SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Hollow metal doors hung in hollow metal frames at interior and exterior locations.
2. Hollow metal door frames for wood doors and borrowed lights at interior locations.
3. Glazed openings in hollow metal doors.

1.2 RELATED REQUIREMENTS

A. Frames fabricated of structural steel: Section 05 50 00, METAL FABRICATIONS.

B. Aluminum frames entrance work: Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.

C. Door Hardware: Section 08 71 00, DOOR HARDWARE.

D. Glazing: Section 08 80 00, GLAZING.

E. Card Readers and Biometric Devices: Section 28 13 00, PHYSICAL ACCESS CONTROL SYSTEM.

F. Security Monitors: Section 28 23 00, VIDEO SURVEILLANCE.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. American National Standard Institute (ANSI):
1. A250.8-2014 - Standard Steel Doors and Frames.

C. ASTM International (ASTM):
1. A240/A240M-15b - Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
2. A653/A653M-15 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip.
3. A1008/A1008M-15 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength Low Alloy and High Strength Low Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
4. B209-14 - Aluminum and Aluminum-Alloy Sheet and Plate.
5. B209M-14 - Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
6. B221-14 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
7. B221M-13 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
8. D3656/D3656M-13 - Insect Screening and Louver Cloth Woven from Vinyl Coated Glass Yarns.
9. E90-09 - Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

D. Federal Specifications (Fed. Spec.):
1. L-S-125B - Screening, Insect, Nonmetallic.

E. Master Painters Institute (MPI):
1. No. 18 - Primer, Zinc Rich, Organic.

F. National Association of Architectural Metal Manufacturers (NAAMM):
   1. AMP 500-06 - Metal Finishes Manual.

G. National Fire Protection Association (NFPA):
   1. 80-16 - Fire Doors and Other Opening Protectives.

H. UL LLC (UL):
   1. 10C-09 - Positive Pressure Fire Tests of Door Assemblies.
   2. 1784-15 - Air Leakage Tests of Door Assemblies and Other Opening Protectives.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:
   1. Show size, configuration, and fabrication and installation details.

C. Manufacturer's Literature and Data:
   1. Description of each product.
   2. Include schedule showing each door and frame requirements fire label and smoke control label for openings.
   3. Installation instructions.

D. Sustainable Construction Submittals:
   1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.

E. Test reports: Certify each product complies with specifications.
   1. Sound rated door.

F. Qualifications: Substantiate qualifications comply with specifications.
   1. Manufacturer with project experience list.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Regularly manufactures specified products.
   2. Manufactured specified products with satisfactory service on five similar installations for minimum five years.
      a. Project Experience List: Provide contact names and addresses for completed projects.

1.6 DELIVERY

A. Fasten temporary steel spreaders across the bottom of each door frame before shipment.

B. Deliver products in manufacturer's original sealed packaging.

C. Mark packaging, legibly. Indicate manufacturer's name or brand, type, production run number, and manufacture date.

D. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

A. Store products indoors in dry, weathertight conditioned facility.

B. Protect products from damage during handling and construction operations.

1.8 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Design hollow metal doors and frames complying with specified performance:
   1. Fire Doors and Frames: UL 10C; NFPA 80 labeled.
      a. Fire Ratings: See drawings.
      b. Where continuous hinges are specified in Section 08 71 00, provide a second labels for the head of the frame and top of doors.
   2. Stair Doors: Temperature rise rated fire doors.
   3. Smoke Control Doors and Frames: UL 1784; NFPA 80 labeled, maximum 0.15424 cu. m/s/sq. m (3.0 cfm/sf) at 24.9 Pa (0.10 inches water gage) pressure differential.
   4. Sound Rated Doors and Frames: Minimum 45 sound transmission class (STC) when tested according to ASTM E90.
   5. Thermal Resistance: R-4.75 R-value 0.57 U-value), minimum at exterior doors.

2.2 MATERIALS

A. Stainless Steel: ASTM A240/A240M; Type 316.

B. Sheet Steel: ASTM A1008/A1008M, cold-rolled.

C. Galvanized Sheet Steel: ASTM A653.

D. Insect Screening: ASTM D3656/D3656M, 18 by 18 aluminum wire mesh.

E. Aluminum Sheet: ASTM B209M (ASTM B209).

F. Aluminum Extrusions: ASTM B221M (ASTM B221).

2.3 PRODUCTS - GENERAL

A. Basis of Design: See Construction documents..

B. Provide hollow metal doors and frames from one manufacturer.

C. Sustainable Construction Requirements:
   1. Steel Recycled Content: 30 percent total recycled content, minimum.
   2. Stainless Steel Recycled Content: 70 percent total recycled content, minimum.
   3. Aluminum Recycled Content: 80 percent total recycled content, minimum.

2.4 HOLLOW METAL DOORS

A. Hollow Metal Doors: ANSI A250.8; 44 mm (1-3/4 inches) thick.
   1. Interior Doors: Level 2 and Physical Performance Level B, heavy duty; Model 2, seamless
   2. Exterior Doors: Level 3 and Physical Performance Level A, extra-heavy duty; Model 2, seamless.

B. Door Faces:
   1. Interior Doors: Galvanized sheet steel minimum Z120 or ZF120 (G40 or A40).
   2. Exterior Doors: Galvanized sheet steel minimum Z275 (G90) coating.

C. Door Cores:
   1. Interior Doors: Kraft paper honeycomb or vertical steel stiffeners.
   2. Exterior Doors: Polyurethane.
   3. Fire Doors: Manufacturer's standard complying with specified fire rating performance.

2.5 HOLLOW METAL FRAMES

A. Hollow Metal Frames: ANSI A250.8; Face welded.
   1. Interior Frames:
      a. Level 2 and Level 3 Hollow Metal Doors: 1.3 mm (0.053 inch) thick.
      b. Level 1 Hollow Metal Doors: 1.0 mm (0.042 inch) thick.

c. Wood Doors and Borrowed Lights: 1.3 mm (0.053 inch) thick.
2. Interior Borrowed Light Frames: 1.3 mm (0.051 inch) thick.
3. Exterior Frames:
a. Level 3Hollow Metal Doors: 1.3 mm (0.053 inch) thick.
b. Level 4 Hollow Metal Doors: 1.7 mm (0.067 inch) thick.

B. Frame Materials:
1. Interior Frames: Galvanized sheet steel minimum Z120 or ZF120 (G40 or A40)coating.
2. Exterior Frames: Galvanized sheet steel minimum Z275 (G90) coating.

2.6 FABRICATION

A. Hardware Preparation: ANSI A250.8; for hardware specified in Section 08 71 00, DOOR HARDWARE.

B. Hollow Metal Door Fabrication:
1. Close top edge of exterior doors flush and seal to prevent water intrusion.
2. Fill spaces between vertical steel stiffeners with insulation.

C. Fire and Smoke Control Doors:
1. Close top and vertical edges flush.
2. Apply steel astragal to active leaf at pair and double egress doors.
a. Exception: Where vertical rod exit devices are specified for both leaves swinging in same direction.
3. Fire and Smoke Control Door Clearances: NFPA 80.
4. Labels:
a. Comply with NFPA 252, UL 10C, and labeled by qualified testing and inspection agency showing fire resistance rating.
b. Metal labels with raised or incised markings.
c. Where continuous hinges are specified in Section 08 71 00, provide a second labels for the top of doors.

D. Custom Metal Hollow Doors:
1. Provide custom hollow metal doors where nonstandard steel doors are shown on drawings.
a. Provide door sizes, design, materials, construction, gages, and finish as specified for standard steel doors.

E. Sound Rated Doors:
1. Seals: Integral spring type automatic door bottom seal.
2. Fabricate vision panel cutouts and frames to receive double glazing as shown on drawings.

F. Hollow Metal Frame Fabrication:
1. Fasten mortar guards to back of hardware reinforcements, except on lead-lined frames.
2. Concealed Closers in Head Frame: Provide 1 mm (0.042 inch) thick steel removable stop sections for access to concealed face plates and control valves, except when cover plates are furnished with closer.
3. Terminated Stops: ANSI A250.8.
4. Borrowed Light Frames:
a. Provide integral stop on exterior, corridor, or secure side of door.
b. Design rabbet width and depth to receive glazing material or panel shown on drawings.
5. Two Piece Frames:
a. One piece unequal leg finished rough buck sub-frames as shown, drilled for anchor bolts.
b. Unequal leg finished frames formed to fit subframes and secured to subframe legs with countersunk, flat head screws, spaced 300 mm (12 inches) on center at head and jambs on both sides.

c. Preassemble at factory for alignment.

6. Frame Anchors:
   a. Floor anchors:
      1) Provide extension type floor anchors to compensate for depth of floor fills.
      2) Provide 1.3 mm (0.053 inch) thick steel clip angles welded to jamb and drilled to receive floor fasteners.
      3) Provide 50 mm by 50 mm by 9 mm (2 inch by 2 inch by 3/8 inch) clip angle for lead lined frames, drilled for floor fasteners.
      4) Provide mullion 2.3 mm (0.093 inch) thick steel channel anchors, drilled for two floor fasteners and frame anchor screws.
      5) Provide continuous 1 mm (0.042 inch) thick steel rough bucks drilled for floor fasteners and frame anchor screws for sill sections.
         a) Space floor bolts50 mm (24 inches) on center.
   b. Jamb anchors:
      1) Place anchors on jambs:
         a) Near top and bottom of each frame.
         b) At intermediate points at maximum 600 mm (24 inches) spacing.
      2) Form jamb anchors from steel minimum 1 mm (0.042 inch) thick.
      3) Anchors set in masonry: Provide adjustable anchors designed for friction fit against frame and extended into masonry minimum 250 mm (10 inches). Provide one of following types:
         a) Wire Loop Type: 5 mm (3/16 inch) diameter wire.
         b) T-Shape type.
         c) Strap and stirrup type: Corrugated or perforated sheet steel.
      4) Anchors for stud partitions: Provide tabs for securing anchor to sides of studs. Provide one of the following:
         a) Welded type.
         b) Lock-in snap-in type.
      5) Anchors for frames set in prepared openings:
         a) Steel pipe spacers 6 mm (1/4 inch) inside diameter, welded to plate reinforcing at jamb stops, or hat shaped formed strap spacers 50 mm (2 inches) wide, welded to jamb near stop.
         b) Drill jamb stop and strap spacers for 6 mm (1/4 inch) flat head bolts to pass through frame and spacers.
         c) Two piece frames: Subframe or rough buck drilled for 6 mm (1/4 inch) bolts.
      6) Anchors for observation windows and other continuous frames set in stud partitions.
         a) Weld clip anchors to sills and heads of continuous frames over 1200 mm (4 feet) long.
         b) Space maximum 600 mm (24 inches) on centers.
      7) Modify frame anchors to fit special frame and wall construction.
      8) Provide special anchors where shown on drawings and where required to suit application.

7. Labels:
   a. Comply with NFPA 252, UL 10C, and labeled by qualified testing and inspection agency showing fire resistance rating.
   b. Metal labels with raised or incised markings.
   c. Where continuous hinges are specified in Section 08 71 00, provide a second label for the head of frame.

G. Sound Rated Door Frames:
   1. Seals: Integral continuous gaskets on frames.

2.7 FINISHES

A. Galvanized Steel: ANSI A250.8; shop primed.

B. Stainless Steel: NAAMM AMP 500; No. 4 polished finish.
   1. Blend welds to match adjacent finish.

C. Finish exposed surfaces after fabrication.

D. Aluminum Anodized Finish: NAAMM AMP 500.
   1. Clear Anodized Finish: AA-C22A41; Class I Architectural, 0.018 mm (0.7 mil) thick.
   2. Color Anodized Finish: AA-C22A42 or AA-C22A44; Class I Architectural, 0.018 mm (0.7 mil) thick.
   3. Clear Anodized Finish: AA-C22A31; Class II Architectural, 0.01 mm (0.4 mil) thick.
   4. Color Anodized Finish: AA-C22A32 or AA-C22A34; Class II Architectural, 0.01 mm (0.4 mil) thick.

2.8 ACCESSORIES

A. Primers: ANSI A250.8.

B. Barrier Coating: ASTM D1187/D1187M.

C. Welding Materials: AWS D1.1/D1.1M, type to suit application.

D. Clips Connecting Members and Sleeves: Match door faces.

E. Fasteners: Galvanized steel .
   1. Metal Framing: Steel drill screws.
   2. Masonry and Concrete: Expansion bolts and power actuated drive pins.

F. Anchors: Galvanized steel.

G. Galvanizing Repair Paint: MPI No. 18.

H. Insulation: Unfaced mineral wool.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.

B. Protect existing construction and completed work from damage.

C. Apply barrier coating to metal surfaces in contact with cementitious materials to minimum 0.7 mm (30 mils) dry film thickness.

3.2 INSTALLATION - GENERAL

A. Install products according to manufacturer's instructions and approved submittal drawings.
   1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.
   2. Install fire doors and frames according to NFPA 80.
   3. Install smoke control doors and frames according to NFPA 105.

3.3 FRAME INSTALLATION

A. Apply barrier coating to concealed surfaces of frames built into masonry.

B. Plumb, align, and brace frames until permanent anchors are set.
   1. Use triangular bracing near each corner on both sides of frames with temporary wood spreaders at midpoint.
   2. Use wood spreaders at bottom of frame when shipping spreader is removed.

3. Where construction permits concealment, leave shipping spreaders in place after installation, otherwise remove spreaders when frames are set and anchored.
4. Remove wood spreaders and braces when walls are built and jamb anchors are secured.

C. Floor Anchors:
1. Anchor frame jambs to floor with two expansion bolts.
   a. Lead Lined Frames: Use 9 mm (3/8 inch) diameter bolts.
   b. Other Frames: Use 6 mm (1/4 inch) diameter bolts.
2. Power actuated drive pins are acceptable to secure frame anchors to concrete floors.

D. Jamb Anchors:
1. Masonry Walls:
   a. Embed anchors in mortar.
   b. Fill space between frame and masonry with grout or mortar as walls are built.
2. Metal Framed Walls: Secure anchors to sides of studs with two fasteners through anchor tabs.
3. Prepared Masonry and Concrete Openings:
   a. Direct Securement: 6 mm (1/4 inch) diameter expansion bolts through spacers.
   b. Subframe or Rough Buck Securement:
      1) 6 mm (1/4 inch) diameter expansion bolts on 600 mm (24 inch) centers.
      2) Power activated drive pins on 600 mm (24 inches) centers.
   c. Secure two-piece frames to subframe or rough buck with machine screws on both faces.

E. Frames for Sound Rated Doors: Fill frames with insulation.

F. Touch up damaged factory finishes.
1. Repair galvanized surfaces with galvanized repair paint.
2. Repair painted surfaces with touch up primer.

3.4 DOOR INSTALLATION

A. Install doors plumb and level.

B. Adjust doors for smooth operation.

C. Touch up damaged factory finishes.
1. Repair galvanized surfaces with galvanized repair paint.
2. Repair painted surfaces with touch up primer.

3.5 CLEANING

A. Clean exposed door and frame surfaces. Remove contaminants and stains.

3.6 PROTECTION

A. Protect doors and frames from traffic and construction operations.

B. Remove protective materials immediately before acceptance.

C. Repair damage.

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SECTION 08 14 00

INTERIOR WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Interior flush wood doors transparent finish.
   a. Fire rated doors.
   b. Smoke rated doors.
   c. Acoustical doors.

1.2 RELATED REQUIREMENTS

A. Paints and Coatings and Composite Wood and Agrifiber VOC Limits: Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.

B. Door Hardware including hardware location (height): Section 08 71 00, DOOR HARDWARE.

C. Installation of Doors and Hardware: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES Section 08 71 00, DOOR HARDWARE.

D. Door Finish: See Construction documents..

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. American National Standards Institute/Window and Door Manufacturers Association (ANSI/WDMA):
1. I.S. 1A-13 - Architectural Wood Flush Doors.

C. ASTM International (ASTM):
1. E90-09 - Laboratory Measurements of Airborne Sound Transmission Loss of Building Partitions and Elements.

D. National Fire Protection Association (NFPA):
1. 80-16 - Fire Doors and Other Opening Protectives.
2. 252-12 - Fire Tests of Door Assemblies.

E. UL LLC (UL):
1. 10C-09 - Positive Pressure Fire Tests of Door Assemblies.

F. Window and Door Manufacturers Association (WDMA):
1. TM 7-14 - Cycle-Slam Test.
2. TM 8-14 - Hinge Loading Test.
3. TM 10-14 - Screw Holding Capacity.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:
1. Show size, configuration, and fabrication and installation details.
2. Include details of glazing .
3. Indicate project specific requirements not included in Manufacturer's Literature and Data submittal.

C. Manufacturer's Literature and Data:

1. Description of each product.
2. Fire rated doors showing conformance with NFPA 80.

D. Samples:
1. Corner section of flush veneered door 300 mm (12 inches) square, showing details of construction, labeled to show grade and type number and conformance to specified standard.
2. Veneer sample 200 mm by 275 mm (8 inch by 11 inch) showing specified wood species sanded to receive a transparent finish. Factory finish veneer sample where the prefinished option is accepted.

E. Sustainable Construction Submittals:
1. Low Pollutant-Emitting Materials:
   a. Show volatile organic compound types and quantities.

F. Test Reports: Indicate each product complies with specifications.
1. Screw Holding Capacity Test.
2. Cycle-Slam Test.
3. Hinge-Loading Test.

G. Operation and Maintenance Data:
1. Care instructions for each exposed finish product.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications:
1. Regularly and presently manufactures specified products.
2. Manufactures specified products with satisfactory service on five similar installations for minimum five years.

1.6 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.
1. Minimum 0.15 mm (6 mil) polyethylene bags or cardboard packaging to remain unbroken during delivery and storage.

B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, and manufacture date.
1. Identify door opening corresponding to Door Schedule.

C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.7 STORAGE AND HANDLING

A. Store products indoors in dry, weathertight conditioned facility.
1. Store doors according to ANSI/WDMA I.S. 1A.

B. Protect products from damage during handling and construction operations.

1.8 FIELD CONDITIONS

A. Environment:
1. Product Temperature: Minimum 21 degrees C (70 degrees F) for minimum 48 hours before installation.
2. Work Area Ambient Temperature Range: 21 to 27 degrees C (70 to 80 degrees F) continuously, beginning 48 hours before installation.
3. Install products when building is permanently enclosed and when wet construction is completed, dried, and cured.
   a. Comply with door manufacturer's instructions for relative humidity.

1.9 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

B. Manufacturer's Warranty: Warrant interior factory finished flush wood doors against material and manufacturing defects.
   1. Warranty Period: Lifetime of original installation.

PART 2 - PRODUCTS

2.1 PRODUCTS - GENERAL

A. Provide each product from one manufacturer.

B. Sustainable Construction Requirements:
   1. Low Pollutant-Emitting Materials: Comply with VOC limits specified in Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS for the following products:
      a. Paints and coatings.
      b. Composite wood and agrifiber.

2.2 FLUSH WOOD DOORS

A. General:
   1. ANSI/WDMA I.S. 1A, Extra Heavy Duty.
   2. Adhesive: Type II.
   3. Core: Structural composite lumber, except when mineral core is required for fire rating.
   4. Thickness: 44 mm (1-3/4 inches) unless otherwise shown or specified.

B. Faces:
   1. ANSI/WDMA I.S. 1A.
   2. One species throughout project unless scheduled or otherwise shown.
   3. Transparent Finished Faces: Premium Grade. Plain sliced, white maple
      a. A Grade face veneer.
      b. Match face veneers for doors for uniform effect of color and grain at joints.
      c. Door Edges: Same species as door face veneer, except maple is acceptable for stile face veneer on birch doors.
      d. In existing buildings, where doors are required to have transparent finish, use wood species, grade, and assembly of face veneers to match adjacent existing doors.
   4. Painted Finishes: Custom Grade, mill option close grained hardwood, premium or medium density overlay.
   5. Factory sand doors for finishing.

C. Wood For Stops, Louvers, Muntins and Moldings For Flush Doors Required to Have Transparent Finish:
   1. Solid wood of same species as face veneer, except maple is acceptable on birch doors.
   2. Glazing:
      a. On non-fire-rated doors, use applied wood stops nailed tightly on room side and attached on opposite side with flathead, countersunk wood screws, spaced approximately 125 mm (5 inches) on center.
   3. Wood Louvers:
      a. Door manufacturer's standard product, fabricated of solid wood sections.
      b. Wood Slats: minimum 5 mm (3/16 inch) thick.
      c. Stiles routed out to receive slats.
      d. Secure louvers in prepared cutouts with wood stops.

D. Stiles and Rails:
   1. Composite material having screw withdrawal force greater than minimum performance level value when tested according to WDMA TM 10.

2. Provide adequate blocking for bottom of doors having mechanically operated door bottom seal meeting or exceeding performance duty level per WDMA TM 10 for horizontal door edge screw holding.
3. Rabbeted transom meeting rail edges match face veneers of doors. Bottom rail of transom panel match face veneer on non-rabbeted meeting rail edge.

E. Fire-Rated Wood Doors:
1. Fire Resistance Rating:
   a. B Label: 1-1/2 hours.
   b. C Label: 3/4 hour.
2. Labels:
   a. Comply with NFPA 252, UL 10C, and labeled by qualified testing and inspection agency showing fire resistance rating.
   b. Metal labels with raised or incised markings.
   c. Where continuous hinges are specified in Section 08 71 00, provide a second labels for the top of doors.
3. Performance Criteria for Stiles of Doors Utilizing Standard Mortise Leaf Hinges:
   a. Hinge Loading: WDMA TM 8. Average of 10 test samples for Extra Heavy Duty doors.
   b. Direct Screw Withdrawal: WDMA TM 10 for Extra Heavy Duty doors. Average of 10 test samples using a steel, fully threaded #12 wood screw.
   c. Cycle-Slam: 1,000,000 cycles with no loose hinge screws or other visible signs of failure when tested according to WDMA TM 7.
4. Hardware Reinforcement:
   a. Provide fire and/or smoke rated doors with hardware reinforcement blocking.
   b. Size of lock blocks as required to secure hardware specified.
   c. Top, Bottom and Intermediate Rail Blocks: Minimum 125 mm (5 inches) by full core width.
   d. Reinforcement blocking in compliance with labeling requirements.
   e. Mineral material similar to core is not acceptable.
5. Other Core Components: Manufacturer's standard as allowed by labeling requirements.
6. Glazed Vision Panel Frame: Steel approved for use in labeled doors.
7. Astragal: Steel type for pairs of doors.

F. Smoke Barrier Doors:
1. Glazed Vision Panel Frame: Steel approved for use in labeled doors.
2. Astragal: Steel type for pairs of doors, including double egress doors.

G. Sound Rated Doors:
1. Fabricated as specified for flush wood doors with additional construction requirements to comply with specified sound transmission class (STC).
2. STC Rating of door assembly in place when tested according to ASTM E90 by independent acoustical testing laboratory minimum 35.
3. Accessories:
   a. Frame Gaskets and Automatic Door Bottom Seal: As specified in Section 08 71 00, DOOR HARDWARE.

2.3 FABRICATION

A. Factory machine interior wood doors to receive hardware, bevels, undercuts, cutouts, accessories and fitting for frame.
1. Factory fit fire rated doors according to NFPA 80.

B. Rout doors for hardware using templates and location heights specified in Section 08 71 00, DOOR HARDWARE.

C. Factory fit doors to frame, bevel lock edge of doors 3 mm (1/8 inch) for each 50 mm (2 inches) of door thickness undercut where shown.

D. Clearances between Doors and Frames and Floors:
   1. Fire Rated Doors: Comply with NFPA 80.
      a. Doors with Automatic Bottom Seal: Maximum clearance 10 mm (3/8 inch) at threshold.
      b. Other Door Bottoms: Maximum 3 mm (1/8 inch) clearance at the jambs, heads, and meeting stiles, and a 19 mm (3/4 inch) clearance at bottom, except as otherwise specified.
   2. Door Jambs, Heads, and Meeting Stiles: Maximum 3 mm (1/8 inch).

