWARE SCHEDULE

- A. The hardware sets listed below indicate the items of hardware required for each opening. It is the bidders responsibility to accurately furnish the proper quantities, items, sizes, weights and functions as required by the plans and specifications. If an opening has, through error, been omitted from the following hardware sets, it shall be the bidders responsibility to supply hardware of equivalent quality and quantity, as that which is specified for a comparable opening.

SINGLE OUTSIDE DOOR

HW1

Doors

Continuous Gear Hinge  
Exit Device  
Closer  
Weatherstripping  
Door Bottom Sweep  
Drip Strip  
Kickplate  
Threshold

PRIVATE TOILET

HW2

Doors

Hinges  
Lockset (function F)  
Door Stops  
Silencers

LOCKER ROOM OR LOCKER VESTIBULE

HW3

Doors

Hinges  
Push Plate  
Pulls  
Closer  
Kick Plate  
Door Stop  
Silencers

FIRE RATED CORRIDOR OR STAIR EXIT

HW4

Doors

Hinges  
Closer  
Exit Device  
Kickplate  
Door Stop  
Silencers

BARBER FOODS  
ADMIN/SECURITY VESTIBULE

DOOR HARDWARE



OFFICE OR STORAGE

HW5

Doors

Hinges

Locksets (function D)

Door Stops

Silencers

SINGLE RATED STORAGE

HW6

Doors

Hinges

Lockset (function D)

Closer

Door Stops

Silencers

END OF SECTION

SECTION 08800

GLAZING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Doors.

1.2 SUBMITTALS

- A. Product Data: For each glass product and glazing material indicated.

1.3 QUALITY ASSURANCE

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.
- B. Safety Glass: Category II materials complying with testing requirements in 16 CFR 1201 and ANSI Z97.1.

1.4 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Manufacturer's Special Warranty on Insulating Glass: Written warranty, made out to Owner and signed by insulating-glass manufacturer agreeing to furnish replacements for insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.
1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 HEAT-TREATED FLOAT GLASS

- A. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.

- B. Clear Tempered Float Glass: ASTM C 1048; Type I (transparent glass, flat); Quality q3 (glazing select); Class 1 (clear), Kind FT (fully tempered), 1/4 inch (6 mm) thick.
1. Application: Interior non-rated doors.

## 2.2 WIRED GLASS

- A. Wired Glass: ASTM C 1036, Type II (patterned and wired glass, flat), Class 1 (clear), Quality q8 (glazing); 6.4 mm thick; of form and mesh pattern indicated below:
1. Polished Wired Glass: Form 1 (wired, polished both sides), and as follows:
    - a. Mesh m1 (diamond).
  2. Application: Interior fire-rated doors.

## 2.3 INSULATING GLASS

- A. Insulating-Glass Units: Preassembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CEA units and with requirements specified in this Article.
1. Provide Kind HS (heat-strengthened) float glass in place of annealed glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in "Performance Requirements" Article.
  2. Provide Kind FT (fully tempered) where safety glass or tinted glass is indicated.
- B. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated in the this article are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.
- C. Sealing System: Dual seal, with primary and secondary sealants as follows:
1. Polyisobutylene and silicone.
- D. Spacer Specifications: Manufacturer's standard spacer material and construction.
- E. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:
1. Aluminum with mill or clear-anodized finish.
  2. Desiccant: Molecular sieve or silica gel, or blend of both.
  3. Corner Construction: Manufacturer's standard corner construction.
- F. Insulating Glass, Type 1: Where glass of this designation is indicated, provide uncoated insulating-glass units complying with the following:
1. Overall Unit Thickness and Thickness of Each Lite: 16 and 3 mm
  2. Interspace Content: Air.
  3. Indoor Lite: Type I (transparent glass, flat), Class 1 (clear) float glass.
  4. Outdoor Lite: Type I (transparent glass, flat) float glass.
    - a. Class 1 (clear).
  5. Application: Exterior hollow metal doors.

## 2.4 ELASTOMERIC GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:

1. **Compatibility:** Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  2. **Suitability:** Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  3. **Colors of Exposed Glazing Sealants:** As selected by Architect from manufacturer's full range for this characteristic.
- B. Elastomeric Glazing Sealant Standard:** Comply with ASTM C 920 and other requirements indicated for each liquid-applied, chemically curing sealant, including those referencing ASTM C 920 classifications for type, grade, class, and uses.
1. **Additional Movement Capability:** Where additional movement capability is specified in the Glazing Sealant Schedule, provide products with the capability, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, to withstand the specified percentage change in the joint width existing at time of installation and remain in compliance with other requirements in ASTM C 920 for uses indicated.
- C. Low-Modulus Nonacid-Curing Silicone Glazing Sealant:** Where glazing sealants of this designation are indicated, provide products complying with the following:
1. **Products:** Available products include the following:
    - a. 790; Dow Corning.
    - b. Silpruf; GE Silicones.
    - c. 864; Pecora Corporation.
    - d. Omnisel; Sonneborn, Div of ChemRex, Inc.
    - e. Spectrem I; Tremco.
  2. **Type and Grade:** S (single component) and NS (nonsag).
  3. **Class:** 25.
  4. **Additional Movement Capability:** 50 percent movement in extension and 50 percent movement in compression for a total of 100 percent movement.
  5. **Applications:** Wet sealant installations.