E. Provide cutouts for glazed openings.

F. Finish surfaces, including both faces, top and bottom and edges of the doors smooth to touch.

G. Identify each door on top edge.
   1. Mark with stamp, brand or other indelible mark, giving manufacturer's name, door's trade name, construction of door, date of manufacture and quality.
   2. Mark door or provide separate certification including name of inspection organization.
   3. Identify door manufacturing standard, including glue type.
   4. Identify veneer and quality certification.
   5. Identification of preservative treatment for stile and rail doors.

2.4 FINISHES

A. Factory Transparent Finish:
   1. Factory finish flush wood doors.
      a. ANSI/WDMA I.S. 1A Section F-3 Finish System Descriptions for System 5, Conversion Varnish or System 7, Catalyzed Vinyl.
      b. Use stain when required to produce finish specified in See Construction documents..
         1) Stain: Cane by Masonite Architectural or equal.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.
   1. Verify door frames are properly anchored.
   2. Verify door frames are plumb, square, in plane, and within tolerances for door installation.

B. Protect existing construction and completed work from damage.

C. Install astragal on active leaf of pair of smoke doors and one leaf of double egress smoke doors.

3.2 INSTALLATION

A. Install products according to manufacturer's instructions and approved submittal drawings.
   1. Install fire rated doors according to NFPA 80.
   2. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

3.3 PROTECTION

A. After installation, place shipping container over door and tape in place.
   1. Do not apply tape to door faces and edges.

B. Provide protective covering over exposed hardware in addition to covering door.

C. Maintain covering in good condition until removal is directed by Contracting Officer's Representative.

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SECTION 08 17 10

INTEGRATED DOOR ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Integrated door assemblies including metal door frame, door, and hardware, unless specified in another Section, installed at cross-corridor locations.

B. Smoke and draft control seals, unless specified in another Section.

1.2 RELATED REQUIREMENTS

A. Non-Flooring Adhesives and Sealants and Paints and Coatings VOC Limits: Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.

B. Hollow Metal Doors: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES.

C. Aluminum Framed Entrances: Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.

D. Lock Cylinders: Section 08 71 00, DOOR HARDWARE.

E. Delayed Egress Exit Devices: Section 08 71 00, DOOR HARDWARE.

F. Automatic Door Operators: Section 08 71 13, AUTOMATIC DOOR OPERATORS.

G. Door and Frame Color: See Construction documents..

H. Electrical Power: DIVISION 26, ELECTRICAL.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. Builders Hardware Manufacturers Association (BHMA):
   1. A156.3-14 - Exit Devices.
   2. A156.26-06 - Continuous Hinges.
   3. A156.32-14 - Integrated Door Opening Assemblies.

C. ASTM International (ASTM):
   1. A1011/A1011M-14 - Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
   2. E2180-07(2012) - Determining the Activity of Incorporated Antimicrobial Agents in Polymeric or Hydrophobic Materials.

D. Door and Hardware Institute (DHI):
   1. Recommended Locations for Architectural Hardware for Standard Doors & Frames (2004).
   2. Recommended Locations for Builders' Hardware Custom Steel Doors & Frames (1996).

E. National Fire Protection Association (NFPA):
   1. 105-16 - Smoke Door Assemblies and Other Opening Protectives.
   2. 252-12 - Fire Tests of Door Assemblies.

F. Steel Door Institute (SDI):
   1. A250.3-11 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames.
   2. A250.8-14 - Specifications for Standard Steel Doors and Frames.

3. A250.10-11 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

G. UL LLC (UL):
1. 10C-09 - Positive Pressure Fire Tests of Door Assemblies.
2. 1784-15 - Air Leakage Tests of Door Assemblies and Other Opening Protectives.

1.4 PREINSTALLATION MEETINGS

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.
1. Required Participants:
   a. Contracting Officer's Representative.
   b. Architect/Engineer.
   c. Contractor.
   d. Installer.
   e. Other installers responsible for adjacent and intersecting work, including electrical.
2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.
   a. Installation schedule.
   b. Installation sequence.
   c. Preparatory work.
   d. Protection before, during, and after installation.
   e. Installation.
   f. Transitions and connections to other work.
   g. Other items affecting successful completion.
3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.5 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:
1. Show size, configuration, and fabrication and installation details.
2. For each opening, list finish hardware items included in assembly, finish, degree of opening, and electrical rough-in requirements according to Door Schedule.
3. Submit templates to door and frame manufacturers to ensure proper size and location of hardware.

C. Manufacturer's Literature and Data:
1. Description of each product.
2. Installation instructions.

D. Sustainable Construction Submittals:
1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
2. Low Pollutant-Emitting Materials:
   a. Show volatile organic compound types and quantities.

E. Certificates: Indicate integrated door assemblies comply with specifications.
1. Show fire rated integrated door assembly is UL Listed for specified application.

F. Qualifications: Substantiate qualifications comply with specifications.
1. Installer.

G. Operation and Maintenance Data:
1. Care instructions for each exposed finish product.
2. Maintenance and adjustment instructions for integrated door assemblies.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Regularly installs specified products.
   2. Installed specified products with satisfactory service on five similar installations for minimum five years.
      a. Provide contact names and addresses for completed projects when requested by Contracting Officer's Representative.

1.7 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.

B. Mark packaging, legibly. Indicate manufacturer's name.

C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.8 STORAGE AND HANDLING

A. Store products indoors in dry, weathertight facility.

B. Protect products from damage during handling and construction operations.

1.9 FIELD CONDITIONS

A. Field Measurements: Verify field conditions affecting integrated door assembly fabrication and installation. Show field measurements on Submittal Drawings.
   1. Coordinate field measurement and fabrication schedule to avoid delay.
   2. Coordinate electrical work for electrified hardware installation.

1.10 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

B. Manufacturer's Warranty: Warrant door closers and hinges against material and manufacturing defects.
   1. Warranty Periods:
      a. Door Closers: 10 years.
      b. Steel Pinned Continuous Hinges: 10 years.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Design integrated door assemblies complying with specified performance:
   1. BHMA A156.32: Grade 1: 1,000,000 cycles.

B. Fire Rated Doors:
   1. Fire Resistance Rating: As shown in Door Schedule.
   2. Label: Comply with NFPA 252, UL 10C, and labeled by qualified testing and inspection agency showing fire resistance rating.

C. Smoke Rated Doors:
   1. Smoke Resistance Rating: As shown in Door Schedule.
   2. Label: Comply with NFPA 105, UL 1784, and labeled by qualified testing and inspection agency showing smoke resistance rating.

2.2 PRODUCTS - GENERAL

A. Provide each integrated door assembly from one manufacturer.

B. Sustainable Construction Requirements:
   1. Steel Recycled Content: 30 percent total recycled content, minimum.

2. Low Pollutant-Emitting Materials: Comply with VOC limits specified in Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS for the following products:
   a. Non-flooring adhesives and sealants.
   b. Paints and coatings.

2.3 INTEGRATED DOOR ASSEMBLY

A. Metal Doors: SDI A250.8; Level 2 and Physical Performance Level B, heavy duty; Model 2 seamless.
   1. Face: ASTM A1011/A1011M; cold rolled steel, 1.0 mm (0.04 inches) thick, minimum.
      a. Cladding: Wood veneer.
      b. Steel Skins:
         1) Minimum Thickness: 0.042 IN (18 GA).
         2) Stretcher leveled, electro-galvanized, bonderized.
         3) Flush top closures with joints welded, filled and ground.
   2. Core: Kraft paper honeycomb or polystyrene.
   3. Thickness: 44 mm (1-3/4 inch).
   4. Reinforce door for hardware installation.
   5. Exterior Metal Doors: Insulate per Section 08 11 13, HOLLOW METAL DOORS AND FRAMES.
   6. Aluminum Entrances: Per Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONT.

B. Metal Frames: SDI A250.8 Level 2.
   1. Metal: ASTM A1011/A1011M; cold rolled steel, 1.3 mm (0.05 inches) thick, minimum.
   2. Construction: Continuously welded.
   3. Reinforce frame for hardware.
      a. Continuous Hinges: 2.3 mm (0.09 inches) thick.
      b. Other Hardware: Comply with SDI A250.8.
   4. Frame Anchors: Provide adjustable type anchors coordinated with wall construction, minimum 4 per jamb.
   5. Aluminum Frames: Per Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONT.

C. Integrated Hardware:
   1. Exit Device: BHMA A156.3; Grade 1, passage function, inset in door face, clean and unobtrusive in design.
      a. Push Bar End Caps: Metal, plated satin nickel (BHMA 619) finish.
      b. Exit Device Trim: Lever matching door hardware specified in Section 08 71 00, DOOR HARDWARE.
      c. Delayed Egress Exit Device: Section 08 71 00, DOOR HARDWARE.
   2. Continuous Hinges: BHMA A156.26.
      a. Plastic Laminate Clad Doors: Wrap-around style hinge guards and provide stainless steel wrap-around edge guards at strike edge of door.
   3. Other Hardware: As scheduled in this section.

2.4 FINISHES

A. Hardware Finish Symbols:

Table 1 Hardware Finish Symbols

US	BHMA 156.18	Description
USP	600	Primed for field painting
US15	619	Dull Nickel Plated
US26D	626/652	Satin Chrome Plated
US28	628	Satin Aluminum
US32	629	Bright Stainless
US32D	630	Satin Stainless
N/A	689	Aluminum Painted

B. Finish Requirements:
   1. Door Faces: Factory Pre-Finished, SDI A250.3.
   2. Frames: Prime painted, SDI A250.10.
   3. Door Metal Faces: Factory Primed, ready for field painting per 09 91 00, PAINTING.
   4. Door Hardware:
      a. Continuous Hinges: BHMA 630.
      b. Push Bar: BHMA 630 clad with BHMA 619 end caps.
      c. Exit Device Trim: BHMA 630.
      d. Push/Pull Trim: BHMA 626.
      e. Door Closers: BHMA 689.
      f. Miscellaneous: To match other finishes.
   5. Anti-Microbial Coating: ASTM E2180; ionic silver coating.
   6. Apply coating to hand-operated hardware including levers, pulls, push bars, push plates, and paddles.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.

B. Protect existing construction and completed work from damage.

3.2 INSTALLATION - INTEGRATED DOOR ASSEMBLIES

A. Install products according to manufacturer's instructions and approved submittal drawings.

B. Install door hardware at locations indicated in DHI Recommended Locations for Architectural Hardware for Standard Steel Doors & Frames and DHI Recommended Locations for Builders' Hardware Custom Steel Doors & Frames, unless otherwise indicated, or to comply with requirements of governing regulations, or if otherwise directed by Contracting Officer's Representative.

C. Install door hardware in compliance with manufacturers' instructions, and templates. Comply with specified degree of opening for doors with automatic operators and overhead door closers. Securely fasten hardware. Confirm operating parts move freely and smoothly without binding, sticking, and excessive clearance.

D. Coordinate installation and interface wiring with fire alarm and smoke detection systems. Provide auxiliary contacts, relays, and interface for fire alarm and security systems.

E. Remove or protect door hardware, before painting and finishing performed after integrated door assembly installation.

F. Adjust and check door assembly and each operating hardware item to ensure correct operation and function. Replace products which cannot be adjusted to operate as intended.

G. Final Adjustment: Perform final hardware check and adjustment maximum one month before building acceptance or partial building occupancy.

3.3 CLEANING

A. Clean exposed surfaces, including hardware. Do not use cleaners that will harm finishes.

3.4 PROTECTION

A. Protect integrated door assemblies from construction operations.

3.5 SCHEDULES

A. The following is a general listing of the Integrated Door Assembly requirements and is not intended for use as a final door submittal. Provide hardware items required by established

standards and practices, and to meet IBC and NFPA 101 whether specified or not in the following listed groups.

B. HW-SH-10A	
Each (AC, RR, ADO, EL, REX, DEPH, DPS) Pair Integrated Doors to Have:	NONRATED
1 Alum Frame	
2 Integrated Door w/ DEPH Elec. Exit Device	Q2131 x TYPE 8 ELECTRIC DEVICE (E01, E05/E06-VERIFY)x F03 OUTSIDE CYLINDER ONLY (no dogging)
2 Continuous Transfer Hinges	A51031B x 12-THRUWIRE TRANSFER x IN-HINGE ACCESS PANEL
1 Power Supply	BY EXIT DEVICE MFR. FOR E04 FUNCTION
2 Wall Stops	L02101 CONVEX
1 Set Frames Seals	R3G165
1 Remote Release Button	660-PB by Schlage or equal
2 DEPH Regulatory Signage Per Section 08 71 00 2.14 & 28 13 00 2.14 D. 2. g.	

1. POWER, WIRING, CONDUIT, AND FIRE ALARM CONNECTION BY DIVISION 26.
2. POWER TRANSFER SHARED BY ELECTRIC PANIC AND RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).
3. CARD READER BY DIVISION 28. VALID CARD SHUNTS DEPH ALARM, FROM BOTH SIDES..
4. LOCK CYLINDER BY SECTION 08 71 00, DOOR HARDWARE.
5. AUTO DOOR OPERATOR AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS. REMOTE RELEASE BUTTON SHALL ALSO ACTIVATE OPERATOR TO OPEN.
6. Functional Description:
   a. Normal Function: Unlocked during visiting hours. Locked all other hours, ingress via card reader, or Remote Release Button, Egress at all times via DEPH. Hours unlocked controlled and set via Access Control System.
   b. Loss of Power: Fail Secure (FSE), door remains locked; ingress via key in trim. Egress at all times
   c. Fire Alarm: Fail Secure (FSE), door remain locked; ingress via key in trim. Egress at all times
7. Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR

C. HW-SH-12	
Each (AC, ADO, ES, REX, DPS, KS, RR) Integrated Door to Have:	NON-RATED
1 Steel Frame	
1 Integrated Door w/ Exit Device	Q2131 x TYPE 8 DEVICE (E01, E04) x F03 OUTSIDE CYLINDER ONLY (no dogging)
1 Electric Strike	E09391 (FAIL-SECURE), 24VDC
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS

1	Power Supply	BY ADO
1	Anti-Vandal Pull	
1	Closer	C02021 (PT4D, PT4F, PT4H)
2	Kick Plate	J102 (BOTH SIDES)
1	Overhead Stop	C01541-ADJUSTABLE
1	Threshold	J35130 x SILICONE GASKET
1	Door Sweep	R3A414
1	Set Frame Seals	R3E165
1	Drip	R0Y976
1	Alarm Contact	
1	Key Switch	Three Position Key Switch (by Section 08 71 13)
1	Remote Release Button	660-PB by Schlage or equal

1. POWER TRANSFER **SHARED BY ELECTRIC STRIKE AND** RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).
2. AUTOMATIC DOOR OPERATOR AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.
   120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
3. CARD READER BY DIVISION 28.
4. LOCK CYLINDER BY SECTION 08 71 00, DOOR HARDWARE.
5. Functional Description:
   a. Normal Function: Unlocked during visiting hours. Locked all other hours, ingress via card reader, or Remote Release Button, Free Egress at all times via exit device. Hours unlocked controlled and set via Access Control System.
      1) Omit Remote Release Button at Door B6WA.
   b. Loss of Power: Fail Secure (FSE), door remains locked; ingress via key in trim
6. Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR

D. HW-SH-12A	
Each (AC, ES, REX, DPS) Integrated Door to Have:	NON-RATED
1 Steel Frame	
1 Integrated Door w/ Exit Device	Q2131 x TYPE 8 DEVICE (E01, E04) x F03 OUTSIDE CYLINDER ONLY (no dogging)
1 Electric Strike	E09391 (FAIL-SECURE), 24VDC
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Power Supply	
1 Anti-Vandal Pull	
1 Closer	C02021 (PT4D, PT4F, PT4H)
2 Kick Plate	J102 (BOTH SIDES)
1 Threshold	J35130 x SILICONE GASKET
1 Door Sweep	R3A414
1 Set Frame Seals	R3E165
1 Drip	R0Y976
1 Alarm Contact	

1. 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
2. CARD READER BY DIVISION 28.
3. LOCK CYLINDER BY SECTION 08 71 00, DOOR HARDWARE.
4. Functional Description:
   a. Loss of Power: Fail Secure (FSE), door remains locked; ingress via key in trim
5. Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR

1)

E. HW-SH-12B	
Each (AC, ES, REX, DPS) Integrated Door to Have:	NON-RATED
1 Steel Frame	
1 Storeroom Lock	F13-MOD x RIGID OUTSIDE LEVER x KEY RETRACTS DEADBOLT AND LATCHBOLT
1 Electric Strike	E09391 (FAIL-SECURE), 24VDC
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Power Supply	
1 Anti-Vandal Pull	
1 Closer	C02021 (PT4D, PT4F, PT4H)
2 Kick Plate	J102 (BOTH SIDES)
1 Threshold	J35130 x SILICONE GASKET
1 Door Sweep	90100CNB (PEMKO), OR EQUAL
1 Set Frame Seals	R3E165
1 Drip	R0Y976
1 Alarm Contact	

1. 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
2. CARD READER BY DIVISION 28.
3. LOCK CYLINDER BY SECTION 08 71 00, DOOR HARDWARE.
4. Functional Description:
   a. Loss of Power: Fail Secure (FSE), door remains locked; ingress via key in trim
5. Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR

F. HW-SH-12D	
Each (AC, ES, DEPH, REX, DPS) Integrated Door to Have:	NON-RATED
1 ALUM Frame	
1 Integrated Door w/ DEPH Elec. Exit Device	Q2131 x TYPE 8 ELECTRIC DEVICE (E01, E05/E06-VERIFY)x F03 OUTSIDE CYLINDER ONLY (no dogging)
1 Electric Strike	E09391 (FAIL-SECURE), 24VDC
1 Continuous Transfer Hinge	A51031B x 12-THRUWIRE TRANSFER x IN-HINGE ACCESS PANEL
1 Power Supply	BY EXIT DEVICE MFR. FOR E04 FUNCTION
1 Anti-Vandal Pull	
1 Closer	C02021 (PT4D, PT4F, PT4H)
1 Threshold	J35130 x SILICONE GASKET
1 Door Sweep	R3A414
1 Set Frame Seals	R3E165
1 Drip	R0Y976
1 Alarm Contact	
1 DEPH Regulatory Signage Per Section 08 71 00 2.14 & 28 13 00 2.14 D. 2. g.	

1. 120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
2. CARD READER BY DIVISION 28. VALID CARD SHUNTS DEPH ALARM, FROM BOTH SIDES.
3. LOCK CYLINDER BY SECTION 08 71 00, DOOR HARDWARE.
4. Functional Description:

a. Normal Function: Locked all time, ingress via card reader, Egress controlled via DEPH.
b. Loss of Power: Fail Secure (FSE), door remains locked; ingress via key in trim. Egress at all times via exit device.
c. Fire Alarm: Fail Secure (FSE), door remain locked; ingress via key in trim. Egress at all times via exit device.

5. Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR

G. HW-SH-13

Each (AC, ADO, EL, REX, DPS, RR) Pair Integrated Doors to Have:	RATED
1 Integrated Pair Doors w/Elec. Exit Devices	Q2231 x TYPE 8 (E01, E04) ELECTRIC EXIT DEVICES (F01/F08) (no dogging)
2 Continuous Transfer Hinges	A51031B x 12-THRUWIRE TRANSFER x IN-HINGE ACCESS PANEL
1 Power Supply	BY EXIT DEVICE MFR. FOR E04 FUNCTION
1 Set Meeting Stile Astragals	R0Y834
1 Threshold	J35130 x SILICONE GASKET
1 Door Sweep	R3A414
1 Set Frame Seals	R3E165
1 Drip	R0Y976
1 Remote Release Button	660-PB by Schlage or equal

1. POWER, WIRING, CONDUIT, BY DIVISION 26.
2. POWER TRANSFER SHARED BY ELECTRIC PANIC AND RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).
3. CARD READER BY DIVISION 28.
4. LOCK CYLINDER BY SECTION 08 71 00, DOOR HARDWARE.
5. AUTO DOOR OPERATOR AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.
   REMOTE RELEASE BUTTON SHALL ALSO ACTIVATE OPERATOR TO OPEN.
6. Functional Description:
   a. Normal Function: Unlocked during visiting hours. Locked all other hours, ingress via card reader, or Remote Release Button, Free Egress at all times. Hour unlocked controlled and set via Access Control System.
   b. Loss of Power: Fail Secure (FSE), door remains locked; ingress via key in trim
7. Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR

H. HW-SH-14

Each (AC, EL, REX, DPS) Pair Integrated Doors to Have:	RATED
1 Steel Frame	
1 Integrated Pair Doors w/Elec. Exit Devices	Q2231 x TYPE 8 (E01, E04) ELECTRIC EXIT DEVICES (F01/F08) (no dogging)
2 Continuous Transfer Hinges	A51031B x 12-THRUWIRE TRANSFER x IN-HINGE ACCESS PANEL
1 Power Supply	BY EXIT DEVICE MFR. FOR E04 FUNCTION
1 Set Meeting Stile Astragals	R0Y834
2 Armor Plates	J101 x 1.275 mm (0.050 inch) THICKNESS
2 Closer	C02021 (PT4D, PT4F, PT4H)
1 Threshold	J35130 x SILICONE GASKET

1	Door Sweep	R3A414
1	Set Frame Seals	R3E165
1	Drip	R0Y976

1. POWER, WIRING, CONDUIT, CONNECTION BY DIVISION 26.
2. POWER TRANSFER SHARED BY ELECTRIC PANIC.
3. CARD READER BY DIVISION 28.
4. Functional Description:
   a. Loss of Power: Fail Secure (FSE), door remains locked; ingress via key in trim
5. Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR
   a.

I. HW-SH-14A	
Each (AC, ES, REX, DPS) Pair Integrated Doors to Have:	RATED
1 Steel Frame	
1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Continuous Transfer Hinges	A51031B x 12-THRUWIRE TRANSFER x IN-HINGE ACCESS PANEL
1 Storeroom Lock	F13-MOD x RIGID OUTSIDE LEVER x KEY RETRACTS DEADBOLT AND LATCHBOLT
1 Electric Strike	E09391 (FAIL-SECURE), 24VDC
1 Power Supply	BY EXIT DEVICE MFR. FOR E04 FUNCTION
1 Set Auto Flush Bolts	TYPE 25
1 Set Meeting Stile Astragals	R0Y834
1 Coordinator	TYPE 21A
1 Closer	C02021 (PT4D, PT4F, PT4H)
1 Threshold	J35130 x SILICONE GASKET
1 Door Sweep	R3A414
1 Set Frame Seals	R3E165
1 Drip	R0Y976

1. POWER, WIRING, CONDUIT, BY DIVISION 26.
2. POWER TRANSFER SHARED BY ELECTRIC PANIC.
3. CARD READER BY DIVISION 28.
4. Functional Description:
   a. Loss of Power: Fail Secure (FSE), door remains locked; ingress via key in trim
5. Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR
   a. All hardware to be coordinated with and submitted by AHC certified consultant to provide a complete and workable system, including necessary components not specifically listed.

- - E N D - -

SECTION 08 31 13

ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Access doors and panels installed in walls and ceilings.

1.2 RELATED REQUIREMENTS

A. Wire Mesh and Screen Access Doors: Section 05 50 00, METAL FABRICATIONS.

B. Lock Cylinders: Section 08 71 00, DOOR HARDWARE.

C. Field Painting: Section 09 91 00, PAINTING.

D. Finish Color: See Construction documents..

E. Access Doors for Control or Drain Valves: Section 21 13 13, WET-PIPE SPRINKLER SYSTEMS.

F. Access Doors for Plumbing Valves: Section 22 40 00, PLUMBING FIXTURES.

G. Locations of Access Doors for Ductwork Cleanouts: Section 23 31 00, HVAC DUCTS AND CASINGS.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. American Welding Society (AWS):
   1. D1.3/D1.3M-08 - Structural Welding Code - Sheet Steel.

C. ASTM International (ASTM):
   1. A653/A653M-15 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Sip Process.
   2. A1008/A1008M-15 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Baked Hardenable.
   3. A666-15 - Annealed or Cold-Worked Austenitic Stainless Steel sheet, Strip, Plate, and Flat Bar.
   4. E119-15 - Fire Test of Building Construction and Materials.

D. National Fire Protection Association (NFPA):
   1. 80-16 - Fire Doors and Other Opening Protectives.
   2. 251-12 - Fire Tests of Door Assemblies.

E. National Association of Architectural Metal Manufacturers (NAAMM):
   1. AMP 500-06 - Metal Finishes Manual.

F. UL LLC (UL):
   1. Listed - Online Certifications Directory.
   2. 10B-08 - Standard for Fire Tests of Door Assemblies.
   3. 263-11 - Fire Tests of Building Construction and Materials.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:
   1. Show size, configuration, and fabrication and installation details.

C. Manufacturer's Literature and Data:
   1. Description of each product.
   2. Installation instructions.

D. Sustainable Construction Submittals:
   1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.

1.5 DELIVERY

A. Deliver products in manufacturer's original sealed packaging.

B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.

C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

1.6 STORAGE AND HANDLING

A. Store products indoors in dry, weathertight facility.

B. Protect products from damage during handling and construction operations.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify field conditions affecting access door fabrication and installation. Show field measurements on Submittal Drawings.
   1. Coordinate field measurement and fabrication schedule to avoid delay.

1.8 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel Sheet: ASTM A1008/A1008M.

B. Galvanized Steel: ASTM A 653/A 653M.

C. Stainless Steel: ASTM A666; Type 302 or Type 304.

2.2 PRODUCTS - GENERAL

A. Provide each product from one manufacturer.

B. Sustainable Construction Requirements:
   1. Steel Access Doors Recycled Content: 30 percent total recycled content, minimum.
   2. Stainless Steel Access Doors Recycled Content: 70 percent total recycled content, minimum.

2.3 ACCESS DOORS, FIRE-RATED

A. Door Construction:
   1. Ceiling Access Door Construction: ASTM E119 or UL 263.
   2. Wall Access Doors: NFPA 252 or UL 10B.

B. Label: Class B opening according to UL 10B or test by another nationally recognized laboratory. 1 hour fire-rated with maximum temperature rise of 120 degrees C (216 degrees F).

C. Door Panel: Minimum 0.9 mm (0.0359 inch) thick steel sheet, with mineral-fiber insulation core, insulated sandwich type construction.

D. Frame: Minimum 1.5 mm (0.0598 inch) thick steel sheet, depth and configuration to suit material and construction type where installed.
   1. Frame Flange: Provide at units installed in concrete, masonry, or gypsum board.
   2. Exposed Joints in Flange: Weld and grind smooth.
   3. Provide expanded galvanized metal lath perimeter wings when installed in plaster, except veneer plaster.

E. Provide automatic closing device.

F. Hinge: Continuous steel hinge with stainless steel pin.

G. Lock: Self-latching, mortise type with provision for fitting flush a standard screw-in type lock cylinder.
   1. Lock cylinder specified in Section 08 71 00, DOOR HARDWARE.
   2. Latch release device operable from inside of door.

H. Anchors for Fire-Rated Access Doors: Comply with requirements of applicable fire test.

2.4 ACCESS DOORS, FLUSH PANEL, NON-RATED

A. Door Panel:
   1. 1.5 mm (0.06 inch) thick steel sheet.
   2. Reinforce to maintain flat surface.

B. Frame:
   1. 1.5 mm (0.06 inch) thick steel sheet, depth and configuration to suit material and construction type where installed.
   2. Frame Flange: Provide at units installed in concrete, masonry, and gypsum board.
   3. Exposed Joints in Flange: Weld and grind smooth.

C. Hinge:
   1. Concealed spring hinge, 175 degrees of opening.
   2. Removable hinge pin to allow removal of door panel from frame.

D. Lock:
   1. Flush, screwdriver-operated cam lock.
      a. At Mechanical rooms omit locks and provide Cam-operated closure with knurled knob which compresses panel tightly.

2.5 EXTERIOR FLUSH NON FIRE-RATED ACCESS PANELS AND FRAMES

A. Super insulated weather-resistant flush access panel.
   1. 36 inches by 36 inches (914 mm x 914 mm).
   2. Frame: 16-gauge galvannealed steel with 1-inch (25.40-mm) flange.
   3. Panel: Insulated .040-inch (1.016-mm) aluminum with 2” polyisocyanurate R=13 and continuous stainless steel hinge; 2-inch (50.80-mm) thickness.
   4. Gaskets: Adhesive backed EPDM foam and silicone rubber seals on frame and panel.
   5. Finish: White powder coat.
   6. Standard Latch/Lock:
      a. Exterior Side: Flush, lockable compression paddle latch, black.
   7. General Use: Walls or Ceilings
   8. Options:
      a. Color: Gray.
      b. Lock Feature: Locking Chrome Flush Compression Latch
      c. Rainhood

2.6 FABRICATION - GENERAL

A. Size: Minimum 600 mm (24 inches) square door unless otherwise shown or required to suit opening in suspension system of ceiling.

B. Component Fabrication: Straight, square, flat and in same plane where required.
   1. Exposed Edges: Slightly rounded, without burrs, snags and sharp edges.
   2. Exposed Welds: Continuous, ground smooth.
   3. Welding: AWS D1.3/D1.3M.

C. Locks and Non-Continuous Hinges: Provide in numbers required to maintain alignment of door panel with frame. For fire-rated doors, provide hinges and locks as required by fire test.

D. Anchoring: Make provisions in frame for anchoring to adjacent construction. Provide anchors in size, number and location on four sides to secure access door to substrate. Provide anchors as required by fire test.

2.7 FINISHES

A. Steel Paint Finish:
   1. Powder-Coat Finish: Manufacturer's standard two-coat finish system consisting of the following:
      a. One coat primer.
      b. One coat thermosetting topcoat.
      c. Dry-film Thickness: 0.05 mm (2 mils) minimum.
      d. Color: Refer to See Construction documents..

B. Stainless Steel Exposed Surfaces: NAAMM AMP 500; No. 4 polished finish.

2.8 ACCESSORIES

A. Fasteners: Type and size recommended by access door manufacturer, to suit application.
   1. Stainless Steel Access Doors: Stainless steel fasteners.
   2. Other Access Doors: Galvanized steel fasteners.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.
   1. Verify access door locations and sizes provide required maintenance access to installed building services components.

B. Protect existing construction and completed work from damage.

3.2 INSTALLATION - GENERAL

A. Install products according to manufacturer's instructions and approved submittal drawings.
   1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

B. Install access doors and panels permitting access to service valves, traps, dampers, cleanouts, and other mechanical, electrical and conveyor control items concealed in walls and partitions, and concealed above gypsum board and plaster ceilings.

C. Install fire rated access door according to NFPA 80.

D. Install fire-rated doors in fire-rated partitions and ceilings.

E. Install flush access panels in partitions and in gypsum board and plaster ceilings.

3.3 ACCESS DOOR AND FRAME INSTALLATION

A. Wall Installations: Install access doors in openings with sides vertical.

B. Ceiling Installations: Install access doors parallel to ceiling suspension grid or room partitions.

C. Frames without Flanges: Install frame flush with surrounding finish surfaces.

D. Frames with Flanges: Overlap opening, with face uniformly spaced from finish surface.

E. Recessed Panel Access Doors: Install with face of surrounding materials flush with door panel installed finish.

F. Secure frames to adjacent construction with fasteners.

G. Install type, size and quantity of anchoring device suitable for material surrounding opening to maintain alignment, and resist displacement, during normal use of access door.

H. Field Painting Primed Access Doors: Comply with the requirements of Section 09 91 00, PAINTING.

3.4 ADJUSTMENT

A. Adjust hardware so door panel opens freely.

B. Adjust door when closed so door panel is centered in frame.

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SECTION 08 36 16.13
HIGH PERFORMANCE BARN (SLIDING) DOOR

PART 1 - GENERAL

1.1 SUMMARY

A. Sliding Barn Doors - flush wood and flush wood with glass, aluminum frames and related hardware.

1.2 RELATED SECTION

A. Section 08 14 00 – INTERIOR WOOD DOORS

B. Section 08 71 00 – DOOR HARDWARE

C. Section 08 80 00 – GLAZING

D. Section 09 22 16 – NON-STRUCTURAL METAL FRAMING

E. Section 10 14 00 - SIGNAGE

F. Division 26 – Electrical

G. Section 28 13 00 – Physical Access Control System

1.3 SUBMITTALS

A. Comply with Section 01 33 23 – SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

B. Product Data: Submit manufacturer’s product data, including installation instructions.

C. Shop Drawings: Submit manufacturer’s shop drawings, including plans, elevations, sections, and details, indicating dimensions, tolerances, materials, components, hardware, finish, options, and accessories. Shop Drawings to show required blocking by others.

D. Samples: Submit manufacturer’s samples of the following sliding door components:
   1. Door veneer or laminate sample
   2. Aluminum Frame finish sample

E. Manufacturer’s Certification: Submit manufacturer’s certification that materials comply with specified requirements and are suitable for intended application.

F. Warranty Documentation: Submit manufacturer’s standard warranty.

G. Test Reports: Submit acoustical reports or UL1784 as applicable.

1.4 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of interior aluminum frames and doors.

B. Source: Integrated assembly Obtain sliding aluminum framed doors, Door leaves and door hardware and seal systems from single source integrated assembly manufacturer.

C. Manufacturer's Qualifications: Manufacturer regularly engaged for past 5 years in manufacture of sliding doors similar to that specified.

1.5 REFERENCES

A. Architectural Barriers Act

B. Department of Veterans Affairs Barrier Free Design Standard PG-18-13

C. ANSI – American National Standards Institute

1. ANSI 156.18 Materials and Finishes
2. ANSI A117.1 Specifications for making buildings and facilities usable by physically handicapped people.

D. BHMA – Builders Hardware Manufacturers Association

E. DHI – Door and Hardware Institute

F. NFPA – National Fire Protection Association
1. NFPA 80 – Fire Doors and Windows
2. NFPA 101 – Life Safety code
3. NFPA 105 – Smoke and Draft Control Door Assemblies
4. NFPA 252 – Fire Tests of Doors Assemblies

G. AWS – Architectural Woodwork Standards

1.6 PERFORMANCE

A. Aluminum perimeter frames with integral acoustic seals

B. Maximum Ambient Air Infiltration of 1.569CFM/ft2 @ 25Pa.

C. Maximum Elevated Temperature Air Infiltration 1.475 CFM/ft2 @ 25Pa and 400f.

D. Soft self-closing mechanism integrated with top track.

E. Concealed door guide.

1.7 DELIVERY: STORAGE AND PROTECTION

A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Notify manufacturer immediately of any shipping damage.

C. Storage and Handling Requirements:
1. Store and handle materials in accordance with manufacturer's instructions.
2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
3. Store materials in clean, dry area indoors.
4. Protect materials and finish during storage, handling, and installation to prevent damage.

PART 2 - PRODUCTS

2.1 INTERIOR SLIDING ALUMINUM-FRAMED DOORS AND PARTITIONS

A. Interior Aluminum-Framed Integrated Assembly High Performance Top-Hung Sliding Doors with no visible bottom track.

B. Specified Wall Thickness: See Plans

C. Frame Profiles: Extruded aluminum frame "wrap" frame with integral vertical jamb (stile pocket).
1. Finish:
a. Standard: Painted Hardcoat (Kynar) Finish. Meets AAMA 2604 Standard Colors: Light Sequin 789G048.

D. Door Leafs. All Doors to be factory machined for hardware including pilot and function holes.
1. 1-3/4" Flush Wood Door: Reference Spec Section 08 14 00 Wood Doors or other section as applicable.
a. Optional Glazing: safety laminated glass, Reference Section 08 80 00 GLAZING.

E. Integrated Assembly Door Components:
1. Single Top Track: High Performance barn door track

2. Valances: Extruded aluminum with integral end caps
   a. Standard square valance
3. Top Rollers: Tandem nylon roller sized to match door weight with integral soft close mechanism at both sides of door.
4. Concealed Floor Guide: Automatic Drop down acoustic and smoke seal with Integral concealed floor guide. (No bottom track in floor)
5. Soft-Closer: Soft and self-closing damper mechanism at one sides of door leaf
6. Handles:
   a. Standard Ladder Pull: 16” long x 1” diameter. Finish: US32D Satin Stainless Steel.

F. Accessories:
1. Door Locks:
   a. Mortise Latch and Lock Options:
      1) Standard AD-1 Thumbturn with Key Lock & 16-inch Ladder Pull
         a) Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR
2. Automatic Door Bottom for improved acoustical performance

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine wall openings to receive sliding doors for plumb, level, and square. Note: Finish door operation will be affected by out of tolerance framing.

B. Verify dimensions of wall openings.

C. Examine surfaces to receive top and bottom guide.

D. Notify Architect of conditions that would adversely affect installation or subsequent use of sliding doors.

E. Do not begin installation until unacceptable conditions are corrected.

F. Base of door side to be flush or minimal. Rubber Base acceptable.

3.2 INSTALLATION

A. Install sliding doors in accordance with manufacturer’s instructions at locations indicated on the Drawings.

B. Install sliding doors plumb, level, square, and in proper alignment.

C. Install sliding doors to close against walls without gaps

D. Install sliding doors to open and close smoothly.

E. Anchor sliding doors securely in place to supports. Required: Fire treated 2 x 6 blocking required full length of track.

3.3 ADJUSTING

A. Adjust sliding doors for proper operation in accordance with manufacturer’s instructions.

B. Adjust sliding doors to operate smoothly without binding.

C. Repair minor damages to finish in accordance with manufacturer’s instructions and as approved by Architect.

3.4 CLEANING

A. Clean sliding doors promptly after installation in accordance with manufacturer’s instructions.

B. Do not use harsh cleaning materials or methods that could damage materials or finish.

3.5 PROTECTION

A. Protect installed sliding doors from damage during construction.

END OF SECTION

SECTION 08 41 13

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Aluminum-framed entrances and storefronts.

1.2 RELATED REQUIREMENTS

A. Door Finish and Color: See Construction documents.

B. Glass and Glazing: Section 08 80 00, GLAZING.

C. Hardware: Section 08 71 00, DOOR HARDWARE.

D. Automatic Door Actuators: Section 08 71 13, AUTOMATIC DOOR OPERATORS.

E. Aluminum Finish and Color: See Construction documents..

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. American Architectural Manufacturers Associations (AAMA):
   1. 2603-15 - Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
   2. 2604-13 - Performance Requirements and Test Procedures for High Performance Organic Coatings on Architectural Extrusions and Panels.
   3. 2605-13 - Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

C. American Welding Society (AWS):
   1. D1.2/D1.2M-14 - Structural Welding Code - Aluminum.

D. ASTM International (ASTM):
   1. A240/A240M-15b - Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
   2. B209-14 - Aluminum and Aluminum-Alloy Sheet and Plate.
   3. B209M-14 - Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
   4. B221-14 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   5. B221M 13 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
   6. D1187/D1187M-97(2011)e1 - Asphalt-Base Emulsions for Use as Protective Coatings for Metal.
   7. E283-04(2012) - Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
   8. E330/E330M-14 -Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
   9. E331-00(2009) - Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
   10. E1886-13a - Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missiles and Exposes to Cyclic Pressure Differentials.
   11. E1996-14a - Performance of Exterior Windows, Curtain Walls, Doors, and impact Protective Systems Impacted by Windborne Debris in Hurricanes.
   12. F468-15 - Nonferrous Bolts, Hex Cap Screws, and Studs for General Use.

13. F593-13a - Stainless Steel Bolts, Hex Cap Screws, and Studs.

E. National Association of Architectural Metal Manufacturers (NAAMM):
1. AMP 500-06 - Metal Finishes Manual.

F. National Fenestration Rating Council (NFRC):
1. 500-14(E1A0) - Determining Fenestration Product Condensation Resistance Values.

G. United States Veterans Administration (VA):
1. PSDSDD - Physical Security Design Standards Data Definitions.

1.4 PREINSTALLATION MEETINGS

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.
1. Required Participants:
   a. Contracting Officer's Representative.
   b. Architect/Engineer.
   c. Contractor.
   d. Installer.
   e. Manufacturer's field representative.
   f. Other installers responsible for adjacent and intersecting work.
2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.
   a. Installation schedule.
   b. Installation sequence.
   c. Preparatory work.
   d. Protection before, during, and after installation.
   e. Installation.
   f. Terminations.
   g. Transitions and connections to other work.
   h. Other items affecting successful completion.
3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.5 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings: Minimum 1 to 2 (half size) scale.
1. Show size, configuration, and fabrication and installation details.
2. Show anchorage and reinforcement.
3. Show interface and relationship to adjacent work, including thermal, air, and water barrier continuity.

C. Manufacturer's Literature and Data:
1. Description of each product.
2. Doors, each type.
3. Entrance and Storefront construction.
4. Installation instructions.
5. Warranty.

D. Samples:
1. Door Corner Section: Minimum 450 mm x 450 mm (18 x 18 inches) for each specified door type, showing head rail and hinge stile, door closer reinforcement, internal reinforcement and insulation in flush panel door.
2. Aluminum Anodized Finish: w/o sample extrusions minimum 150 mm (6 inches) long for each specified color in sets of three showing maximum color range.

E. Sustainable Construction Submittals:

1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.

F. Test reports: Certify products comply with specifications.

G. Certificates: Certify products comply with specifications.
1. Certify anodized finish thickness.

H. Qualifications: Substantiate qualifications comply with specifications.
1. Manufacturer with project experience list.
2. Installer with project experience list.
3. Welders and welding procedures.

I. Delegated Design Drawings and Calculations: Signed and sealed by responsible design professional.
1. Show location and magnitude of loads applied to building structural frame.
2. Identify deviations from details shown on drawings.

J. Operation and Maintenance Data:
1. Care instructions for each exposed finish product.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:
1. Regularly manufactures specified products.
2. Manufactured specified products with satisfactory service on five similar installations for minimum five years.
a. Project Experience List: Provide contact names and addresses for completed projects.

B. Installer Qualifications: Manufacturer authorized representative.
1. Regularly installs specified products.
2. Installed specified products with satisfactory service on five similar installations for minimum five years.
a. Project Experience List: Provide contact names and addresses for completed projects.

C. Welders and Welding Procedures Qualifications: AWS D1.2/D1.2M.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver products in manufacturer's original sealed packaging.

B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.

C. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

D. Store products indoors in dry, weathertight conditioned facility.

E. Protect products from damage during handling and construction operations.

1.8 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

B. Manufacturer's Warranty: Warrant painted finish against material and manufacturing defects.
1. Warranty Period: 20 years.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Delegated Design: Prepare submittal documents including design calculations and drawings signed and sealed by registered design professional, licensed in state where work is located.
   1. Minor deviations to details shown on drawings to accommodate manufacturer's standard products may be accepted by Contracting Officer's Representative when deviations do not affect design concept and specified performance.

B. Design aluminum framed entrances and storefronts complying with specified performance:
   1. Wind Load Resistance: ASCE/SEI 7; Design criteria as indicated on Drawings when tested according to ASTM E330/E330M.
      a. Wind Load: 1.7 kPa (36 psf) positive and negative, minimum.
      b. Maximum Deflection: 1/175 of span, maximum with minimum 1.65 safety factor.
   2. Thermal Movement: Accommodate ambient temperature range of 67 degrees C (120 degrees F).
   3. Blast Resistance:
      a. Life Safety Protected Facilities: VA PSDSDD W1 design threat level located at standoff distance.
         1) Standoff Distance: Minimum 7.5 m (25 feet); maximum VA PSDSDD GP1.
         2) Glass Fragment Penetration: Maximum 3 m (10 feet).
      b. Failure: Glass must fail first.
   4. Condensation Resistance: NFRC 500.
      a. Fixed Framing: 45 CRF, minimum.
   5. Water Resistance: ASTM E331; No uncontrolled penetration at380 Pa (8 psf), minimum, pressure differential.
   6. Fixed Framing Air Infiltration Resistance: ASTM E283; 0.30 L/s/sq. m (0.06 cfm/sf), maximum at 300 Pa (6.24 psf), minimum, pressure differential.
   7. Entrance Doors Air Infiltration Resistance: ASTM E283; maximum allowable at 75 Pa (1.57 psf), minimum, pressure differential.
      a. Single Doors: 2.5 L/s/sq. m (0.5 cfm/sf).
      b. Paired Doors: 6 L/s/sq. m (1.2 cfm/sf).

2.2 MATERIALS

A. Aluminum:
   1. Sheet Metal: ASTM B209M (ASTM B209), minimum 1.6 mm (0.063 inch) thick.
   2. Extrusions: ASTM B221M (ASTM B221).
      a. Framing: Minimum 3 mm (0.125 inch) wall thickness.
      b. Glazing Beads, Moldings, and Trim: Minimum 1.25 mm (0.050 inch) thick.
   3. Alloy 6063 temper T5 for doors, door frames, storefronts and transoms.
   4. Alloy 6061 temper T6 for guide tracks for sliding doors and other extruded structural members.
   5. Color Anodized Aluminum: Provide aluminum alloy required to produce specified color.

B. Stainless Steel: ASTM A240/A240M; Type 302 or Type 304.

C. Thermal Break: Manufacturer standard low conductive material retarding heat flow in the framework, where insulating glass is scheduled.

2.3 PRODUCTS - GENERAL

A. Provide aluminum framed entrances and storefronts from one manufacturer and from one production run.

B. Provide aluminum entrances, storefront, windows, systems from same manufacturer.

C. Sustainable Construction Requirements:
   1. Aluminum Recycled Content: 50 percent total recycled content, minimum.

2.4 FRAMES

A. Framing Members: Extruded aluminum, thermally broken.

B. Stops: Provide integral fixed stops and glass rebates and snap-on removable stops.

C. Provide concealed screws, bolts and other fasteners.

D. Secure cover boxes to frames in back of lock strike cutouts.

2.5 STILE AND RAIL DOORS

A. Stiles and Rails: Extruded aluminum, thermally broken.
   1. Thickness: 45 mm (1-3/4 inch).
   2. Stiles and Head Rails: 90 mm (3-1/2 inches) wide.
   3. Bottom Rails: 250 mm (10 inches) wide.

B. Single-Acting Doors:
   1. Bevel: 3 mm (1/8 inch) at lock, hinge, and meeting stile edges.
   2. Clearances: 2 mm (1/16 inch) at hinge stiles, 3 mm (1/8 inch) at lock stiles and top rails, and 5 mm (3/16 inch) at floors and thresholds.

C. Glass Rebates: Integral with stiles and rails.

D. Glazing Beads: Extruded aluminum, 1.3 mm (0.050 inch) thick. Integral with stiles and rails or applied type, snap-fit secured.

E. Stile and Rail Joints: Welded or interlocking dovetail joints between stiles and rails.
   1. Clamp door together through top and bottom rails with 9 mm (3/8 inch) primed steel tie rod extending into stiles, and having self-locking nut and washer at both ends.
   2. Reinforce stiles and rails to prevent door distortion when tie rods are tightened.
   3. Provide compensating spring-type washer under each nut for stress relief.
   4. Construct joints to remain rigid and tight when door is operated.

F. Weather-stripping: Removable, woven pile type (silicone-treated) weather-stripping attached to aluminum or vinyl holder.
   1. Make slots for applying weather-stripping integral with doors and door frame stops.
   2. Apply continuous weather-stripping to heads, jambs, bottom, and meeting stiles of doors and frames so doors swing freely and close positively.

2.6 COLUMN COVERS AND TRIM

A. Column Covers and Trim: Sheet aluminum fabrications shown from sheet aluminum of longest available lengths.

B. Provide concealed fasteners.

C. Provide aluminum stiffeners and supporting members shown on drawings and as required to maintain component integrity and shape.

2.7 FABRICATION

A. Form metal parts and fit and assemble joints, except joints designed to accommodate movement. Seal joints to resist air infiltration and water penetration.

B. Welding:
   1. Make welds without distorting and discoloring exposed surfaces.
   2. Clean and dress welds. Remove welding flux and weld spatter.