## 2.5 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tape:** Preformed, butyl-based elastomeric tape with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

## 2.6 MISCELLANEOUS GLAZING MATERIALS

- A. General:** Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Elastomeric material with a Shore A durometer hardness of 85, plus or minus 5.
- D. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

## 2.7 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

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

## PART 3 - EXECUTION

### 3.1 GLAZING, 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. Glazing channel dimensions, as indicated on Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- 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 sealant-substrate 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 the length plus width is larger than 50 inches (1270 mm) as follows:

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 (3-mm) 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.

### 3.2 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until just before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

### 3.3 PROTECTION AND CLEANING

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, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended 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 build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including 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 by glass manufacturer.

END OF SECTION

SECTION 09220

METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes non-load-bearing and load-bearing steel framing members for the following applications:
  - 1. Interior framing systems (e.g., supports for partition walls, etc.).
  - 2. Interior load-bearing wall framing.
  - 3. Ceiling joist framing.

1.2 PERFORMANCE REQUIREMENTS

- A. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."
  - 1. Headers: Design according to AISI's "Standard for Cold-Formed Steel Framing - Header Design."
  - 2. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

1.3 SUBMITTALS

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

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed cold-formed metal framing similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. 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.
- C. 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.
- D. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."



1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."
- E. SSMA Section Properties: Provide cold-formed metal framing members with section properties that equal or exceed the properties indicated in SSMA's "Product Technical Information" publication.
- 1.5 DELIVERY, STORAGE, AND HANDLING
    - A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.
    - B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  1. Steel Framing and Furring:
    - a. Dietrich Industries, Inc., and UltraSteel™ Framing.
    - b. MarinoWare; Division of Ware Inc.
    - c. National Gypsum Company.
    - d. The Steel Network, Inc.
    - e. Unimast, Inc.

### 2.2 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 (Z120), hot-dip galvanized or equivalent per ASTM A1003.

### 2.3 LOAD-BEARING MATERIALS

- A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
  1. Grade: ST33H or ST50H as required by structural performance.
  2. Coating: G60, A60, AZ50, or GF30.

B. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated.
2. Flange Width: As indicated.

C. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: Matching steel studs.
2. Flange Width: As indicated.

#### 2.4 CEILING JOIST FRAMING

A. Steel Ceiling Joists: Manufacturer's standard C-shaped steel sections, of web depths indicated, unpunched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: As indicated.
2. Flange Width: As indicated.

#### 2.5 STEEL FRAMING FOR FRAMED ASSEMBLIES

A. Steel Studs and Runners: ASTM C 645.

1. Minimum Base-Metal Thickness: As indicated on Drawings.
2. Depth: As indicated on Drawings.

#### 2.6 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated.

#### 2.7 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

C. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

D. Mechanical Fasteners: ASTM C 1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.
2. Minimum size; No. 10-16 (D=0.19"), with length adequate for 3 threads to project through the connected members.

### 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 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

#### 3.3 INSTALLING NON-STRUCTURAL FRAMED ASSEMBLIES

A. Installation Standard: ASTM C 754, except comply with framing sizes and spacing indicated.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install studs so flanges within framing system point in same direction.

1. Space studs as follows:

- a. Single-Layer Construction: 16 inches o.c., unless otherwise indicated.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
  - a. Install two 0.312 inch (0.79 mm) (20 gage) studs at each jamb, unless otherwise indicated.
  - b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
  - c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
2. Other Framed Openings: Frame openings other than door openings the same as required for door openings, unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
- E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

### 3.4 INTERIOR LOAD-BEARING WALL INSTALLATION

- A. Cold-formed metal framing is to be field assembled.
- B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.
- D. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Space studs as follows:
  1. Stud Spacing: As indicated.
- E. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

### 3.5 JOIST INSTALLATION

- A. Install perimeter joist track sized to match joists. Align and securely anchor or fasten track to supporting structure at corners, ends, and spacings indicated on Shop Drawings.
- B. Install joists bearing on supporting frame, level, straight, and plumb; adjust to final position, brace, and reinforce. Fasten joists to both flanges of joist track.