C. Prepare and reinforce doors and frames for hardware and accessories.
   1. Coordinate preparation with specified hardware. See Section 08 71 00, DOOR HARDWARE.
   2. Fabricate reinforcement from stainless steel plates.
      a. Hinge and pivot reinforcing: Minimum 4.5 mm (0.179 inch) thick.

b. Lock Face, Flush Bolts, Concealed Holders, Concealed and Surface Mounted Closers Reinforcing: Minimum 2.6 mm (0.104 inch) thick.
c. Other Surface Mounted Hardware Reinforcing: Minimum 1.5 mm (0.059 inch) thick.

3. Where concealed hardware is specified, provide space, cutouts, and reinforcement for installation and secure fastening.

D. Factory assemble doors.

2.8 FINISHES

A. Aluminum Anodized Finish: NAAMM AMP 500.
1. Clear Anodized Finish: AA-C22A41; Class I Architectural, 0.018 mm (0.7 mil) thick.
2. Color Anodized Finish: AA-C22A42 or AA-C22A44; Class I Architectural, 0.018 mm (0.7 mil) thick.
3. Clear Anodized Finish: AA-C22A31; Class II Architectural, 0.01 mm (0.4 mil) thick.
4. Color Anodized Finish: AA-C22A32 or AA-C22A34; Class II Architectural, 0.01 mm (0.4 mil) thick.

2.9 ACCESSORIES

A. Dielectric Tape: Plastic, non-absorptive, with pressure sensitive adhesive; 0.18 to 0.25 mm (7 to 10 mils) thick.

B. Barrier Coating: ASTM D1187/D1187M.

C. Welding Materials: AWS D1.2/D1.2M, type to suit application.

D. Fasteners:
1. Aluminum: ASTM F468, Alloy 2024.
2. Stainless Steel: ASTM F593, Alloy Groups 1, 2 and 3.

E. Anchors: Aluminum or stainless steel; type to suit application.

F. Galvanizing Repair Paint: MPI No. 18.

G. Touch-Up Paint: Match shop finish.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.
1. Coordinate floor closer installation recessed into concrete slabs.
2. Coordinate anchor installation built into masonry and concrete.

B. Protect existing construction and completed work from damage.

C. Clean substrates. Remove contaminants capable of affecting subsequently installed product's performance.

D. Apply dielectric tape or barrier coating to aluminum surfaces in contact with dissimilar metals and cementitious materials to minimum 0.7 mm (30 mils) dry film thickness.

3.2 INSTALLATION - GENERAL

A. Install products according to manufacturer's instructions and approved submittal drawings.
1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

B. Install aluminum framed entrances and storefronts plumb and true, in alignment and to lines shown on drawings.

C. Anchor frames to adjoining construction at heads, jambs and sills.

D. Provide concealed aluminum clips to connect adjoining frame sections.

E. Install door hardware and hang doors. See Section 08 71 00, DOOR HARDWARE.

F. Install door operators. See Section 08 71 13, AUTOMATIC DOOR OPERATORS.

G. Adjust doors and hardware uniform clearances and proper operation.

H. Touch up damaged factory finishes.
   1. Repair galvanized surfaces with galvanized repair paint.
   2. Repair painted surfaces with touch up primer.

I. Tolerances:
   1. Variation from Plumb, Level, Warp, and Bow: Maximum 3 mm in 3 m (1/8 inch in 10 feet).
   2. Variation from Plane: Maximum3 mm in 3.65 m (1/8 inch in 12 feet); 6 mm (1/4 inch) over total length.
   3. Variation from Alignment: Maximum 1.5 mm (1/16 inch) in-line offset and maximum3 mm (1/8 inch) corner offset.
   4. Variation from Square: Maximum 3 mm (1/8 inch) diagonal measurement differential.

3.3 PROTECTION, CLEANING AND REPAIRING

A. Clean exposed aluminum and glass surfaces. Remove contaminants and stains.

B. Protect aluminum-framed entrances and storefronts from construction operations.

C. Remove protective materials immediately before acceptance.

D. Repair damage.

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SECTION 08 51 13

ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Aluminum windows for new construction.

1.2 RELATED REQUIREMENTS

A. Sealing Joints: Section 07 92 00, JOINT SEALANTS.

B. Glazing: Section 08 80 00, GLAZING.

C. Color of finish: See Construction documents.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. American Architectural Manufacturers Associations (AAMA):
   1. AAMA/WDMA/CSA 101/I.S.2/A440-11 - Windows, Doors, and Skylights.
   2. AAMA 505-09 - Dry Shrinkage and Composite Performance Thermal Cycle Test Procedures.
   3. AAMA 2605-13 - Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
   4. AAMA TIR A8-08 - Structural Performance of Composite Thermal Barrier Framing System.

C. American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI):
   1. 7-10 - Minimum Design Loads for Buildings and Other Structures.

D. American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE):
   1. 90.1-13 - Energy Standard for Buildings Except Low-Rise Residential Buildings.

E. ASTM International (ASTM):
   1. B209-14 - Aluminum and Aluminum-Alloy Sheet and Plate.
   2. B209M-14 - Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
   3. B221-14 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   4. B221M-13 - Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
   5. E283-04(2012) - Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
   6. E331-00(2009) - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

1.4 PREINSTALLATION MEETINGS

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.
   1. Required Participants:
      a. Contracting Officer's Representative.
      b. Architect/Engineer.
      c. Inspection and Testing Agency.
      d. Contractor.
      e. Installer.

f. Manufacturer's field representative.

2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.
   a. Installation schedule.
   b. Installation sequence.
   c. Preparatory work.
   d. Protection before, during, and after installation.
   e. Installation.
   f. Transitions and connections to other work.
   g. Other items affecting successful completion.
3. Document and distribute meeting minutes to participants to record decisions affecting installation.

1.5 SUBMITTAL

A. Submit according to Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:
   1. Indicate window types required for project.
   2. Identify window unit components by name and type of metal or material, show construction, locking systems, mechanical operators, trim, installation and anchorages.
   3. Include glazing details and standards for factory glazed units.

C. Manufacturer's Literature and Data:
   1. Description of each product.
   2. Installation instructions.
   3. Warranty.

D. Sustainable Construction Submittals:
   1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.

E. Samples:
   1. Window Frame: 150 mm (6 inch) long samples showing finishes, specified.

F. Test reports: Indicate each product complies with specifications.
   1. Windows.
   2. Operating hardware.

G. Certificates: Indicate each product complies with requirements (window characteristics may be on window schedule or other drawings).

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:
   1. Regularly manufactures specified products.
   2. Manufactured specified products with satisfactory service on five similar installations for minimum five years.
      a. Provide contact names and addresses for completed projects when requested by Contracting Officer's Representative.

B. Quality Certified Labels or Certificates:
   1. AAMA Label affixed to each window indicating compliance with specification.
   2. Certificates in lieu of label with copy of test report maximum 4 years old from independent testing laboratory and certificate signed by window manufacturer stating that windows provided comply with specified requirements and AAMA/WDMA/CSA 101/I.S.2/A440 for type of window specified.

1.7 STORAGE AND HANDLING

A. Protect windows from damage during handling and construction operations before, during and after installation.

B. Store windows under cover, setting upright.

C. Do not stack windows flat.

D. Do not lay building materials or equipment on windows.

1.8 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

B. Manufacturer's Warranty: Warrant windows against material and manufacturing defects.
   1. Warranty Period: 10 years.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Design windows complying with specified performance:
   1. Load Resistance: ASCE/SEI 7 Design criteria as indicated on Drawings.
      a. Performance Grade: AAMA/WDMA/CSA 101/I.S.2/A440 required to resist maximum positive and negative wind load.
   2. Thermal Transmittance: Maximum U-value W/sq. m/degree K (Btu/sq. ft./hr./degree F).
      a. Insulating Glass Windows: U-2.1 (U-0.38).
   3. Condensation Resistance Factor (CRF): NFRC 500 Minimum CRF of C 70.
   4. Water Resistance: ASTM E331; No uncontrolled penetration at 390 Pa (8.00 psf), minimum, pressure differential.
   5. Air Infiltration Resistance: ASTM E2830.5 L/s/sq. m 0.1 cfm/sq. ft.), maximum at 300 Pa (6.24 psf), minimum, pressure differential.

B. Provide the following operation types for locations indicated on the Drawings.
   1. Fixed Windows:
      a. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440, minimum AW-40.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B221M (ASTM B221); 6063 alloy, T5 temper.

B. Aluminum Sheet: ASTM B209M (ASTM B209); 5005 alloy, H15 or H34 temper.

2.3 PRODUCTS - GENERAL

A. Provide windows from one manufacturer.

B. Sustainable Construction Requirements:
   1. Aluminum Recycled Content: 80 total recycled content, minimum.

2.4 ALUMINUM WINDOWS

A. Frames and Sashes: Aluminum extrusions, AAMA/WDMA/CSA 101/I.S.2/A440.

B. Thermal-Break Window Construction:
   1. Manufacturer’s Standard.
   2. Low conductance thermal barrier.
   3. Capable of structurally holding sash in position and together.
   4. Thermal Break Assemblies: Tested according to AAMA TIR A8 and AAMA 505.
   5. Design location of thermal break so that, in closed position, outside air does not come in direct contact with interior frame of window.

C. Mullions: Match window units.

D. Provide anchors and other related accessories required for installation.

2.5 GLAZING

A. Glass and Glazing: As specified in Section 08 80 00, GLAZING.
   1. Factory glaze windows.
   2. Weep holes through glazed areas are not acceptable.

2.6 INSECT SCREENING

A. Screen Mesh: 18 by 18, AAMA/WDMA/CSA 101/I.S.2/A440.
   1. Screen Cloth: Vinyl clad aluminum.

B. Frame: Aluminum, match window unit finish type and color, unless otherwise indicated.

2.7 HARDWARE

A. Locks: Two position locking bolts or cam type tamperproof custodial locks with a single point control located not higher than 1500 mm (60 inches) from floor level. Locate locking devices in vent side rail. Provide concealed or nonremovable fastenings for locks and keepers. Provide cam type locks on single hung and double windows to pull window sashes together in a locked and secured position.

B. Locking Device Strikes: Locate adjustable strikes in frame jamb. Fabricate strikes from Type 304 stainless steel or white bronze.

C. Counterbalancing: Primary window sash shall be equipped with counterbalancing mechanisms meeting the requirements of AAMA 902 or AAMA 908. Counterbalancing mechanism shall be of appropriate size and capacity to hold the sash stationary at any open position shall be used for the weights of sash to be counterbalanced.

D. Fabricate hinges of noncorrosive metal. Hinges may be either fully concealed when window is closed or semi-concealed with exposed knuckles and hospital tips. Surface mounted hinges are not acceptable.

E. Guide Blocks: Fabricate guide blocks of injection molded nylon. Install guide block fully concealed in vent/frame sill.

F. Hardware for Emergency Ventilation of Windows:
   1. Provide windows with hold open linkage.
   2. Provide hold open hardware for maximum 150 mm (6 inches) of window opening with adjustable friction shoe to provide resistance when closing window.
   3. Handles: Removable type.

G. Hardware for Maintenance Opening of Windows: Opening beyond limit stop position accomplished by maintenance key captured by release device when window is in open position.
   1. Design operating device to prevent opening with standard tools, coins or bent wire devices.

H. Pole Operators:
   1. Provide pole operator and pole hanger where operable windows have hardware more than 1500 mm (60 inches) above floor, but not over 3000 mm (10 feet) above floor.
   2. Fabricate pole of tubular anodized aluminum with rubber cap at lower end and standard push-pull hook at top end to match hardware design.
   3. Provide sufficient length for window operation without reaching more than 1500 mm (60 inches) above floor.
   4. Provide one operating pole and one pole hanger in each room or space where pole operation of windows is required.

I. Weather Stripping: AAMA/WDMA/CSA 101/I.S.2/A440; leaf type weather-stripping is not acceptable.

J. Provide wrenches, keys, or removable locking operating handles, as specified to operate windows.

1. Provide one emergency ventilating operating handle for every four windows.
2. Provide maintenance or window washer operating handles as required.

2.8 FABRICATION

A. Fabricate windows to comply specified performance class and grade.
   1. Assemble frame and sash so fasteners are concealed when window is closed.
   2. Attach locking and hold-open devices to windows with concealed fasteners.
   3. Where extrusion wall thickness is less than 3 mm (0.125 inch) thick, provide backup plates or similar reinforcements for fasteners.
   4. Use stainless steel fasteners to secure Venetian blind hanger clips, vent guide blocks, friction adjuster, and limit opening device.

B. Aluminum Trim:
   1. Trim includes casings, closures, and panning.
   2. Fabricate to shapes shown, minimum 1.6 mm (0.062 inch) thick.
   3. Extruded or formed sections, straight, true, and smooth on exposed surfaces. Curved sections true to line.
   4. Exposed external corners mitered and internal corners coped; fitted with hairline joints.
   5. Reinforce 1.6 mm (0.062 inch) thick members with minimum 3 mm (1/8 inch) thick aluminum.
   6. Except for strap anchors, provide reinforcing for fastening near ends and spaced maximum 300 mm (12 inches) on center.
   7. Design to allow unrestricted expansion and contraction of members and window frames.
   8. Secure to window frames with machine screws or expansion rivets.
   9. Exposed screws, fasteners or pop rivets are not acceptable on exterior of casing or trim cover system.

C. Aluminum Subsills and Stools:
   1. Fabricate to shapes shown, minimum 2 mm (0.080 inch) thick extrusion.
   2. One piece full length of opening with concealed anchors.
   3. Sills turned up back edge minimum 6 mm (1/4 inch). Front edge provide with drip.
   4. Sill back edge behind face of window frame. Do not extend to interior surface or bridge thermal breaks.
   5. Do not perforate for anchorage, clip screws, or other requirements.

2.9 FINISHES

A. Finish window units according to NAAMM AMP 500 series.

B. Anodized Aluminum:
   1. Clear Anodized Finish: AA-C22A41; Class I Architectural, 0.018 mm (0.7 mil) thick.
   2. Color Anodized Finish: AA-C22A42 or AA-C22A44; Class I Architectural, 0.018 mm (0.7 mil) thick.

C. Aluminum Paint finish:
   1. Fluorocarbon Finish: AAMA 2605; 70 percent fluoropolymer resin, 2-coat system.
   2. Color: Refer to See Construction documents.

D. Hardware: Finish hardware exposed when window is in closed position to match window.

2.10 ACCESSORIES

A. Fasteners: AAMA/WDMA/CSA 101/I.S.2/A440; non-magnetic stainless steel.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.

1. Verify openings are within acceptable tolerances.

B. Protect existing construction and completed work from damage.

C. Remove existing windows to permit new installation when replacement window is available, and ready for immediate installation.
1. Remove existing work carefully; avoid damage to existing work indicated to remain.
2. Perform other operations as necessary to prepare openings for proper installation and operation of new windows.
3. Do not leave openings uncovered at end of working day, during precipitation or temperatures below 16 degrees C (60 degrees F).

3.2 INSTALLATION, GENERAL

A. Install products according to manufacturer's instructions and approved submittal drawings.
1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

B. Where type, size or spacing of fastenings for securing window accessories or equipment to building construction is not shown or specified, provide expansion or toggle bolts or screws, as best suited to construction material.
1. Provide bolts or screws minimum 6 mm (1/4 inch) in diameter.
2. Sized and spaced to resist tensile and shear loads imposed.
3. Do not install exposed fasteners on exterior, except when unavoidable for application of hardware.
4. Provide non-magnetic stainless steel Phillips flat-head machine screws for exposed fasteners, where required, or special tamper-proof fasteners.
5. Locate fasteners to avoid disturbing window thermal break.

C. Set windows plumb, level, true, and in alignment; without warp or rack of frames or sash.

D. Anchor windows on four sides with anchor clips or fin trim.
1. Do not allow anchor clips to bridge thermal breaks.
2. Use separate clips for both sides of thermal breaks.
3. Make connections to allow for thermal and other movements.
4. Do not allow building load to bear on windows.
5. Use manufacturer's standard clips at corners and maximum 600 mm (24 inches) on center.
6. Where fin trim anchorage is indicated build into adjacent construction, anchoring at corners and maximum 600 mm (24 inches) on center.

E. Sills and Stools:
1. Set in bed of mortar or other compound to fully support, true to line shown.
2. Do not extend sill to inside window surface or past thermal break.
3. Leave space for sealants at ends and to window frame unless indicated otherwise.

3.3 MULLIONS CLOSURES, TRIM, AND PANNING

A. Cut mullion full height of opening and anchor directly to window frame on both sides.

B. Closures, Trim, and Panning: External corners mitered and internal corners coped, fitted with hairline, tightly closed joints.
1. Secure to concrete and solid masonry with expansion bolts, expansion rivets, split shank drive bolts, or powder actuated drive pins.
2. Toggle bolt to hollow masonry units.
3. Screw to wood and metal.

C. Fasten except for strap anchors, near ends and corners and maximum 300 mm (12 inches) on center.

D. Seal units following installation to provide weathertight system.

3.4 ADJUSTING

A. Adjust ventilating sash and hardware to provide tight fit at contact points, and at weather-stripping for smooth operation and weathertight closure.

3.5 FIELD TESTING

A. Field Tests: Performed by testing laboratory specified in Section 01 45 29, TESTING LABORATORY SERVICES.

B. Test Method: AAMA 502.

C. Test Specimen:
   1. Include window assembly and construction. Affix test chamber to interior side of test specimen and the conduct testing using positive static air pressure (Test method A).
   2. Test specimens to be selected by the Contracting Officer's Representative after windows have been installed according to the drawings and specification.

3.6 CLEANING

A. Lubricate hardware and moving parts.

B. Remove excess glazing and sealant compounds.

C. Clean exposed aluminum and glass surfaces. Remove contaminants and stains.

D. Keep windows locked except while adjusting and testing.

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SECTION 08 56 53

BLAST RESISTANT FAÇADE SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The exterior facade systems and supporting substrates are required to provide specified resistances as indicated on Contract Drawings and as specified in this Section 08 56 53. This specification section is applicable to new façade wall systems.

1.2 RELATED WORK

A. Structural Steel Framing: Section 05 12 00

B. Cold-Formed Metal Framing: Section 05 40 00

C. Aluminum-Framed Entrances and Storefronts: Section 08 41 13

D. Door Hardware: Section 08 71 00

E. Glazing: Section 08 80 00

F. Louvers and Vents: Section 08 90 00

1.3 SYSTEM PERFORMANCE

A. Fabricate and install blast resistant façade wall systems including all exterior windows, exterior store front, exterior curtain wall, exterior doors, exterior louver, exterior cold-formed metal stud and metal panel wall systems, and interior glazing/storefront and metal stud wall system between the Lobby and Vestibule to achieve indicated levels of resistance, unless noted otherwise in this Section. Extend resistance to include anchorages, steel embeds, interfaces with adjoining substrates, glass retention, and hardware. Provide supplementary steel and connections as required to transfer load into main structural framing system.

B. General: Design all exterior façade wall systems and interior wall systems, as noted in this section and on the drawings, to the following:
   1. Design exterior window, exterior glazing and façade non-load bearing wall systems, and interior glazing/storefront and metal stud wall system between the Lobby and Vestibule to meet the performance requirements for a ‘Life Safety Protected” facility with a linearly decaying dynamic load with a peak dynamic pressure of 4-psi and a 14-msec time duration, unless noted otherwise in this section, in accordance with the Physical Security & Resiliency Design Manual for VA Facilities dated October 1, 2020. Design can be performed using dynamic calculations or blast testing as described herein.
   2. 2For load bearing exterior wall systems, including load bearing cold formed metal stud framing and cold formed metal stud jambs supporting window and door systems, and any exterior wall components that are part of the primary structural system, design shall meet the performance requirements with a linearly decaying dynamic load with a peak dynamic pressure of 15.19-psi and a 7.16-msec time duration.
   3. For blast dynamic loadings for exterior doors and louvers, design shall comply with Section 1.3.D and 1.3.G below, respectively.

C. Glazing System Design: Exterior glazing systems, and the interior glazing/curtainwall system separating the Lobby from the Vestibule shall be designed as follows:
   1. Acceptable Response for Blast Resistant Window Systems: Glazing shall be laminated and is to achieve the equivalent of a GSA Performance Condition 3B or better. Condition 3B is defined as glazing breaks, glass fragments enter the space, and land on the floor

no further than 10 feet (3 meters) from the window. The probability of glass failure value of 500 breaks per 1,000 shall be used.

2. Acceptable Glass Response for Blast Resistant Skylight Systems: Skylight glazing shall be laminated and is to achieve the equivalent of a GSA Performance Condition 2 or better. Condition 2 is defined as the glazing cracks but remains in the frame.
3. Glass Design: Use WinGARD 5.5.1 or latest to design exterior glass panes and interior glass pane separating the Lobby from the Vestibule to resist ramp-down dynamic air-blast loads corresponding to a peak pressure of 4-psi that linearly decays over a 14-msec time duration.
4. Supporting Structure Design: Design frame members and mullions to the applied blast load over the appropriate effective area of the frame or mullion.
    a. Support Rotation (Θ): Provide a maximum support rotation of $\Theta \leq L/20$ for steel or aluminum in response to the specified blast loads as indicated in Section 1.3.B. Additionally, mullions and frames must also be designed to accept a blast load equal to the maximum capacity of the weakest lite of supported glass (balanced design), but no less than the calculated blast loads as indicated in Section 1.3.B while sustaining deformations limits of L/14. Mullions and frames are to be design for the capacity of the glazing that would be required to meet the blast requirements only.
    b. Unless demonstrated by analysis that a dry glazed system is adequate, the glass must be restrained within the mullions/frames with a minimum ½-in bite and a minimum 3/8-in wide continuous bead of structural silicone adhesive attaching the inner lite of glass to the frame to allow it to develop its post-damage capacity.
5. Connection Design:
    a. Design connections and any required supplemental steel at the connections to the lesser of the following:
        1) The dynamic peak edge shear glazing reaction over the perimeter length of the frame, or
        2) Sum all mullion reaction forces framing into a connection joint based on each element's flexural yield capacity.
    b. Connections shall be designed with dynamic and static material strength increase factors of 1.0 and applicable material design codes and applicable strength reduction factors. All flexural elements and their connections must be designed and detailed such that no brittle failure mode limits the capacity of the section. Unless the element is designed to remain elastic response to blast loading, ductile failure modes must be the governing failure mode for flexural elements and their connections. When the elements are designed to resist the calculated blast loads elastically, the design of non-ductile modes of failure must include a 1.5 factor of safety on the calculated forces. When using proprietary fasteners, a safety factor of 1.5, in addition to the appropriate strength reduction factors, shall be used to any manufacturers' published ultimate load capacities. Alternatively, fastener design strengths can be taken from the International Code Council (ICC-ES) Evaluation report data.
    c. Connection design to the supporting structure, including permitted allowable connection locations and configurations, shall be coordinated with the contractor. It's the contractor's responsibility to coordinate, design, fabricate and install the window system and its anchorage to the supporting structure.
    d. Vestibule Exterior Storefront and Door: Exterior glazing at the vestibule shall be laminated. Exterior vestibule glazing, framing and connection design do not need to meet the performance requirements of 1.3.C.1, 1.3.C.3, 1.3.C.4 and 1.3.C.5.

D. Exterior Door Design:
    1. The operable portions of all exterior swing doors, Entry Vestibule interior door (interior door system between the Lobby and Vestibule) and the interior door between the Lobby and the adjacent interior waiting spaces must be laminated glass and heavy gauge metal

(14 gauge minimum) and must open towards the detonation. The stationary portions for all exterior swing doors, Entry Vestibule interior door (interior door system between the Lobby and Vestibule), and the interior door between the Lobby and the adjacent interior waiting spaces must be designed using heavy duty frames and anchorages capable of resisting the collected blast loads as indicated in Section 1.3.B, while sustaining the deformations no greater than L/20.

2. The requirements indicated in 1.3.D.1 do not apply to revolving doors, roll-up doors, and sliding doors. The glass for these doors must be laminated.
3. All exterior door glazing, Entry Vestibule interior doors glazing (interior door system between the Lobby and Vestibule), and doors noted on the door schedule shall be laminated and glazing shall meet the performance requirements as indicated in Section 1.3.C.3.

E. Cold-Formed Metal Framing Design: Exterior cold-formed metal framing, in load bearing and non-load bearing walls, as indicated on architectural and structural drawings, that supports exterior façade walls, glazing systems, louvers, and doors shall be designed for the dynamic loading of Section 1.3.B as follows:
1. Non-Load Bearing Wall Metal Framing Ductility (μ): Provide a maximum ductility value for the flexural response of $\mu \leq 2$ for studs connected at top and bottom.
2. Load Bearing Wall Metal Framing Ductility (μ): Provide a maximum ductility value for the flexural response of $\mu \leq 1$ for studs connected at top and bottom.
3. Connection: Design connections to develop the plastic flexural capacity of the element.
4. Built-up sections shall be fastened at regular intervals along the length such that the plastic flexural capacity of the composite section can be developed without instability.

F. Connection: It is contractor's responsibility to coordinate between the sub-contractors and to provide any backing plates, including gauge metal and steel plate, as needed for attachment of windows, doors, and louver systems.

G. Metal Panel Wall: Insulated metal panels, corrugated deck, and metal sheathing, where occurs and where noted on drawings, at exterior face of façade wall systems, and at the interior metal stud wall system between the Lobby and Vestibule shall be designed for the dynamic loading of Section 1.3.B as follows:
1. Deformation limit: 4 degree for secondary structure and 1 degree for primary structure
2. Connection: Develop plastic flexural capacity of the panel

H. Louver Design: Exterior louvers at air-intakes and exhausts that enter critical equipment spaces shall be dynamically designed to minimize the blast over-pressure admitted into critical spaces.
1. Design louver elements to the blast dynamic ramp-down load applied over the appropriate effective area of the louver with 4-psi and 28-psi-msec blast loading.
2. Performance Requirements: Louver elements shall be designed for:
    a. Deformation limit of 6 degree and ductility limit of 20 for steel plate bent about weak axis
    b. Connection: Develop plastic flexural capacity of the louver fins or mullions
3. Louver Supporting Structure Design: If additional secondary steel is required to support louvers, beyond what is shown in the Construction Documents drawings, the contractor shall be responsible to design the additional steel to the applied blast load as indicated in Section 1.3.G.1 over the appropriate effective area of the supporting members. For structural steel framing sections, design shall be as follows:
    a. Ductility (μ): Provide a maximum ductility value for the flexural response of $\mu \leq 12$ for compact structural steel sections or $\mu \leq 1$ for non-compact structural steel sections; provide a maximum ductility value for combined flexure and compression response, where occurs, of $\mu \leq 3$ for compact structural steel sections or $\mu \leq 0.85$ for non-compact structural steel sections
    b. Support Rotation (Θ): Provide a maximum rotation value for the flexural response of $\Theta \leq 10$ degrees for structural steel; provide a maximum rotation value for the combined flexure and compression response, where occurs, of $\Theta \leq 3$ degrees

c. Interior Glazing Systems at Level 1 Lobby: All glazing in this area shall be laminated.

1.4 SUBMITTALS

A. General: Submit the following in accordance with Section 01 33 23, SHOP DRAWINGS.
1. Shop drawings showing dimensioned details of metal window units. Show application of intended glazing materials. Show typical window unit interior and exterior elevations at not less than 3/4"=1'-0" (1:20) scale. Indicate how window units, not necessarily including basic sub-frames, are to be subsequently removed/replaced; and how glazing unit removal/replacement is to be accomplished. After final modifications and corrections have been incorporated, submit drawings as AutoCAD files with .DWG extension:
   a. Details: Show sections at 3"=1'-0" (1:5) scale of members indicating construction, size, and thickness of components, together with connections, fastenings, and means of separating dissimilar metals.
   b. Details of Curtain wall: see Spec Section 08 41 13, Aluminum-Framed Entrances and Storefronts & Section 08 51 13, Aluminum Windows for specific requirements of these shop drawings.

B. Calculations: Provide calculations prepared by qualified blast consultant verifying that façade elements meet specific blast resistance requirements detailed in this Section.
1. Prior to performing engineering calculations intended to address the blast loading identified, submit a description of the technique(s) that will be employed to calculate the response of the system to the defined dynamic loading.
2. Calculation package is to include a summary sheet briefly outlining the following:
   a. Evaluation criteria
   b. Calculation assumptions
   c. Table of results by window type/location
   d. Statement of Conformance with specification requirements.
   e. Blast calculations are to be submitted at the same time as the related shop drawings
3. Calculation submittal is to be stamped and signed by a registered Professional Engineer in the U.S. whose qualifications meet or exceed Quality Assurance criteria.
4. Submit single degree of freedom (or better) dynamic analysis for façade window and wall systems, and structure serving to support the doors. Submit engineering calculations to show that element response meets specified performance requirements under design load. Additionally, illustrate that brittle modes of failure (such as shear and buckling) are avoided. These calculations must include, but may not be limited to, analysis of the following:
   a. Glass: Determine glass pane performance using an analysis program such as WinGard (Version 5.5.1 or later), developed by the General Service Administration. If a program other than WinGard is used, it must be approved by the Owner prior to calculations. WinGard calculations provided in the calculation package are to include the complete text rather than the “concise” text printout.
   b. Window System Mullions and Framing Members: A clear load path from the glass shall be provided. Supporting analysis that illustrates each component's response to design loading shall be provided. Analysis shall consider both flexural and shear responses. Analysis shall verify the element's ability to develop its plastic flexural capacity without instability. Calculations must include, but may not be limited to, analysis of the following
      1) Global Performance: Analysis shall verify that the plastic moment of the mullion, acting in a composite manner with its individual components, can be attained under maximum calculated deflections.
      2) Lateral Torsional Buckling: Analysis shall verify the ability of the mullion to provide adequate resistance against lateral torsional buckling under maximum calculated deflections.

3) Local Buckling: Analysis shall verify the ability of the mullion and its individual components and connections to provide adequate resistance against localized buckling along the entire load path under maximum calculated deflections.
4) Structural Silicone Stress: Analysis shall verify the capacity of the silicone to retain the glass under maximum calculated deflections.

c. Cold-Formed Framing Members: A clear load path shall be provided. Supporting analysis that illustrates the response to design loading shall be provided. Analysis shall consider both flexural and shear responses. Analysis shall verify the element's ability to develop its plastic flexural capacity without instability. Calculations must include, but may not be limited to, analysis of the following
1) Global Performance: Analysis shall verify that the plastic moment of the element can be attained under maximum calculated deflections.
2) Lateral Torsional Buckling: Analysis shall verify the ability of the element to provide adequate resistance against lateral torsional buckling under maximum calculated deflections.
3) Local Buckling: Analysis shall verify the ability of the element to provide adequate resistance against localized buckling along the entire load path under maximum calculated deflections.
4) Web Crippling: Analysis shall verify the ability of the element to provide adequate resistance against web crippling at the element supports.

d. Anchorage: Analyze the strength of entire anchorage assembly, including reaction forces shared with the building structure. Provide supplementary steel plates and embeds as required to impart loads onto the structure. Analyze the wall anchor, clip, inserts, fasteners and assemblies, including bolts and stiffeners, and any additional supplementary steel required to transfer the load back to the main structural framing system. Include exact loadings to be transferred to the building structure in the analysis.

e. Mechanical Anchors: Mechanical anchor capacities shall be developed from dynamic testing. An International Code Council (ICC-ES) evaluation report showing testing for dynamic loading (i.e. seismic or blast) is to be submitted with calculations.

f. Supporting Structure: Coordination of the supporting structure interaction shall be the contractors' responsibility. The contractor's engineer performing blast calculations for each facade system shall coordinate loading scenarios with the other façade contractor's engineer providing design for the other exterior facade system, where occurs. Forces transmitted from the appropriate window tributary area shall be the design loads from the glazing area.

C. Testing Requirements:

1. Testing of façade systems, as an alternative to providing calculations as stated in Section 1.4.B, shall include the entire window, door, louver or wall system, including connections, and shall include but not be limited to the following:

a. A minimum of three (3) identical specimens should be tested for the design blast load summarized herein or higher. Those specimens should be similar to the configuration indicated in the project documents with respect to geometry (within 10%), material properties, connections, etc.

b. Test charge construction and the standoff distance from the center of the charge to the exterior face of the test specimen(s) shall be measured and documented for tests using explosives.

c. Blast source construction (compressed gas and/or explosives) shall be measured and documented for shock tube tests.

d. A minimum of two (2) pressure transducers shall be used on each test reaction structure to measure the pressure-time waveform acting on the exterior face of

tested specimens. A minimum of one (1) interior pressure transducer shall be used in each test structure.

2. Where façade window system performance is demonstrated through testing, testing methods shall be in accordance with ASTM F 1642-17.
3. Test Reports: Evidence of testing in accordance with ASTM F 1642-17 methods for dynamic testing shall be submitted in the form of a test report from an independent testing agency. The test report package shall include, but not be limited to, the following:
   a. Brief description of the test performed and the test apparatus
   b. Table of comparison between test specimens windows and project configuration
   c. Table of test results by system type/location
   d. Summary of recorded air-blast pressure-time history from each pressure transducer
4. Testing shall be performed by an independent testing agency whose personnel meet or exceed Quality Assurance criteria.

D. Certificates: Engineer's qualifications that meet or exceed Quality Assurance criteria. At a minimum, qualifications must list each project in which the Engineer performed analysis of window systems, the effective start and end dates of performance of the analysis, and a reference.

1.5 QUALITY ASSURANCE

A. Provide products that meet the requirements of Physical Security & Resiliency Design Manual (PSRDM) October 1, 2020, for Life Safety Protected Facilities.

B. Engineer: Engage an Engineering Professional in the U.S. to perform dynamic analysis of the Blast Resistant Windows. The Engineer shall have a minimum of 5 years experience performing dynamic analysis for blast resistant design and demonstrable experience designing blast resistant window systems in the past 18 months.

C. Glazing Bite: The required window system bite must be verified in the field.

D. Installation Orientation: Windows delivered to the construction site are to be clearly labeled as to the proper installation orientation (i.e. laminated pane of glass to be installed as the interior pane.)

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with Manufacturer's directions and as required to prevent edge damage or other damage to assembly resulting from effects of moisture, condensation, temperature changes, direct exposure to sun, and contact with chemical solvents.

B. Deliver prefabricated units to Project as completely assembled units, ready for anchorage into supporting structure, and for interfacing with other work.

1.7 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American Society for Testing and Materials (ASTM):

ASTM A36/A36M-14 ..... Standard Specification for Carbon Structural Steel

ASTM A123/A123M-13 ..... Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM B221-14..... Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

ASTM F1642-17..... Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loadings

C. National Association of Architectural Metal Manufactures (NAAMM)

D. AMP 500-06 Metal Finishes Manual

E. Physical Security & Resiliency Design Manual (PSRDM) October 1, 2020, for Veterans Affairs Life Safety Protected Facilities.

F. American Society of Civil Engineers (ASCE), ASCE 59-11, Blast Protection of Buildings

G. WinGARD Version 5.5.1 or latest

PART 2 - PRODUCTS

2.1 MANUFACTURER/FABRICATOR

A. Certified Units: Provide units and sub-frames which are manufactured/fabricated by firms which have produced identical units required for this Project and which have been certified to comply with requirements for levels of resistance to attack specified, unless units have supplemental blast calculations performed by qualified professional engineer licensed in the U.S. demonstrating compliance of the requirements specified in this Section.

2.2 MATERIALS

A. Steel Shapes/Plates/Bars: ASTM A36 or ASTM A572, except where another designation is indicated.

B. Stainless Steel: Provide formed members of AISI Type 304 stainless steel sheet, with No. 4 directional polish.

C. Bolts and Fasteners: Provide AISI Type 300-series stainless steel screws, bolts, nuts, and washers; comply with ASTM A 320. Provide non-removable type where accessible from attack side.

D. Aluminum Extrusions/Bars: Provide members complying with ASTM B 221, alloy 6063-T5, -T6, or -T52, or alloy 6061-T6, for principal framing members; provide alloy 6063-T5, -T6, or -T52 for trim and stops which are not exposed to forced entry attack.

E. Framing Members:
   1. Yield Strength: Provide supporting references that grade of steel or aluminum used is capable of achieving calculated ductility ratio.
   2. The yield strength of framing members may be increased to account for dynamic strain rate effects and differences between expected versus minimum specified yield strength of materials as follows:
      a. Structural Steel: For fy = 36 ksi, the yield strength may be increased by a factor of 1.42. For fy = 46 ksi and fy = 50 ksi, the yield strength may be increased by a factor of 1.31.
      b. Structural Aluminum: The yield strength may be increased by a factor of 1.02.
      c. Cold-Formed Metal: The yield strength may be increased by a factor of 1.33.
   3. Section Modulus: The plastic section modulus may be used in dynamic design calculations.
   4. Built-up Sections: Design built-up sections using ultimate stress and strain compatibility approaches as defined by industry standards. If built-up section is analyzed as one unit, full shear stress transfer along the line of contact between the individual sections must be illustrated.

F. Glazing Materials: Refer to Section 08 80 00.
   1. Glass-to-Glass Interlayers: Clear polyvinyl butyral (PVB) laminating film/sheet shall be used on the inner lite of exterior window systems.
   2. Glazing bite: The minimum allowable bite is 1/2” (12.7 mm).

G. Structural Silicone Sealant:
   1. Use high-strength, high-performance structural silicone.

2. Safety Factors: ultimate tension and shear capacities are to be used with a safety factor of 1.0.
3. Apply the silicone sealant to the inner lite of glass to the frame to allow it to develop its post-damage capacity. The minimum continuous bead size is 3/8” (9.5 mm) structural silicone adhesive. The controlling silicone failure mode shall be cohesive failure.

2.3 FABRICATION

A. Unit Framing: Shop fabricate unit framing system of section profiles in metal as shown. Provide full-strength, mitered-and-welded corner joints. Provide framing units to achieve specified performances, but not less than metal thicknesses and dimensions shown. Comply with applicable AWS standards for welding, with exposed welds ground reasonably smooth. Provide welded-in-place reinforcements, including anchorage devices as shown. Fabricate metal glazing stops for removal, with mitered corners and countersunk screw attachment to frame.

B. Unit Anchorages: Fabricate metal anchorage system/devices as shown, and as required to achieve performance requirements.

C. Unit Glazing: Install glazing sheets in frames at fabrication plant prior to delivery to project except where indicated. See section 08 80 00 for laminated glass assemblies.

PART 3 - EXECUTION

3.1 SEE TECHNICAL SPECIFICATIONS LISTED UNDER RELATED SECTIONS ABOVE

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Door hardware and related items necessary for complete installation and operation of doors.

1.2 RELATED WORK

A. Caulking: Section 07 92 00 JOINT SEALANTS.

B. Application of Hardware: Section 08 14 00, WOOD DOORS; Section 08 11 13, HOLLOW METAL DOORS AND FRAMES; Section 08 17 10, INTEGRATED DOOR ASSEMBLIES; Section 08 36 16.13, HIGH PERFORMANCE BARN (SLIDING) DOOR; Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS; Section 08 71 13, AUTOMATIC DOOR OPERATORS; .Section 32 31 19, PRE-FABRICATED ORNAMENTAL STEEL FENCE.

C. Finishes: See Construction documents..

D. Painting: Section 09 91 00, PAINTING.

E. Card Readers: Section 28 13 00, PHYSICAL ACCESS CONTROL SYSTEMS.

F. Electrical: Division 26, ELECTRICAL.

G. Fire Detection: Section 28 31 00, FIRE DETECTION AND ALARM.

1.3 GENERAL

A. All hardware shall comply with ABAAS, (Architectural Barriers Act Accessibility Standard) unless specified otherwise.

B. Provide rated door hardware assemblies where required by most current version of the International Building Code (IBC).

C. Hardware for Labeled Fire Doors and Exit Doors: Conform to requirements of NFPA 80 for labeled fire doors and to NFPA 101 for exit doors, as well as to other requirements specified. Provide hardware listed by UL, except where heavier materials, large size, or better grades are specified herein under paragraph HARDWARE SETS. In lieu of UL labeling and listing, test reports from a nationally recognized testing agency may be submitted showing that hardware has been tested in accordance with UL test methods and that it conforms to NFPA requirements.

D. Hardware for application on metal and wood doors and frames shall be made to standard templates. Furnish templates to the fabricator of these items in sufficient time so as not to delay the construction.

E. The following items shall be of the same manufacturer, except as otherwise specified:
1. Mortise locksets.
2. Hinges for hollow metal and wood doors.
3. Surface applied overhead door closers.
4. Exit devices.
5. Floor closers.

1.4 WARRANTY

A. Automatic door operators shall be subject to the terms of FAR Clause 52.246-21, except that the Warranty period shall be two years in lieu of one year for all items except as noted below:
1. Locks, latchsets, and panic hardware: 5 years.

2. Door closers and continuous hinges: 10 years.

1.5 MAINTENANCE MANUALS

A. In accordance with Section 01 00 00, GENERAL REQUIREMENTS Article titled "INSTRUCTIONS", furnish maintenance manuals and instructions on all door hardware. Provide installation instructions with the submittal documentation.

1.6 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Submit 6 copies of the schedule per Section 01 33 23. Submit 2 final copies of the final approved schedules to VAMC Locksmith as record copies (VISN Locksmith if the VAMC does not have a locksmith).

B. Hardware Schedule: AHC certified hardware consultant to prepare and submit hardware schedule in the following form:

Hardware Item	Quantity	Size	Reference Publication Type No.	Finish	Mfr. Name and Catalog No.	Key Control Symbols	UL Mark (if fire rated and listed)	ANSI/BHMA Finish Designation

C. Samples and Manufacturers' Literature:
1. Samples: All hardware items (proposed for the project) that have not been previously approved by Builders Hardware Manufacturers Association shall be submitted for approval. Tag and mark all items with manufacturer's name, catalog number and project number.
2. Samples are not required for hardware listed in the specifications by manufacturer's catalog number, if the contractor proposes to use the manufacturer's product specified.

D. Certificate of Compliance and Test Reports: Submit certificates that hardware conforms to the requirements specified herein. Certificates shall be accompanied by copies of reports as referenced. The testing shall have been conducted either in the manufacturer's plant and certified by an independent testing laboratory or conducted in an independent laboratory, within four years of submittal of reports for approval.

1.7 DELIVERY AND MARKING

A. Deliver items of hardware to job site in their original containers, complete with necessary appurtenances including screws, keys, and instructions. Tag one of each different item of hardware and deliver to Resident Engineer for reference purposes. Tag shall identify items by Project Specification number and manufacturer's catalog number. These items shall remain on file in Resident Engineer's office until all other similar items have been installed in project, at which time the Resident Engineer will deliver items on file to Contractor for installation in predetermined locations on the project.

1.8 PREINSTALLATION MEETING

A. Convene a preinstallation meeting not less than 30 days before start of installation of door hardware. Require attendance of parties directly affecting work of this section, including Contractor and Installer, Architect, Project Engineer and VA Locksmith, Hardware Consultant, and Hardware Manufacturer’s Representative. Review the following:

1. Inspection of door hardware.
2. Job and surface readiness.
3. Coordination with other work.
4. Protection of hardware surfaces.
5. Substrate surface protection.
6. Installation.
7. Adjusting.
8. Repair.
9. Field quality control.
10. Cleaning.

1.9 INSTRUCTIONS

A. Hardware Set Symbols on Drawings: Except for protective plates, door stops, mutes, thresholds and the like specified herein, hardware requirements for each door are indicated on drawings by symbols. Symbols for hardware sets consist of letters (e.g., "HW") followed by a number. Each number designates a set of hardware items applicable to a door type.

B. Keying: All cylinders shall be keyed into existing Best Great Grand Master Key System. Provide removable core cylinders that are removable only with a special key or tool without disassembly of knob or lockset. Cylinders shall be 6 pin type. Keying information shall be furnished at a later date by the COR.

1.10 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. In text, hardware items are referred to by series, types, etc., listed in such specifications and standards, except as otherwise specified.

B. American Society for Testing and Materials (ASTM):
F883-04.....Padlocks

E2180-07.....Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) In Polymeric or Hydrophobic Materials

C. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):
A156.1-06.....Butts and Hinges

A156.2-03.....Bored and Pre-assembled Locks and Latches

A156.3-08.....Exit Devices, Coordinators, and Auto Flush Bolts

A156.4-08.....Door Controls (Closers)

A156.5-14.....Cylinders and Input Devices for Locks.

A156.6-05.....Architectural Door Trim

A156.8-05.....Door Controls-Overhead Stops and Holders

A156.11-14.....Cabinet Locks

A156.12-05 .....Interconnected Locks and Latches

A156.13-05.....Mortise Locks and Latches Series 1000

A156.14-07 .....Sliding and Folding Door Hardware

A156.15-06.....Release Devices-Closer Holder, Electromagnetic and Electromechanical

A156.16-08.....Auxiliary Hardware

A156.17-04 .....Self-Closing Hinges and Pivots

A156.18-06.....Materials and Finishes

A156.20-06 .....Strap and Tee Hinges, and Hasps

A156.21-09.....Thresholds

A156.22-05.....Door Gasketing and Edge Seal Systems

A156.23-04.....Electromagnetic Locks

A156.24-03.....Delayed Egress Locking Systems

A156.25-07 .....Electrified Locking Devices

A156.26-06.....Continuous Hinges

A156.28-07 .....Master Keying Systems

A156.29-07 .....Exit Locks and Alarms

A156.30-03 .....High Security Cylinders

A156.31-07 .....Electric Strikes and Frame Mounted Actuators

A156.36-10.....Auxiliary Locks

A250.8-03.....Standard Steel Doors and Frames

D. National Fire Protection Association (NFPA):
80-10 .....Fire Doors and Other Opening Protectives

101-18 .....Life Safety Code

E. Underwriters Laboratories, Inc. (UL):

F. Building Materials Directory (2008)

PART 2 - PRODUCTS

2.1 BUTT HINGES

A. ANSI A156.1. Provide only three-knuckle hinges, except five-knuckle where the required hinge type is not available in a three-knuckle version (e.g., some types of swing-clear hinges). The following types of butt hinges shall be used for the types of doors listed, except where otherwise specified:
1. Exterior Doors: Type A2112/A5112 for doors 900 mm (3 feet) wide or less and Type A2111/A5111 for doors over 900 mm (3 feet) wide. Hinges for exterior outswing doors shall have non-removable pins. Hinges for exterior fire-rated doors shall be of stainless steel material.
2. Interior Doors: Type A8112/A5112 for doors 900 mm (3 feet) wide or less and Type A8111/A5111 for doors over 900 mm (3 feet) wide. Hinges for doors exposed to high humidity areas (shower rooms, toilet rooms, kitchens, janitor rooms, etc. shall be of stainless steel material.

B. Provide quantity and size of hinges per door leaf as follows:
1. Doors up to 1210 mm (4 feet) high: 2 hinges.
2. Doors 1210 mm (4 feet) to 2260 mm (7 feet 5 inches) high: 3 hinges minimum.
3. Doors greater than 2260 mm (7 feet 5 inches) high: 4 hinges.
4. Doors up to 900 mm (3 feet) wide, standard weight: 114 mm x 114 mm (4-1/2 inches x 4-1/2 inches) hinges.
5. Doors over 900 mm (3 feet) to 1065 mm (3 feet 6 inches) wide, standard weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).

6. Doors over 1065 mm (3 feet 6 inches) to 1210 mm (4 feet), heavy weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
7. Provide heavy-weight hinges.
8. At doors weighing 330 kg (150 lbs.) or more, furnish 127 mm (5 inch) high hinges.
9. Provide additional fire labels for both frame and door panel(s) on the top of door panel and head of frame.

C. See Articles "MISCELLANEOUS HARDWARE" and "HARDWARE SETS" for pivots and hinges other than butts specified above and continuous hinges specified below.