1. Install joists over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm).
  2. Reinforce ends and bearing points of joists with web stiffeners, end clips, joist hangers, steel clip angles, or steel-stud sections as indicated on Shop Drawings.
- C. Space joists not more than 2 inches (51 mm) from abutting walls, and as follows:
1. Joist Spacing: 16 inches (406 mm).
- D. Frame openings with built-up joist headers consisting of joist and joist track, nesting joists, or another combination of connected joists if indicated.
- E. Install joist reinforcement at interior supports with single, short length of joist section located directly over interior support, with lapped joists of equal length to joist reinforcement, or as indicated on Shop Drawings.
1. Install web stiffeners to transfer axial loads of walls above.
- F. Install bridging at intervals indicated on Shop Drawings. Fasten bridging at each joist intersection as follows:
1. Bridging: Joist-track solid blocking of width and thickness indicated, secured to joist webs.
- G. Secure joists to load-bearing interior walls as indicated to prevent lateral movement of bottom flange.
- H. Install miscellaneous joist framing and connections, including web stiffeners, closure pieces, clip angles, continuous angles, hold-down angles, anchors, and fasteners, to provide a complete and stable joist-framing assembly.

### 3.6

#### REPAIRS AND PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 092216

SECTION 09260

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior gypsum wallboard.
2. Non-load-bearing steel framing.

1.2 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- (300-mm-) long length for each aluminum trim accessory indicated.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory" and GA-600, "Fire Resistance Design Manual."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Steel Framing and Furring:
  - a. Dietrich Industries, Inc.
  - b. Marino Ware; Division of Ware Ind.
  - c. National Gypsum Company.
  - d. Unimast, Inc.
2. Gypsum Board and Related Products:
  - a. G-P Gypsum Corp.
  - b. National Gypsum Company.
  - c. United States Gypsum Co.

## 2.2 STEEL PARTITION AND SOFFIT FRAMING

- A. Components, General: As follows:
1. Comply with ASTM C 754 for conditions indicated.
  2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized zinc coating.
- B. Steel Studs and Tracks: ASTM C 645.
1. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm) (25 gage).
  2. Depth: As indicated on the plans.
- C. Deep-Leg Deflection Track: ASTM C 645 top runner with 2-inch- (50.8-mm-) deep flanges.
- D. Proprietary Firestop Track: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Available Product: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Fire Trak Corp.; Fire Trak.
    - b. Metal-Lite, Inc.; The System.
- E. Proprietary Firestopping Track: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated and provide head-of-wall firestopping system; in thickness not less than indicated for studs and in width to accommodate depth of studs.
1. Available Product: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Grace Construction Products; The FlowTrak System.
- F. Cold-Rolled Channel Bridging: 0.0538-inch (1.37-mm) bare steel thickness, with minimum 1/2-inch- (12.7-mm-) wide flange.
1. Depth: 1-1/2 inches (38.1 mm).
  2. Clip Angle: 1-1/2 by 1-1/2 inch (38.1 by 38.1 mm), 0.068-inch- (1.73-mm-) thick, galvanized steel.
- G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
1. Minimum Base Metal Thickness: 0.0179 inch (0.45 mm).
  2. Depth: 7/8 inch (22.2 mm).
- H. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (31.8 mm), wall attachment flange of 7/8 inch (22.2 mm), minimum bare metal thickness of 0.0179 inch (0.45 mm), and depth required to fit insulation thickness indicated.
- I. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

## 4.5 INTERIOr GYPSUM WALLBOARD

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

- B. Gypsum Wallboard: ASTM C 36.
  - 1. Type X:
    - a. Thickness: 5/8 inch (15.9 mm).
    - b. Long Edges: Tapered.
  
- C. Mold-Resistant Gypsum Wallboard (for Toilets and Locker Rooms): Gypsum panels with inorganic glass fiber mat, embedded into the side of a gypsum core, which protects the wall cavity side where protection from moisture, is needed most. ASTM D 3273 and ASTM C117, CSA-A82.27-M.
  - 1. Back side: Glass fiber mat resists growth of mold or mildew (per ASTM D 3273).
  - 2. Face side: Heavy duty paper.
  - 3. Core: Noncombustible gypsum core (ASTM E 136).
  - 4. Thickness: 5/8 inch.
  - 5. Long edges: Tapered.
  - 6. Location: Interior side of exterior wall framing.
  - 7. Basis of design Product: "DensGuard", "DensArmor" as manufactured by G-P Gypsum.

#### 2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
  - 1. Material:
    - a. Galvanized steel sheet or rolled zinc at corners.
    - b. Plastic where abutting exterior metal doors and windows.
  - 2. Shapes:
    - a. Cornerbead: Use at outside corners, unless otherwise indicated.
    - b. LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges or where abutting different materials.

#### 2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475.
  
- 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 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 compound or 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 compound or drying-type, all-purpose compound.
  - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.

#### 2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.