2.2 CONTINUOUS HINGES

A. ANSI/BHMA A156.26, Grade 1-600.
1. Listed under Category N in BHMA's "Certified Product Directory."

B. General: Minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete

C. Continuous, Barrel-Type Hinges: Hinge with knuckles formed around a Teflon-coated 6.35mm (0.25-inch) minimum diameter pin that extends entire length of hinge.
1. Base Metal for Exterior Hinges: Stainless steel.
2. Base Metal for Interior Hinges: Steel.
3. Base Metal for Hinges for Fire-Rated Assemblies: Steel.
4. Provide with non-removable pin (hospital tip option) at lockable outswing doors.
5. Where required to clear adjacent casing, trim, and wall conditions and allow full door swing, provide wide throw hinges of minimum width required.
6. Provide with manufacturer’s cut-outs for separate mortised power transfers and/or mortised automatic door bottoms where they occur.
7. Where thru-wire power transfers are integral to the hinge, provide hinge with easily removable portion to allow easy access to wiring connections.
8. Where models are specified that provide an integral wrap-around edge guard for the hinge edge of the door, provide manufacturer’s adjustable threaded stud and machine screw mechanism to allow the door to be adjusted within the wrap-around edge guard.

2.3 DOOR CLOSING DEVICES

A. Closing devices shall be products of one manufacturer for each type specified.

2.4 OVERHEAD CLOSERS

A. Conform to ANSI A156.4, Grade 1.

B. Closers shall conform to the following:
1. The closer shall have minimum 50 percent adjustable closing force over minimum value for that closer and have adjustable hydraulic back check effective between 60 degrees and 85 degrees of door opening.
2. Where specified, closer shall have hold-open feature.
3. Size Requirements: Provide multi-size closers, sizes 1 through 6, except where multi-size closer is not available for the required application.
4. Material of closer body shall be forged or cast.
5. Arm and brackets for closers shall be steel, malleable iron or high strength ductile cast iron.
6. Where closers are exposed to the exterior or are mounted in rooms that experience high humidity, provide closer body and arm assembly of stainless steel material.
7. Closers shall have full size metal cover; plastic covers will not be accepted.
8. Closers shall have adjustable hydraulic back-check, separate valves for closing and latching speed, adjustable back-check positioning valve, and adjustable delayed action valve.

9. Provide closers with any accessories required for the mounting application, including (but not limited to) drop plates, special soffit plates, spacers for heavy-duty parallel arm fifth screws, bull-nose or other regular arm brackets, longer or shorter arm assemblies, and special factory templating. Provide special arms, drop plates, and templating as needed to allow mounting at doors with overhead stops and/or holders.
10. Closer arms or backcheck valve shall not be used to stop the door from overswing, except in applications where a separate wall, floor, or overhead stop cannot be used.
11. Provide parallel arm closers with heavy duty rigid arm.
12. Where closers are to be installed on the push side of the door, provide parallel arm type except where conditions require use of top jamb arm.
13. Provide all surface closers with the same body attachment screw pattern for ease of replacement and maintenance.
14. All closers shall have a 1 ½" (38mm) minimum piston diameter.

2.5 FLOOR CLOSERS AND FLOOR PIVOT SETS

A. Comply with ANSI A156.4. Provide stainless steel floor plates for floor closers and floor pivots, except where metal thresholds occur. Provide cement case for all floor closers. Floor closers specified for fire doors shall comply with Underwriters Laboratories, Inc., requirements for concealed type floor closers for classes of fire doors indicated on drawings. Hold-open mechanism, where required, shall engage when door is opened 105 degrees, except when door swing is limited by building construction or equipment, the hold-open feature shall engage when door is opened approximately 90 degrees. The hold-open mechanism shall be selectable on/off by turning a screw through the floor plate. Floor closers shall have adjustable hydraulic back-check, adjustable close speed, and adjustable latch speed. Provide closers with delayed action where a hold-open mechanism is not required. Floor closers shall be multi-sized. Single acting floor closers shall also have built in dead stop. Where required, provide closers with special cement cases appropriate for shallow deck installation or where concrete joint lines run through the floor blockout. At offset-hung doors installed in deep reveals, provide special closer arm and spindle to allow for installation. Where stone or terrazzo is applied over the floor closer case, provide closer without floor plate and with extended spindle (length as required) and special cover pan (depth as required) to allow closer to be accessed without damaging the material applied over the closer. Pivots for non-labeled doors shall be cast, forged or extruded brass or bronze.

B. Where floor closer appears in hardware set provide the following as applicable.
   1. Double Acting Floor Closers: Type C06012.
   2. Single Acting Floor Closer: Type C06021 (center pivoted). (Intermediate pivot is not required).
   3. Single Acting Floor Closers: Type C06041 (offset pivoted).
   4. Single Acting Floor Closer for Labeled Fire Doors: Type C06051 (offset pivoted).
   5. Single Acting Floor Closers For Lead Lined Doors: Type C06071 (offset pivoted).

C. Pivots:
   1. ANSI/BHMA-A156.4, Type CO7162.
   2. Offset distance: 3/4 IN.
   3. Configuration:
      a. Use a minimum of one bottom pivot and one top pivot per leaf for doors up to 60 IN tall.
      b. Use one additional intermediate pivots for each additional 30 IN in height.
      c. Upgrade as recommended by manufacturer where door weight or width exceeds capacity of models listed.
      d. Upgrade from models listed as necessary for fire rated openings.
   4. Applications:
      a. Offset Pivots for Interior Doors:
         1) Pivot Sets: Types C07162
         2) Intermediate Transfer Pivots: Type C07321 x 4-WIRES

3) Intermediate Pivots: Type C07321

b. Offset Pivots for aluminum and hollow metal entrance doors
   1) Pivot Sets: Types C07162
   2) Intermediate Transfer Pivots: Type C07321 x 4-WIRES
   3) Intermediate Pivots: Type C07321

2.6 DOOR STOPS

A. Conform to ANSI A156.16.

B. Provide door stops wherever an opened door or any item of hardware thereon would strike a wall, column, equipment or other parts of building construction. For concrete, masonry or quarry tile construction, use lead expansion shields for mounting door stops.

C. Where cylindrical locks with turn pieces or pushbuttons occur, equip wall bumpers Type L02251 (rubber pads having concave face) to receive turn piece or button.

D. Provide floor stops (Type L02141 or L02161 in office areas; Type L02121 x 3 screws into floor elsewhere. Wall bumpers, where used, must be installed to impact the trim or the door within the leading half of its width. Floor stops, where used, must be installed within 4-inches of the wall face and impact the door within the leading half of its width.

E. Where drywall partitions occur, use floor stops, Type L02141 or L02161 in office areas, Type L02121 elsewhere.

F. Provide stop Type L02011, as applicable for exterior doors. At outswing doors where stop can be installed in concrete, provide stop mated to concrete anchor set in 76mm (3-inch) core-drilled hole and filled with quick-setting cement.

G. Omit stops where floor mounted door holders are required and where automatic operated doors occur.

H. Provide appropriate roller bumper for each set of doors (except where closet doors occur) where two doors would interfere with each other in swinging.

I. Provide appropriate door mounted stop on doors in individual toilets where floor or wall mounted stops cannot be used.

J. Provide overhead surface applied stop Type C02541, ANSI A156.8 on patient toilet doors in bedrooms where toilet door could come in contact with the bedroom door.

K. Provide door stops on doors where combination closer magnetic holders are specified, except where wall stops cannot be used or where floor stops cannot be installed within 4-inches of the wall.

L. Where the specified wall or floor stop cannot be used, provide concealed overhead stops (surface-mounted where concealed cannot be used).

2.7 OVERHEAD DOOR STOPS AND HOLDERS

A. Conform to ANSI Standard A156.8. Overhead holders shall be of sizes recommended by holder manufacturer for each width of door. Set overhead holders for 110 degree opening, unless limited by building construction or equipment. Provide Grade 1 overhead concealed slide type: stop-only at rated doors and security doors, hold-open type with exposed hold-open on/off control at all other doors requiring overhead door stops.

2.8 FLOOR DOOR HOLDERS

A. Conform to ANSI Standard A156.16. Provide extension strikes for Types L01301 and L01311 holders where necessary.

2.9 LOCKS AND LATCHES

A. Conform to ANSI A156.2. Locks and latches for doors 45 mm (1-3/4 inch) thick or over shall have beveled fronts. Lock cylinders shall have not less than six pins. Cylinders for all locksets shall be removable core type. Cylinders shall be furnished with construction removable cores and construction master keys. Cylinder shall be removable by special key or tool. Construct all cores so that they will be interchangeable into the core housings of all mortise locks, rim locks, cylindrical locks, and any other type lock included in the Great Grand Master Key System. Disassembly of lever or lockset shall not be required to remove core from lockset. All locksets or latches on double doors with fire label shall have latch bolt with 19 mm (3/4 inch) throw, unless shorter throw allowed by the door manufacturer's fire label. Provide temporary keying device or construction core to allow opening and closing during construction and prior to the installation of final cores.

B. In addition to above requirements, locks and latches shall comply with following requirements:
   1. Mortise Lock and Latch Sets: Conform to ANSI/BHMA A156.13. Mortise locksets shall be series 1000, minimum Grade 2. All locksets and latchsets, except on designated doors in Psychiatric (Mental Health) areas, shall have lever handles fabricated from cast stainless steel. Provide sectional (lever x rose) lever design matching Corbin Russwin ML2000 series lever Newport Escutcheon R. No substitute lever material shall be accepted. All locks and latchsets shall be furnished with 122.55 mm (4-7/8-inch) curved lip strike and wrought box. At outswing pairs with overlapping astragals, provide flat lip strip with 21mm (7/8-inch) lip-to-center dimension. Lock function F02 shall be furnished with emergency tools/keys for emergency entrance. All lock cases installed on lead lined doors shall be lead lined before applying final hardware finish. Furnish armored fronts for all mortise locks. Where mortise locks are installed in high-humidity locations or where exposed to the exterior on both sides of the opening, provide non-ferrous mortise lock case.
   2. Auxiliary locks shall be as specified under hardware sets and conform to ANSI A156.36.
      a. Auxiliary Multi-point Lock
         1) Bolts:
            a) Stainless Steel 1-1/4 inch main locking bot.
         2) Concealed wiring through door panel.
         3) Provide Dustproof strike in door frame & transfer hinge or pivot.
         4) Manual Locking control by 3-position key switch by Section 08 71 13.
         5) Lock House:
            a) Factory Assembled, Metal housing, security screws
         6) Acceptable Manufacture:
            a) Securitech Trident Multi-point lock.
            b) Or equal.
   3. Locks on designated doors in Psychiatric (Mental Health) areas shall be paddle type with arrow projection covers and be UL Listed. Provide these locks with paddle in the down position on both sides of the door. Locks shall be fabricated of wrought stainless steel.

2.10 PUSH-BUTTON COMBINATION LOCKS

A. ANSI/BHMA A156.5, Grade 1. Battery operated pushbutton entry.

B. Construction: Heavy duty mortise lock housing conforming to ANSI/BHMA A156.13, Grade 1. Lever handles and operating components in compliance with the ABA Accessibility Guidelines and the VA Barrier Free Guide. Match lever handles of locks and latchsets on adjacent doors.

C. Special Features: Key override to permit a master keyed security system and a pushbutton security code activated passage feature to allow access without using the entry code.

2.11 ELECTROMAGNETIC LOCKS

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

1. Type: Full exterior or full interior, as required by application indicated.
2. Strength Ranking: 1000 lbf (4448 N).
3. Inductive Kickback Peak Voltage: Not more than 0 V.
4. Residual Magnetism: Not more than 0 lbf (0 N) to separate door from magnet.

2.12 ELECTRIC STRIKES

A. ANSI/ BHMA A156.31 Grade 1.

B. General: Use fail-secure electric strikes at fire-rated doors.

2.13 KEYS

A. Stamp all keys with change number and key set symbol. Furnish keys in quantities as follows:

Locks/Keys	**Quantity**
Cylinder locks	2 keys each
Cylinder lock change key blanks	100 each different key way
Master-keyed sets	6 keys each
Grand Master sets	6 keys each
Great Grand Master set	5 keys
Control key	2 keys

2.14 ARMOR PLATES, KICK PLATES, MOP PLATES AND DOOR EDGING

A. Conform to ANSI Standard A156.6.

B. Provide protective plates and door edging as specified below:
1. Kick plates, mop plates and armor plates of metal, Type J100 series.
2. Provide kick plates and mop plates where specified. Kick plates shall be 254 mm (10 inches) or 305 mm (12 inches) high. Mop plates shall be 152 mm (6 inches) high. Both kick and mop plates shall be minimum 1.27 mm (0.050 inches) thick. Provide kick and mop plates beveled on all 4 edges (B4E). On push side of doors where jamb stop extends to floor, make kick plates 38 mm (1-1/2 inches) less than width of door, except pairs of metal doors which shall have plates 25 mm (1 inch) less than width of each door. Extend all other kick and mop plates to within 6 mm (1/4 inch) of each edge of doors. Kick and mop plates shall butt astragals. For jamb stop requirements, see specification sections pertaining to door frames.
3. Kick plates and/or mop plates are not required on following door sides:
   a. Armor plate side of doors;
   b. Exterior side of exterior doors;
   c. Closet side of closet doors;
   d. Both sides of aluminum entrance doors.
4. Armor plates for doors are listed under Article "Hardware Sets". Armor plates shall be thickness as noted in the hardware set, 875 mm (35 inches) high and 38 mm (1-1/2 inches) less than width of doors, except on pairs of metal doors. Provide armor plates beveled on all 4 edges (B4E). Plates on pairs of metal doors shall be 25 mm (1 inch) less than width of each door. Where top of intermediate rail of door is less than 875 mm (35 inches) from door bottom, extend armor plates to within 13 mm (1/2 inch) of top of intermediate rail. On doors equipped with panic devices, extend armor plates to within 13 mm (1/2 inch) of panic bolt push bar.
5. Where louver or grille occurs in lower portion of doors, substitute stretcher plate and kick plate in place of armor plate. Size of stretcher plate and kick plate shall be 254 mm (10 inches) high.

6. Provide stainless steel edge guards where so specified at wood doors. Provide mortised type instead of surface type except where door construction and/or ratings will not allow. Provide edge guards of bevel and thickness to match wood door. Provide edge guards with factory cut-outs for door hardware that must be installed through or extend through the edge guard. Provide full-height edge guards except where door rating does not allow; in such cases, provide edge guards to height of bottom of typical lockset armor front. Forward edge guards to wood door manufacturer for factory installation on doors.
7. Armor plates for doors shall be listed per NFPA 80; installed per door testing, and bear label from testing agency. Forward armor plates to wood door manufacturer for factory installation on doors.

2.15 EXIT DEVICES

A. Conform to ANSI Standard A156.3. Exit devices shall be Grade 1; type and function are specified in hardware sets. Provide flush with finished floor strikes for vertical rod exit devices in interior of building. Trim shall have cast satin stainless steel lever handles of design similar to locksets, unless otherwise specified. Provide key cylinders for keyed operating trim and, where specified, cylinder dogging.

B. Surface vertical rod panics shall only be provided less bottom rod; provide fire pins as required by exit device and door fire labels. Do not provide surface vertical rod panics at exterior doors.

C. Concealed vertical rod panics shall be provided less bottom rod at interior doors, unless lockable or otherwise specified; provide fire pins as required by exit device and door fire labels. Where concealed vertical rod panics are specified at exterior doors, provide with both top and bottom rods.

D. Where removable mullions are specified at pairs with rim panic devices, provide mullion with key-removable feature.

E. At non-rated openings with panic hardware, provide panic hardware with key cylinder dogging feature.

F. Exit devices for fire doors shall comply with Underwriters Laboratories, Inc., requirements for Fire Exit Hardware. Submit proof of compliance.

G. Electrified devices:
   1. Include concealed Power Transfer devices where electrified Exit devices are scheduled.
      a. Select Power Transfer models having required number of conductors and conductors of the wire gauge recommended for the device served.
   2. Include Power Supply as required.

H. Delayed Egress Devices
   1. Meet the following Regulatory Requirements:
      a. National Fire Protection Association Life Safety Code 101
      b. International Building Code
      c. UL 294 Listing
      d. ANSI/BHMA A156.24 Delayed Egress Locks
   2. Include concealed Power Transfer devices where delayed egress Exit devices are scheduled.
      a. Select Power Transfer models having required number of conductors and conductors of the wire gauge recommended for the device served.
   3. Include Power Supply as required.
   4. Control Panel:
      a. Fire Alarm contacts
      b. Secure Status contacts
      c. Card Readers
      d. Remote Alarms
      e. Door Position Switch.

5. Signage or decal to be applied to the door panels for each delayed egress exit device.
   a. Silk screen on device
   b. See Section 28 13 00, PHYSICAL ACCESS CONTROL SYSTEMS 2.14 D. 2. g.
6. Status Indicator at the device for the following statuses:
   a. Armed
   b. Off
   c. Rearm Delay
7. Key Switch to arm, disarm, and reset the device.
   a. Key to be removable in either position.
8. Selectable Delay to egress:
   a. 15 Seconds
   b. 30 Second where the AHJ approves
      1) For this project the AHJ approves the use of the 30 Second delay.
9. Selectable Nuisance Delay:
   a. Allow Push Pad to be actuated and released and alarm to not sound.
   b. Nuisance Delay selectable between:
      1) 0 Seconds, off
      2) 1 Second
      3) 3 Seconds.
10. Rearm Delay:
    a. Selectable between 0 and 30 seconds and device will rearm after the door is closed.
    b. Rearm Delay shall also use the door position switch.
11. Internal Alarm
    a. To sound continuously during and after a fire alarm or a Release Delay.
    b. Status indicator and Internal Alarm shall pulse fast during the nuisance delay or a tamper.
    c. Pulses slow during the disarmed powerup mode.
12. Fail Secure (FSE)
    a. Trim shall fail secure (FSE) unless noted otherwise.
13. Dogging
    a. No Dogging allowed unless noted otherwise
    b. Where Doggin is allowed provide cylinder dogging with SFIC cores.
14. Cylinder
    a. Provide cylinder to retract latch
    b. Provide cylinder with SFIC cores.

2.16 FLUSH BOLTS (LEVER EXTENSION)

A. Conform to ANSI A156.16. Flush bolts shall be Type L24081 unless otherwise specified. Furnish proper dustproof strikes conforming to ANSI A156.16, for flush bolts required on lower part of doors.

B. Lever extension manual flush bolts shall only be used at non-fire-rated pairs for rooms only accessed by maintenance personnel.

C. Face plates for cylindrical strikes shall be rectangular and not less than 25 mm by 63 mm (1 inch by 2-1/2 inches).

D. Friction-fit cylindrical dustproof strikes with circular face plate may be used only where metal thresholds occur.

E. Provide extension rods for top bolt where door height exceeds 2184 mm (7 feet 2 inches).

2.17 FLUSH BOLTS (AUTOMATIC)

A. Conform to ANSI A156.3. Dimension of flush bolts shall conform to ANSI A115. Bolts shall conform to Underwriters Laboratories, Inc., requirements for fire door hardware. Flush bolts shall automatically latch and unlatch. Furnish dustproof strikes conforming to ANSI A156.16 for

bottom flushbolt. Face plates for dustproof strike shall be rectangular and not less than 38 mm by 90 mm (1-1/2 by 3-1/2 inches).

B. At interior doors, provide auto flush bolts less bottom bolt, unless otherwise specified, except at wood pairs with fire-rating greater than 20 minutes; provide fire pins as required by auto flush bolt and door fire labels.

2.18 DOOR PULLS WITH PLATES

A. Conform to ANSI A156.6. Pull Type J401, 152 mm CTC (6 inches CTC) length by 19 mm (3/4 inches) diameter minimum with plate Type J302, 90 mm by 381 mm (3-1/2 inches by 15 inches), unless otherwise specified. Provide pull with projection of 57.2 mm (2 1/4 inches) minimum and a clearance of 38.1 mm (1 1/2 inches) minimum. Cut plates of door pull plate for cylinders, or turn pieces where required.

2.19 PUSH PLATES

A. Conform to ANSI A156.6. Metal, Type J302, 203 mm (8 inches) wide by 406.4 mm (16 inches) high. Provide metal Type J302 plates 102 mm (4 inches) wide by 406.4 mm (16 inches) high where push plates are specified for doors with stiles less than 203 mm (8 inches) wide. Cut plates for cylinders, and turn pieces where required.

2.20 COMBINATION PUSH AND PULL PLATES

A. Conform to ANSI 156.6. Type J303, stainless steel 3 mm (1/8 inch) thick, 80 mm (3-1/3 inches) wide by 800 mm (16 inches) high), top and bottom edges shall be rounded. Secure plates to wood doors with 38 mm (1-1/2 inch) long No. 12 wood screws. Cut plates for turn pieces, and cylinders where required. Pull shall be mounted down.

2.21 COORDINATORS

A. Conform to ANSI A156.16. Coordinators, when specified for fire doors, shall comply with Underwriters Laboratories, Inc., requirements for fire door hardware. Coordinator may be omitted on exterior pairs of doors where either door will close independently regardless of the position of the other door. Coordinator may be omitted on interior pairs of non-labeled open where open back strike is used. Open back strike shall not be used on labeled doors. Paint coordinators to match door frames, unless coordinators are plated. Provide bar type coordinators, except where gravity coordinators are required at acoustic pairs. For bar type coordinators, provide filler bars for full width and, as required, brackets for push-side surface mounted closers, overhead stops, and vertical rod panic strikes.

2.22 THRESHOLDS

A. Conform to ANSI A156.21, mill finish extruded aluminum, except as otherwise specified. In existing construction, thresholds shall be installed in a bed of sealant with ¼-20 stainless steel machine screws and expansion shields. In new construction, embed aluminum anchors coated with epoxy in concrete to secure thresholds. Furnish thresholds for the full width of the openings.

B. For thresholds at elevators entrances see other sections of specifications.

C. At exterior doors and any interior doors exposed to moisture, provide threshold with non-slip abrasive finish.

D. Provide with miter returns where threshold extends more than 12 mm (0.5 inch) beyond face of frame.

2.23 AUTOMATIC DOOR BOTTOM SEAL AND RUBBER GASKET FOR LIGHT PROOF OR SOUND CONTROL DOORS AND SMOKE SEALS.

A. Conform to ANSI A156.22. Provide mortise or under-door type, except where not practical. For mortise automatic door bottoms, provide type specific for door construction (wood or metal).

B. Perimeter Gasketing
   1. Perimeter Gasketing – Self-Adhesive Seals:
      a. Seal: Silicone.
      b. Fasteners: Self-adhesive strip.
      c. Color: Black or White depending on door frame.
      d. At Aluminum Door Frames see Section 08 41 13.
      e. Use ANSI R0Y154.
   2. Perimeter Gasketing - Heavy Duty Type:
      a. Material: Extruded tempered aluminum 6063-T6.
      b. Finish (ANSI/BHMA 156.18): Mill finish aluminum @ Hollow Metal Frames. Clear anodized aluminum at aluminum door frames.
      c. Seal: Silicone.
      d. Fasteners: Stainless steel.
      e. Use ANSI R3G165.
   3. 180 Degree Aluminum Retainer Brush Weatherstrip:
      a. Material: Extruded tempered aluminum 6063-T6.
      b. Finish (ANSI/BHMA A156.18): Mill finish aluminum at Interior Doors Clear anodized aluminum for Exterior Doors and Aluminum Doors.
      c. Brush Construction: Densely compressed nylon filaments encased in galvanized retainer.
      d. Color: Aluminum color, black and gray nylon.
      e. Use ANSI R3A734

2.24 WEATHERSTRIPS (FOR EXTERIOR DOORS)

A. Conform to ANSI A156.22. Air leakage shall not to exceed 0.50 CFM per foot of crack length (0.000774m^3/s/m).

B. Perimeter Gasketing
   1. Perimeter Gasketing - Heavy Duty Type:
      a. Material: Extruded tempered aluminum 6063-T6.
      b. Finish (ANSI/BHMA 156.18): Mill finish aluminum @ Hollow Metal Frames. Clear anodized aluminum at aluminum door frames.
      c. Seal: Thermo-plastic elastomer.
      d. Fasteners: Stainless steel.
      e. Use ANSI R3E165.
   2. 90 Degree Aluminum Retainer Brush Weatherstrip:
      a. Material: Extruded tempered aluminum 6063-T6.
      b. Finish (ANSI/BHMA A156.18): Mill finish aluminum @ Hollow Metal Frames. Clear anodized aluminum at aluminum door frames
      c. Brush Construction: Densely compressed nylon filaments encased in galvanized retainer.
      d. Color: Aluminum color, black and gray nylon.
      e. Use ANSI R3A414

2.25 MISCELLANEOUS HARDWARE

A. Access Doors (including Sheet Metal, Screen and Woven Wire Mesh Types): Except for fire-rated doors and doors to Temperature Control Cabinets, equip each single or double metal access door with Lock Type E07213, conforming to ANSI A156.11. Key locks as directed. Ship lock prepaid to the door manufacturer. Hinges shall be provided by door manufacturer.

B. Cylinders for Various Partitions and Doors: Key cylinders same as entrance doors of area in which partitions and door occur, except as otherwise specified. Provide cylinders to operate locking devices where specified for following partitions and doors:
   1. Fire-rated access doors-Engineer's key set.

C. Mutes: Conform to ANSI A156.16. Provide door mutes or door silencers Type L03011 or L03021, depending on frame material, of white or light gray color, on each steel or wood door frame, except at fire-rated frames, lead-lined frames and frames for sound-resistant, lightproof and electromagnetically shielded doors. Furnish 3 mutes for single doors and 2 mutes for each pair of doors, except double-acting doors. Provide 4 mutes or silencers for frames for each Dutch type door. Provide 2 mutes for each edge of sliding door which would contact door frame.

2.26 CONTROLLED ACCESS ACCESSORY ITEMS

A. Keyswitch (KS):
1. Wall mounted, single gang box activation device.
2. Maintained contacts unless otherwise noted; field-selectable to momentary action.
3. Red/green LED.
4. Include Cylinder.
5. Base Product: 653-L2 by Schlage.

B. Remote Lock Release (RR) Button:
1. Surface mounted under countertop or under cabinets.
2. Convenience lock release device for staff use.
3. Where used with Automatic Doors: RR shall also activate operator to open.
4. Momentary contacts.

C. Card Readers:
1. Per Section 28 13 00, PHYSICAL ACCESS CONTROL SYSTEM.

D. Door Position Switches (DPS):
1. Per Section 28 13 00, PHYSICAL ACCESS CONTROL SYSTEM.
   a. Exception: Where Hardware Sets specifically call for DPS to be provided by Section 08 71 00 (this section), refer to the following paragraph.

E. Div 08 Door Position Switches (DPS) specified herein:
1. Description: Magnetic, concealed mounting, normally closed contacts.
2. Provided and installed by Hardware supplier/installer.

F. Request-to-Exit (REX) motion sensors:
1. Provide where necessary to shunt alarm.

G. Request-to-Exit (REX) motion sensors by Division 08:
1. REX devices provided by Division 08 where used to momentarily drop a lock for free egress. (See Security System for REX Motion Sensors used to shunt alarm).
2. Passive Infrared (PIR) technology, unaffected by Fire Alarm Strobes, camera flashes, ambulance lights etc.
3. Adjustable latch time, up to 60 seconds.
4. Tilt adjustable.
5. Selectable Voltage: 12-24 VDC.

H. Fire Alarm Relays:
1. Specified with Fire Alarm System in Section 28 31 00.

I. Low Voltage Power (centrally supplied by Security System):
1. Unless otherwise noted, Section 28 13 00, PHYSICAL ACCESS CONTROL SYSTEM will provide low voltage power required to power items with current draw less than 2 AMP (24 VDC) including the following:
   a. Electric Strikes.
   b. Electro-Mechanical Mortise Locksets.
   c. Electric Auxiliary locks.

J. Power Supplies (PS) – Division 08 devices installed local to opening:
1. Provide filtered, regulated power.
2. Include relay modules that interface with Fire Alarm System.

3. Select power supply units that are:
   a. Same brand as primary devices being powered.
   b. Capable of receiving Fire Alarm Inputs.
   c. Capable of interfacing scheduled hardware with automatic operators.
   d. Include time delay modules where required for described function.
4. Provide UL listed power supply units where ever Electrified Locksets, Electric Strikes and similar items are scheduled.

2.27 PADLOCKS FOR VARIOUS DOORS, GATES AND HATCHES

A. ASTM E883, size 50 mm (2 inch) wide chain; furnish extended shackles as required by job conditions. Provide padlocks, with key cylinders, for each door in following areas as noted.

B. Key padlocks as follows:
1. Chain Link Fence Gates for Electrical Substation and other Fenced Buildings or Areas: Engineer's set, except as otherwise specified.
2. Roof Access and Scuttles: Engineer's set.

C. Omit padlocks on communicating refrigerator doors.

2.28 THERMOSTATIC TEMPERATURE CONTROL VALVE CABINETS

A. Where lock is shown, equip each cabinet door (metal) with lock Type E06213, conforming to ANSI A156.36. Key locks in Key Sets approved by Contracting Officer. See mechanical drawings and specifications for location of cabinets.

B. Cabinet manufacturer shall supply the hinges, bolts and pulls. Ship locks to cabinet manufacturer for installation.

2.29 FINISHES

A. Exposed surfaces of hardware shall have ANSI A156.18, finishes as specified below. Finishes on all hinges, pivots, closers, thresholds, etc., shall be as specified below under "Miscellaneous Finishes." For field painting (final coat) of ferrous hardware, see Section 09 91 00, PAINTING.

B. 626 or 630: All surfaces on exterior and interior of buildings, except where other finishes are specified.

C. Miscellaneous Finishes:
1. Hinges --exterior doors: 626 or 630.
2. Hinges --interior doors: 652 or 630.
3. Pivots: Match door trim.
4. Door Closers: Factory applied paint finish. Dull or Satin Aluminum color.
5. Thresholds: Mill finish aluminum.
6. Cover plates for floor hinges and pivots: 630.
7. Other primed steel hardware: 600.

D. Hardware Finishes for Existing Buildings: U.S. Standard finishes shall match finishes of hardware in (similar) existing spaces.

E. Special Finish: Exposed surfaces of hardware for dark bronze anodized aluminum doors shall have oxidized oil rubbed bronze finish (dark bronze) finish on door closers shall closely match doors.

F. Anti-microbial Coating: All hand-operated hardware (levers, pulls, push bars, push plates, paddles, and panic bars) shall be provided with an anti-microbial/anti-fungal coating that has passed ASTM E2180 tests. Coating to consist of ionic silver (Ag+). Silver ions surround bacterial cells, inhibiting growth of bacteria, mold, and mildew by blockading food and respiration supplies.

2.30 BASE METALS

A. Apply specified U.S. Standard finishes on different base metals as following:

Finish	Base Metal
652	Steel
626	Brass or bronze
630	Stainless steel

PART 3 - EXECUTION

3.1 HARDWARE HEIGHTS

A. For new buildings locate hardware on doors at heights specified below, with all hand-operated hardware centered within 864 mm (34 inches) to 1200 mm (48 inches), unless otherwise noted.:

B. Hardware Heights from Finished Floor:
1. Exit devices centerline of strike (where applicable) 1024 mm (40-5/16 inches).
2. Locksets and latch sets centerline of strike 1024 mm (40-5/16 inches).
3. Deadlocks centerline of strike 1219 mm (48 inches).
4. Hospital arm pull 1168 mm (46 inches) to centerline of bottom supporting bracket.
5. Centerline of door pulls to be 1016 mm (40 inches).
6. Push plates and push-pull shall be 1270 mm (50 inches) to top of plate.
7. Push-pull latch to be 1024 mm (40-5/16 inches) to centerline of strike.
8. Locate other hardware at standard commercial heights. Locate push and pull plates to prevent conflict with other hardware.

3.2 INSTALLATION

A. Closer devices, including those with hold-open features, shall be equipped and mounted to provide maximum door opening permitted by building construction or equipment. Closers shall be mounted on side of door inside rooms, inside stairs, and away from corridors. At exterior doors, closers shall be mounted on interior side. Where closers are mounted on doors they shall be mounted with hex nuts and bolts; foot shall be fastened to frame with machine screws.

B. Hinge Size Requirements:

Door Thickness	Door Width	Hinge Height
45 mm (1-3/4 inch)	900 mm (3 feet) and less	113 mm (4-1/2 inches)
45 mm (1-3/4 inch)	Over 900 mm (3 feet) but not more than 1200 mm (4 feet)	125 mm (5 inches)
35 mm (1-3/8 inch) (hollow core wood doors)	Not over 1200 mm (4 feet)	113 mm (4-1/2 inches)

C. Hinge leaves shall be sufficiently wide to allow doors to swing clear of door frame trim and surrounding conditions.

D. Where new hinges are specified for new doors in existing frames or existing doors in new frames, sizes of new hinges shall match sizes of existing hinges; or, contractor may reuse existing hinges provided hinges are restored to satisfactory operating condition as approved by Resident Engineer. Existing hinges shall not be reused on door openings having new doors and new frames. Coordinate preparation for hinge cut-outs and screw-hole locations on doors and frames.

E. Hinges Required Per Door:

Door Description	Number butts
Doors 1500 mm (5 ft) or less in height	2 butts
Doors over 1500 mm (5 ft) high and not over 2280 mm (7 ft 6 in) high	3 butts
Doors over 2280 mm (7 feet 6 inches) high	4 butts
Dutch type doors	4 butts
Doors with spring hinges 1370 mm (4 feet 6 inches) high or less	2 butts
Doors with spring hinges over 1370 mm (4 feet 6 inches)	3 butts

F. Fastenings: Suitable size and type and shall harmonize with hardware as to material and finish. Provide machine screws and lead expansion shields to secure hardware to concrete, ceramic or quarry floor tile, or solid masonry. Fiber or rawl plugs and adhesives are not permitted. All fastenings exposed to weather shall be of nonferrous metal.

G. After locks have been installed; show in presence of COR that keys operate their respective locks in accordance with keying requirements. (All keys, Master Key level and above shall be sent Registered Mail to the Medical Center Director along with the bitting list. Also a copy of the invoice shall be sent to the Resident Engineer for his records.) Installation of locks which do not meet specified keying requirements shall be considered sufficient justification for rejection and replacement of all locks installed on project.

3.3 FINAL INSPECTION

A. Installer to provide letter to VA Resident/Project Engineer that upon completion, installer has visited the Project and has accomplished the following:
1. Re-adjust hardware.
2. Evaluate maintenance procedures and recommend changes or additions, and instruct VA personnel.
3. Identify items that have deteriorated or failed.
4. Submit written report identifying problems.

3.4 DEMONSTRATION

A. Demonstrate efficacy of mechanical hardware and electrical, and electronic hardware systems, including adjustment and maintenance procedures, to satisfaction of COR and VA Locksmith.

3.5 HARDWARE SETS

A. Following sets of hardware correspond to hardware symbols shown on drawings. Only those hardware sets that are shown on drawings will be required. Disregard hardware sets listed in specifications but not shown on drawings.

B. Hardware Consultant working on a project will be responsible for providing additional information regarding these hardware sets. The numbers shown in the following sets come from BHMA standards.

ELECTRIC HARDWARE ABBREVIATIONS LEGEND:
ADO = Automatic Door Operator
EMCH = Electro-Mechanical Closer-Holder
MHO = Magnetic Hold-Open (wall- or floor-mounted)

HW-1L

Each Door to Have:		NON-RATED
1	Continuous Hinge	
1	Institutional Privacy Lock	F26
2	Kick Plate	J102 (BOTH SIDES)
1	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Wall Stop	L02101 CONVEX
1	Auto Door Bottom	R0Y346 – HEAVY DUTY
1	Set Frame Seals	R3G165

Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-2

Each Door to Have:		RATED/NON-RATED
	Hinges	QUANTITY & TYPE AS REQUIRED PER PARAGRAPH 3.2
1	Keyed Privacy Indicator Lock	F13 x OCCUPANCY INDICATOR
1	Closer	C02011/C02021
2	Kick Plate	J102 (BOTH SIDES)
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Wall Stop	L02101 CONVEX
1	Set Frame Seals	R3G165

STONE THRESHOLD BY OTHER TRADES.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-3E

Each Door to Have:		NON-RATED
	Hinges	QUANTITY & TYPE AS REQUIRED PER PARAGRAPH 3.2
1	Office Lock	F04
2	Kick Plate	J102 (BOTH SIDES)
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Wall Stop	L02101 CONVEX
1	Set Frame Seals	R3G165
1	Coat Hook	L03121

OMIT COAT HOOK WHERE GLASS LITE PREVENTS INSTALLATION.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-4E

Each Door to Have:		NON-RATED/RATED
	Hinges	QUANTITY & TYPE AS REQUIRED PER PARAGRAPH 3.2
1	Utility Lock	F09
1	Closer (@ rated doors)	C02011/C02021
1	Closer (@ non-rated doors)	CO2051/CO2061
2	Kick Plate	J102 (BOTH SIDES)
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Wall Stop	L02101 CONVEX

1	Auto Door Bottom	R0Y346 – HEAVY DUTY
1	Set Frame Seals	R3G165

Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-4J

Each Door to Have:		RATED/NON-RATED
	Hinges	QUANTITY & TYPE AS REQUIRED PER PARAGRAPH 3.2
1	Classroom Lock	F05
2	Kick Plate	J102 (BOTH SIDES)
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Wall Stop	L02101 CONVEX
1	Auto Door Bottom	R0Y346 – HEAVY DUTY
1	Set Frame Seals	R3G165

Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-4Z

Each Existing Door to Have:		RATED/NON-RATED
1	Classroom Lock	F05
2	Kick Plate	J102 (BOTH SIDES)
1	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Overhead Stop	C01541-ADJUSTABLE
1	Set Frame Seals	R3G165

Verify Existing Hardware is in good order, repair or replace to make operational.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-5

Each Door to Have:		RATED
	Hinges	QUANTITY & TYPE AS REQUIRED PER PARAGRAPH 3.2
1	Storeroom Lock	F07
1	Closer	C02011/C02021
2	Kick Plate	J102 (BOTH SIDES)
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Set Frame Seals	R3G165

Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-5B

Each Door to Have:		RATED
1	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Storeroom Lock	F07
1	Closer	C02011/C02021
2	Heavy-Duty Armor Plate	J101 x 3.175 MM (0.125 INCH) THICKNESS (BOTH SIDES)
1	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Wall Stop	L02101 CONVEX
1	Set Frame Seals	R3G165
2	Listed Fire Labels for top of door and frame head	

Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-5D

Each Door to Have:		NON-RATED
1	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Storeroom Lock	F07
1	Closer	C02011/C02021
2	Heavy-Duty Armor Plate	J101 x 3.175 MM (0.125 INCH) THICKNESS (BOTH SIDES)
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Wall Stop	L02101 CONVEX
3	Silencers	L03011

Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-5F

Each Door to Have:		RATED/NON-RATED
1	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Storeroom Lock	F07
1	Closer (@ Rated Doors)	C02011/C02021
2	Kick Plate	J102 (BOTH SIDES)
1	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Wall Stop	L02101 CONVEX
1	Set Frame Seals	R3G165
2	Listed Fire Labels for top of door and frame head	

Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-5G

Each Door to Have:		RATED/NON-RATED
	Hinges	QUANTITY & TYPE AS REQUIRED PER PARAGRAPH 3.2
1	Storeroom Lock	F07
2	Heavy-Duty Armor Plate	J101 x 3.175 MM (0.125 INCH) THICKNESS (BOTH SIDES)
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Wall Stop	L02101 CONVEX
1	Set Frame Seals	R3G165

Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-AD-1

Each Sliding Door to Have:		NON-RATED
1	Key Cylinder	TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 08 36 16.13 HIGH PERFORMANCE BARN (SLIDING) DOOR
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

INTERIOR PAIRS OF DOORS

HW-8

Each (MHO) Pair Integrated Dual Egress Doors to Have: NON-RATED/RATED

2	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
2	Push/Pull Trim	J401 x J302
1	Overlapping Astragal	R3A734 x THRU BOLTS
2	Armor Plates	J101 x 1.275 MM (0.050 INCH) THICKNESS
1	Kick Plate	J102
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWAR
2	Closers C02011	(PT4D, PT4H)
2	Magnetic Holders	C00011 TRI VOLTAGE
1	Set Frame Seals	R3G165

POWER, WIRING, CONDUIT BY DIVISION 26, AND FIRE ALARM CONNECTION BY DIVISION 28.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-8D

Each (ADO) Aluminum Storefront Pair to Have: NON-RATED

2	Pivot Sets	C07162
2	Intermediate Pivots	C07321
2	Push/Pull Bar Sets	J505 – 305 MM (12 INCH) CENTER-TO-CENTER PULL

AUTO DOOR OPERATORS, CONTROLS, AND REACTIVATION SENSORS BY SECTION 08 71 13.
POWER TRANSFERS FOR RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).
120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-8G

Each (ADO, EL, DPS, KS) Aluminum Storefront Pair to Have: NON-RATED

2	Pivot Sets	C07162
2	Intermediate Transfer Pivots	C07321 x 4-WIRES
2	Intermediate Pivots	C07321
2	Aux Multi-Point Lock	Trident Multi-point lock (FAIL SAFE)
2	Push/Pull Bar Sets	J505 – 305 MM (12 INCH) CENTER-TO-CENTER PULL
2	Overhead Stops	C01541-ADJUSTABLE
1	Key Switch	3 Position Key Switch (by Section 08 71 13)
1	Alarm Contact	

AUTO DOOR OPERATORS, CONTROLS, AND REACTIVATION SENSORS BY SECTION 08 71 13.
POWER TRANSFERS FOR RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).
120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

Function:

During Visiting Hours: Key Switch set to On
- Free Egress
- Free Ingress
- ADO works via TWS.
- EL Lock disengaged.

After hours: Key Switch set to off
- No Egress

No Ingress
ADO is off.
EL Lock Engaged.
Hold Open: Key Switch set to Hold Open
Loss of Power:
Fail Safe
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-10

Each Pair to Have:		RATED
2	Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1	Classroom Lock	F05
1	Coordinator	TYPE 21A
1	Overlapping Astragal	R3A734 x THRU-BOLTS
2	Closers	C02011/C02021
2	Armor Plates	J101 x 1.275 MM (0.050 INCH) THICKNESS
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Wall Stop	L02101 CONVEX
1	Overhead Stop	C01541-ADJUSTABLE
2	Auto Door Bottoms	R0Y346 – HEAVY DUTY
1	Set Frame Seals	R3G165

INSTALL LOCK TRIM PROTECTOR BAR ON PUSH SIDE OF ACTIVE LEAF TO PROTECT LEVER TRIM.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-10A

Each (ADO, ES, KS) Pair to Have:		NON-RATED
1	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Continuous Hinge	A51031B x 12-THRUWIRE TRANSFER x IN-HINGE ACCESS PANEL
1	Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT
1	Classroom Lock	F05
1	Electric Unlatch Strike	E09321 (FAIL SECURE)
1	Power Supply	Regulated, Filtered, 24VDC, Amperage as required
1	Overlapping Astragal	R3A734 x THRU-BOLTS
4	Armor Plates	J101 x 1.275 MM (0.050 INCH) THICKNESS
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Wall Stop	L02101 CONVEX
2	Auto Door Bottoms	R0Y346 – HEAVY DUTY
1	Set Frame Seals	R3G165 1 Toggle Switch

3 Position Toggle Switch (by Section 08 71 13)

AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.
POWER TRANSFER **SHARED BY ELECTRIC STRIKE AND** RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

EXTERIOR SINGLE DOORS

Each Door (ADO, ES, DPS, KS) to Have:		HW-E2 NON-RATED
1	Continuous Hinge	
1	Utility Lock	F14-keyed both side
1	Electric Strike	E09321 (FAIL SECURE)
1	Power Supply	Regulated, Filtered, 24VDC, Amperage as required
1	Key Switch	Three Position Key Switch (by Section 08 71 13)
1	Kick Plate	J102
2	Overhead Stop	C01541-ADJUSTABLE
1	Threshold (outswing door)	J32120 x SILICONE GASKET
1	Door Sweep	R3A414
1	Set Frame Seals	R3E165
1	Drip	R0Y976
1	Alarm Contact	

POWER TRANSFER **SHARED BY ELECTRIC STRIKE AND** RE-ACTIVATION SENSOR WIRING (RE-ACTIVATION SENSORS PROVIDED BY SECTION 08 71 13).
AUTOMATIC DOOR OPERATOR AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.
Function:
When ADO is on, electric strike shall allow ingress and egress.
When ADO is off, electric strike shall be secure, ingress and egress via key in latch set.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

Each Door to Have:		HW-E3 NON-RATED
1	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Storeroom Lock	F13-MOD x RIGID OUTSIDE LEVER x KEY RETRACTS DEADBOLT AND LATCHBOLT
1	Latch Protector (outswing dr)	
1	Closer	C02011/C02021
1	Armor Plate	J101 x 3.125 MM (0.125 INCH) THICKNESS
1	Threshold (outswing door)	J32120 x SILICONE GASKET
1	Door Sweep	R3A414
1	Set Frame Seals	R3E165
1	Drip	R0Y976

Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

EXTERIOR PAIRS OF DOORS

Each Pair (DPS) to Have:		HW-E7 NON-RATED
2	Continuous Hinge	
1	Set Auto Flush Bolts	TYPE 25

1	Dust Proof Strike	L04021
1	Utility Lock	F14
1	Dummy Trim	
1	Set Meeting Stile Astragals	R0Y834
1	Coordinator	TYPE 21A
2	Closer	C02011/C02021
2	Kick Plate	J102
2	Overhead Stop	C01541-ADJUSTABLE
1	Threshold (outswing door)	J32120 x SILICONE GASKET
1	Threshold (inswing door)	ALUMINUM, PER ARCHITECTURAL DETAIL
2	Door Sweep	R3A414
1	Set Frame Seals	R3E165
1	Drip	R0Y976
2	Alarm Contact	

Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

EXTERIOR PAIRS OF GATES

HW-G6

Each Pair Traffic Gates to Have: NON-RATED

	Spring Hinge	TYPE REQUIRED X STAINLESS STEEL

BALANCE OF HARDWARE BY SECTION 32 31 19, PRE-FABRICATED ORNAMENTAL STEEL FENCE.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-G9

Each (DEPH, DPS) Pair Gates to Have: NON-RATED

2	Weldable Gate Hinges	A8181 (3 KNUCKLE) X 5 INCHES X WELDED OR FASTENED X SHEAR HINGE LEAVES TO FIT GATE MEMBERS
2	Weldable Panic Boxes	
1	Anti-Vandal Pull	
1	Rim Panic (DEPH) Device	TYPE 1 F01
1	Rim Panic (DEPH) Device	TYPE 1 F03 LESS TRIM
1	Cylinder	TYPE AS REQUIRED
2	Stainless Steel Closer	C52011/C22021
2	Alarm Contact	
1	Remote Alarm	
2	DEPH Regulatory Signage Per Section 08 71 00 2.14 & 28 13 00 2.14 D. 2. g.	

BALANCE OF HARDWARE BY SECTION 32 31 19, PRE-FABRICATED ORNAMENTAL STEEL FENCE & SECTION 05 50 00, METAL FABRICATIONS.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

RESIDENTIAL UNIT SINGLE DOORS

HW-R1

Door Hardware

Each Door to Have: NON-RATED/RATED

	Hinges	QUANTITY & TYPE AS REQUIRED PER PARAGRAPH 3.2
1	Institutional Privacy Lock	F26
1	Wall Stop	L02101 CONVEX
1	Overhead Stop	C01541-ADJUSTABLE
1	Auto Door Bottom	R0Y346 – HEAVY DUTY
1	Set Frame Seals	R3G165
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2	Kick Plate	J102 (BOTH SIDES)

NO CLOSER REQUIRED DUE TO EXEMPTION FOR PATIENT ROOM DOORS.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-R3

Each Door to Have: NON-RATED

	Hinges	QUANTITY & TYPE AS REQUIRED PER PARAGRAPH 3.2
	Keyed Privacy Indicator Lock	F13 x OCCUPANCY INDICATOR
1	Overhead Stop	C01541-ADJUSTABLE
2	Kick Plate	J102 (BOTH SIDES)
1	Coat Hook	L03121
3	Silencers	L03011

Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

SECURITY HARDWARE ABBREVIATIONS LEGEND:
AC = Access Control Device (Card reader, biometric reader, keypad, etc.)
ADO = Automatic Door Operator
DEML = Delayed Egress Magnetic Lock
DEPH = Delayed Egress Panic Exit Device
DPS = Door Position Switch (Door or Alarm Contact)
EL = Electric Lock or Electric Lever Exit Device
ES = Electric Strike
PB = Push-button Combination Lock (stand-alone)
RR = Remote Release Button
ELR = Electric Latch Retraction Exit Device

INTERIOR SINGLE SECURITY DOORS

HW-SH-3D

Each (AC, ES, REX, DPS) Door to Have: RATED

1	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Storeroom Lock	F07
1	Electric Unlatch Strike	E09321 (FAIL SECURE)
1	Power Supply	Regulated, Filtered, 24VDC, Amperage as required
1	Closer	C02011/C02021

1	Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Wall Stop	L02101 CONVEX
1	Overhead Stop	C01541-ADJUSTABLE
1	Auto Door Bottom	R0Y346 – HEAVY DUTY
1	Set Frame Seals	R3G165
1	Alarm Contact	
2	Listed Fire Labels for top of door and frame head	

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
CARD READER BY DIVISION 28.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-SH-3G

Each (AC, RR, ES, REX, DEPH, DPS) Door to Have: NON-RATED

1	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS x 4-THRUWIRE TRANSFER x IN-HINGE ACCESS PANEL
1	Integrated Door w/ DEPH Elec. Exit Device	Q2131 x TYPE 8 ELECTRIC DEVICE (E01, E05/E06 VERIFY)x F13 LEVER (no dogging)
1	Electric Unlatch Strike	E09321 (FAIL SECURE)
1	Power Supply	Regulated, Filtered, 24VDC, Amperage as required
1	Closer	C02011/C02021
2	Kick Plate	J102 (BOTH SIDES)
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Overhead Stop	C01541-ADJUSTABLE
1	Set Frame Seals	R3G165
1	Alarm Contact	
1	Remote Release Button	660-PB by Schlage or equal.
1	DEPH Regulatory Signage Per Section 08 71 00 2.14 & 28 13 00 2.14 D. 2. g.	

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.
CARD READER BY DIVISION 28. VALID CARD SHUNTS DEPH ALARM, FROM BOTH SIDES.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

INTERIOR PAIR SECURITY DOORS

HW-SH-10A

Each (AC, RR, ADO, EL, REX, DEPH, DPS) Pair Integrated Doors to Have: NON-RATED

1	Key Cylinder	TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES.
AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

EXTERIOR SINGLE SECURITY DOORS

HW-SH-12

Each (AC, ADO, ES, REX, DPS) Integrated Door to Have: NON-RATED

1	Key Cylinder	TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES
AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-SH-12A
Each (AC, ES, REX, DPS) Integrated Door to Have: NON-RATED

1 Key Cylinder TYPE AS REQUIRED
BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-SH-12B
Each (AC, ES, REX, DPS) Integrated Door to Have: NON-RATED

1 Key Cylinder TYPE AS REQUIRED
BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-SH-12D
Each (AC, ES, REX, DEPH, DPS) Integrated Door to Have: NON-RATED

1 Key Cylinder TYPE AS REQUIRED
BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

EXTERIOR PAIR SECURITY DOORS

HW-SH-13
Each (AC, ADO, EL, REX, DPS, RR) Integrated Door to Have: NON-RATED

1 Key Cylinder TYPE AS REQUIRED
BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES
AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-SH-14
Each (AC, EL, REX, DPS) Integrated Door to Have: NON-RATED

1 Key Cylinder TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES
AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

HW-SH-14A
Each (AC, ES, REX, DPS) Integrated Door to Have: NON-RATED

1 Key Cylinder TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES
AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.
Install, adjust, instruct all hardware per Part 3 of Division 8, 26, 28 to the satisfaction of COR.

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SECTION 08 71 13

AUTOMATIC DOOR OPERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Automatic operators for swinging.

1.2 RELATED REQUIREMENTS

A. Aluminum Frames Entrance Work: Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.

B. Door Hardware: Section 08 71 00, DOOR HARDWARE.

C. Access Control Devices: Division 28, ELECTRONIC SAFETY AND SECURITY.

D. Electric General Wiring, Connections and Equipment Requirements: Division 26, ELECTRICAL.

1.3 APPLICABLE PUBLICATIONS

A. Comply with references to extent specified in this section.

B. ASTM International (ASTM):
   1. B209-14 - Aluminum and Aluminum-Alloy Sheet and Plate.
   2. A1008/A1008M-15 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Baked Hardenable.

C. Builders Hardware Manufacturers Association (BHMA):
   1. BHMA A156.10-11 - Power Operated Pedestrian Doors.

D. National Fire Protection Association (NFPA):
   1. 101-18 - Life Safety Code.

E. Underwriters Laboratories (UL):
   1. 325-13 - Standard for Doors, Drapery, Gate, Louver, and Window Operators and Systems.

1.4 SUBMITTALS

A. Submittal Procedures: Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Submittal Drawings:
   1. Show size, configuration, and fabrication and installation details.

C. Manufacturer's Literature and Data:
   1. Description of each product.
   2. Installation instructions.
   3. Warranty.

D. Sustainable Construction Submittals:
   1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.

E. Test reports: Certify each product complies with specifications.

F. Qualifications: Substantiate qualifications comply with specifications.
   1. Manufacturer with project experience list.

2. Installer with project experience list.

G. Operation and Maintenance Data:
1. Care instructions for each exposed finish product.
2. Start-up, maintenance, troubleshooting, emergency, and shut-down instructions for each operational product.

1.5 QUALITY ASSURANCE

A. Manufacturer’s Qualifications:
1. Regularly manufactures specified products.
2. Manufactured specified products with satisfactory service on five similar installations for minimum five years.
a. Provide contact names and addresses for completed projects when requested by Contracting Officer's Representative.

B. Installer’s Qualifications: Experienced installer, approved by the manufacturer.

1.6 WARRANTY

A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."

B. Manufacturer's Warranty: Warrant automatic door operators against material and manufacturing defects.
1. Warranty Period: Two years.

PART 2 - PRODUCTS

2.1 SYSTEM PERFORMANCE

A. Comply with requirements of BHMA A156.10. Unless otherwise indicated on Drawings, provide operators that move doors from fully closed to fully opened position in seven seconds maximum time interval, when speed adjustment is at maximum setting.

B. Equipment: Conforming to UL 325. Provide key operated power disconnect wall switch for each door installation.

C. Electrical Wiring, Connections and Equipment: Motors, starters, controls, associated devices, and interconnecting wiring required for installation. Equipment and wiring as specified in Division 26, ELECTRICAL.

2.2 PRODUCTS - GENERAL

A. Provide door operators from one manufacturer.

B. Provide one type of operator throughout project.

C. Sustainable Construction Requirements:
1. Steel Recycled Content: 30 percent total recycled content, minimum.
2. Aluminum Recycled Content: 80 percent total recycled content, minimum.

2.3 SWING DOOR OPERATORS

A. General:
1. Type: Institutional type.
2. Size: As recommended by manufacturer for door weight and sizes.

B. Function:
1. Provide operators, enclosed in housing, permitting opening of door by energizing motor and stopped by electrically reducing Voltage and stalling motor against mechanical stop.
2. Door to close by means of spring energy, and closing force controlled by gear system and motor being used as dynamic brake without power, or controlled by hydraulic closer in electro-hydraulic operators.

3. Opening and Closing Speeds: Field adjustable.
4. Operators with checking mechanism providing cushioning action at last part of door travel, in both opening and closing cycle.
5. Operators capable of recycling doors instantaneously to full open position from any point in closing cycle when control switch is activated.
6. When automatic power is interrupted or shut-off, permit doors to easily open manually without damage to automatic operator system.

C. Connect hardware with drive arm attached to door with pin linkage rotating in a self-lubricating bearing. Prevent doors from pivoting on shaft of operator.

D. Operator Housing:
1. ASTM B209, Type 6063-T5 aluminum alloy, 112 mm (4-1/2 inches) wide by 140 mm (5.5 inches) high by 3.2 mm (0.125 inch) thick, aluminum extrusions with enclosed end caps for application to 100 mm (4 inches) and larger frame systems.

E. Power Operator:
1. Completely assembled and sealed unit including gear drive transmission, mechanical spring and bearings, located in aluminum case and filled with special lubricant for extreme temperature conditions. Rubber mounted units with provisions for easy maintenance and replacement, without removing door from pivots or frame.

F. Motors:
1. Provide with interlock to prevent operation when doors are electrically locked from opening.

G. Electrical Control:
1. Self-contained electrical control unit, including necessary transformers, relays, rectifiers, and other electronic components for proper operation and switching of power operator.
2. Connecting Harnesses: Interlocking plugs.

H. Accessories:
1. Metal mounting supports, brackets and other accessories necessary for installation of operators at head of door frames.

I. Microprocessor Controls:
1. Multi-function microprocessor control providing adjustable hold open time (1-30 seconds) with fully adjustable opening speed, LED indications for sensor input signals and operator status and power assist close options. Control capable of receiving activation signals from any device with normally open dry contact output.
2. Hold doors held open by low Voltage applied to the continuous duty motor.
3. Controls:
   a. Adjustable safety circuit that monitors door operation and stops opening direction of door if obstruction is sensed.
   b. Recycle feature that reopens door if obstruction is sensed at any point during closing cycle.
   c. Standard three position key switch with functions for ON, OFF, and HOLD OPEN, mounted on operator enclosure, door frame, or wall, as indicated on drawings.
      1) 3 position Toggle switch mounted on device @ door 143

2.4 POWER UNITS

A. Self-contained, electric operated and independent of door operator.
1. Capacity and size of power circuits according to automatic door operator manufacturer's specifications and Division 26 - ELECTRICAL.

2.5 DOOR CONTROLS

A. Control Devices: BHMA A156.10; control opening and closing functions.

B. Open doors when control device is actuated; hold doors in open positions; then, close doors after an adjustable time period, unless safety device or reactivated control interrupts operation.

C. Manual Controls:
   1. Touchless Wall Switch (TWS):
      a. Contact free, microwave technology.
      b. Adjustable 2 to 20 IN.
      c. Face plate engraved with ADA symbol and WAVE TO OPEN text.
      d. Mount center line of switch 40 IN above floor.
      e. Locate where indicated in drawings.

D. Motion Detector:
   1. Mounting: Surface or concealed.
   2. Detection Area: 1500 mm (60 inches) deep and 1500 mm (60 inches) across, plus or minus 150 mm (6 inches).
   3. Response Time: 25 milliseconds, maximum.
   4. Control Power: 24 Volt DC.
   5. Design units to be unaffected by cleaning material, solvents, dust, dirt and outdoor weather conditions.

2.6 SAFETY DEVICES

A. Swing Doors: Install presence sensor on pull side of door to detect any person standing in door swing path and prevent door from opening.
   1. Time delay Switches: Adjustable between 3 to 60 seconds and control closing cycle of doors.

B. Install decal signs with "In" or "Do Not Enter" on both faces of each door where shown.

2.7 BOLLARDS WITH DOOR CONTROLS:

A. Description: Hollow pedestal in which door actuation switches and similar items can be mounted.

B. Material: Extruded Aluminum, nominal 1/8 IN wall thickness.
   1. Finish: Clear Anodized.
   2. Size and Shape: 6 x 6 IN square.
   3. Mounting Type: In-ground mounting; embed not less than 12 IN into concrete-filled, earthen hole.
   4. Height (in-ground mounted Bollards): 54 IN AFF.
   5. Top Cap: Sloped.
   6. Devices to be installed in Bollards:
      a. Touchless Wall Switch
      b. Cardreader
      c. Intercom
      d. Design and Fabricate custom bollards to accommodate switches indicated.

2.8 CARD READERS:

A. Specified in Section 28 13 00.

B.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine and verify substrate suitability for product installation.
   1. Verify door opening is correctly sized and within acceptable tolerances.

B. Protect existing construction and completed work from damage.

3.2 INSTALLATION

A. Install products according to manufacturer's instructions and approved submittal drawings.
   1. When manufacturer's instructions deviate from specifications, submit proposed resolution for Contracting Officer's Representative consideration.

B. Coordinate door installation with other related work.

C. Install manual controls and power disconnect switches recessed or semi-flush mounted in partitions.

D. Secure operator components to adjacent construction with suitable fastenings.

E. Conceal conduits, piping, and electric equipment, in finish work.

F. Install power units in locations shown.
   1. Where units are mounted on walls, provide metal supports or shelves for units.
   2. Ensure equipment, including time delay switches, are accessible for maintenance and adjustment.

G. Ensure operators are adjusted and function properly for type of expected traffic.

H. Synchronize each leaf of pair doors to open and close simultaneously. Permit each door leaf to be opened manually, independent of other door leaf.

I. Install controls at positions shown and ensuring convenience for expected traffic.

J. Push Plate Wall Switches Mounting Height: 1000 mm (40 inches) maximum, unless otherwise approved by Contracting Officer's Representative.

3.3 DEMONSTRATION AND TRAINING

A. Instruct VA personnel in proper automatic door operator operation and maintenance.
   1. Trainer: Manufacturer approved instructor.
   2. Training Time: 4 hours minimum.

B. Coordinate instruction to VA personnel with VA Contracting Officer's Representative.

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SECTION 08 80 00

GLAZING

PART 1 - GENERAL

1.1 DESCRIPTION:

A. This section specifies the following:
   1. Glass.
   2. Glazing materials and accessories for both factory and field glazed assemblies.

1.2 RELATED WORK:

A. Sustainable Design Requirements: Section 01 81 13, SUSTAINABLE CONSTRUCTION REQUIREMENTS.

B. Factory glazed by manufacturer in following units:
   1. Sound resistant doors: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES, and Section 08 14 00, WOOD DOORS.
   2. Mirrors: Section 10 28 00, TOILET, BATH, AND LAUNDRY ACCESSORIES.
   3. Aluminum Windows: Section 08 51 13, ALUMINUM WINDOWS.
   4. BLAST RESISTANT FAÇADE SYSTEMS; Color of spandrel glass, tinted (heat absorbing or light reducing) glass, and reflective (metallic coated) glass: See Construction documents.
   5. Access Control Systems: Section 28 13 00, PHYSICAL ACCESS CONTROL SYSTEMS.
   6. Wiring (120 V AC, 15A or 20A): Section 26 05 19, LOW VOLTAGE ELECTRICAL POWER AND CONDUCTORS AND CABLES.
   7. Junction and Switch Boxes: Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS.

1.3 LABELS:

A. Temporary labels:
   1. Provide temporary label on each light of glass identifying manufacturer or brand and glass type, quality and nominal thickness.
   2. Label in accordance with NFRC label requirements.
   3. Temporary labels are to remain intact until glass is approved by Contracting Officer Representative (COR).

B. Permanent labels:
   1. Locate in corner for each pane.
   2. Label in accordance with ANSI Z97.1 and SGCC label requirements.
      a. Tempered glass.
      b. Laminated glass or have certificate for panes without permanent label.
      c. Organic coated glass.
   3. Bullet resistance glass or plastic assemblies:
      a. Bullet resistance glass or plastic assemblies in accordance with UL 752 requirements for power rating specified.
      b. Identify each security glazing permanently with glazing manufacturer's name, date of manufacture, product number, and DOS Code number inconspicuously located in lower corner on protective side and visible after glazing is framed.
      c. The "attack (threat) side" is to be identified in bold lettering on each side of glazing with removable label.
   4. Fire rated glazing assemblies: Mark in accordance with IBC.

1.4 PERFORMANCE REQUIREMENTS:

A. General: Design glazing system consistent with guidance and practices presented in the GANA Glazing Manual, GANA Laminated Glazing Manual, and GANA Sealant Manual, as applicable to project. Installed glazing is to withstand applied loads, thermal stresses, thermal movements, building movements, permitted tolerances, and combinations of these conditions without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; unsafe engagement of the framing system; deflections beyond specified limits; or other defects in construction.

B. Glazing Unit Design: Design glass, including engineering analysis meeting requirements of authorities having jurisdiction. Thicknesses listed are minimum. Coordinate thicknesses with framing system manufacturers.
   1. Design glass in accordance with ASTM E1300, and for conditions beyond the scope of ASTM E1300, by a properly substantiated structural analysis.
   2. Design Wind Pressures: As indicated on construction documents.
   3. Wind Design Data: As indicated on construction documents.
   4. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than the structural capacity of the glazing unit, the threshold at which frame engagement is no longer safely assured, 1/100 times the short-side length, or 19 mm (0.75 inch), whichever is less.

C. Ballistic- and Blast- resistant glass or plastic glazing assemblies:
   1. For blast-resistant and ballistic-resistant units comply with requirements in UFC 4-010-01, Physical Security Design Manual for VA Facilities, and project-specific criteria provided by VA.
   2. Spall Resistance: Laminated glazing is not permitted to produce spall to interior (protected side) when impacted with scheduled ballistics.
   3. Tolerances:
      a. Outside dimensions: Overall outside dimensions (height and width) of laminated security glazing is to maintain tolerance of $\pm$ 3 mm ($\pm$ 0.12 inch).
      b. Warpage: Out-of-flat (warpage or bowing) condition of laminates is not to exceed 2.5 mm per lineal meter (0.10 inch per 3.3 lineal foot). The condition, if present, is to be localized to extent not greater than 0.75 mm (0.03 inch) for any 0.3 meter (0.98 feet) section.
   4. For blast-resistant units separating the lobby from the protected interior space, glazing shall be designed to withstand a blast loading with a linearly decaying dynamic load with a peak pressure of 233.12-psi and a 1.56-msec time duration and meet the performance limits defined in section 08 56 53 for blast resistant façade systems.

D. Building Enclosure Vapor Retarder and Air Barrier:
   1. Utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapor retarder seal.
   2. Maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

1.5 SUBMITTALS:

A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Sustainable Design Submittals, as described below:
   1. Volatile organic compounds per volume as specified in PART 2 - PRODUCTS.

C. Manufacturer's Certificates:
   1. Certificate stating that fire-protection and fire-resistive glazing units meet code requirements for fire-resistance-rated assembly and applicable safety glazing requirements.
   2. Certificate on solar heat gain coefficient when value is specified.

3. Certificate on "R" value when value is specified.
4. Certificate test reports confirming compliance with specified bullet resistive rating.
5. Certificate that blast resistant glass meets the specified requirements.

D. Manufacturer Warranty.

E. Manufacturer's Literature and Data:
1. Glass, each kind required.
2. Insulating glass units.
3. Elastic compound for metal sash glazing.
4. Glazing cushion.
5. Sealing compound.

F. Samples:
1. Size: 305 mm by 305 mm (12 inches by 12 inches).
2. Tinted glass.
3. Reflective glass.
4. Transparent (one-way vision glass) mirrors.

G. Preconstruction Adhesion and Compatibility Test Report: Submit glazing sealant manufacturer’s test report indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

1.6 DELIVERY, STORAGE AND HANDLING:

A. Delivery: Schedule delivery to coincide with glazing schedules so minimum handling of crates is required. Do not open crates except as required for inspection for shipping damage.

B. Storage: Store cases according to printed instructions on case, in areas least subject to traffic or falling objects. Keep storage area clean and dry.

C. Handling: Unpack cases following printed instructions on case. Stack individual windows on edge leaned slightly against upright supports with separators between each.

D. Protect laminated security glazing units against face and edge damage during entire sequence of fabrication, handling, and delivery to installation location. Provide protective covering on exposed faces of glazing plastics, and mark inside as "INTERIOR FACE" or "PROTECTED FACE":
1. Treat security glazing as fragile merchandise, and packaged and shipped in export wood cases with width end in upright position and blocked together in a mass. Storage and handling to comply with manufacturer's directions and as required to prevent edge damage or other damage to glazing resulting from effects of moisture, condensation, temperature changes, direct exposure to sun, other environmental conditions, and contact with chemical solvents.
2. Protect sealed-air-space insulating glazing units from exposure to abnormal pressure changes, as could result from substantial changes in altitude during delivery by air freight. Provide temporary breather tubes which do not nullify applicable warranties on hermetic seals.
3. Temporary protections: The glass front and polycarbonate back of glazing are to be temporarily protected with compatible, peelable, heat-resistant film which will be peeled for inspections and re-applied and finally removed after doors and windows are installed at destination. Since many adhesives will attack polycarbonate, the film used on exposed polycarbonate surfaces is to be approved and applied by manufacturer.
4. Edge protection: To cushion and protect glass clad, and polycarbonate edges from contamination or foreign matter, the four (4) edges are to be sealed the depth of glazing with continuous standard-thickness thermoplastic rubber tape. Alternatively, continuous channel shaped extrusion of thermoplastic rubber are to be used, with flanges extending into face sides of glazing.

5. Protect "Constant Temperature" units including every unit where glass sheet is directly laminated to or directly sealed with metal-tube type spacer bar to polycarbonate sheet, from exposures to ambient temperatures outside the range of 16 to 24 degrees C (60 to 75 degrees F), during the fabricating, handling, shipping, storing, installation, and subsequent protection of glazing.

1.7 PROJECT CONDITIONS:

A. Field Measurements: Field measure openings before ordering tempered glass products to assure for proper fit of field measured products.

1.8 WARRANTY:

A. Construction Warranty: Comply with the FAR clause 52.246-21 “Warranty of Construction”.

B. Manufacturer Warranty: Manufacturer shall warranty their glazing from the date of installation and final acceptance by the Government as follows. Submit manufacturer warranty.
1. Bullet resistive plastic material to remain visibly clear without discoloration for 10 years.
2. Insulating glass units to remain sealed for ten (10) years.
3. Laminated glass units to remain laminated for five (5) years.
4. Polycarbonate to remain clear and ultraviolet light stabilized for five (5) years.
5. Insulating plastic to not have more than 6 percent decrease in light transmission and be ultraviolet light stabilized for ten (10) years.

1.9 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Architectural Manufacturers Association (AAMA):
800 .....Test Methods for Sealants

810.1-77 .....Expanded Cellular Glazing Tape

C. American National Standards Institute (ANSI):
Z97.1-14.....Safety Glazing Material Used in Building - Safety Performance Specifications and Methods of Test

D. American Society of Civil Engineers (ASCE):
7-10 .....Wind Load Provisions

E. ASTM International (ASTM):
C542-05(R2011) .....Lock-Strip Gaskets

C716-06.....Installing Lock-Strip Gaskets and Infill Glazing Materials

C794-10.....Adhesion-in-Peel of Elastomeric Joint Sealants

C864-05(R2011) .....Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers

C920-14a.....Elastomeric Joint Sealants

C964-07(R2012) .....Standard Guide for Lock-Strip Gasket Glazing

C1036-11(R2012) .....Flat Glass

C1048-12.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.

C1172-14.....Laminated Architectural Flat Glass

C1349-10.....Standard Specification for Architectural Flat Glass Clad Polycarbonate

C1376-10.....Pyrolytic and Vacuum Deposition Coatings on Flat Glass

D635-10.....Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastic in a Horizontal Position

D4802-10.....Poly (Methyl Methacrylate) Acrylic Plastic Sheet

E84-14.....Surface Burning Characteristics of Building Materials

E119-14.....Standard Test Methods for Fire Test of Building Construction and Material

E1300-12a.....Load Resistance of Glass in Buildings

E1886-13a.....Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials

E1996-14a.....Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes

E2141-12.....Test Methods for Assessing the Durability of Absorptive Electrochromic Coatings on Sealed Insulating Glass Units

E2190-10.....Insulating Glass Unit

E2240-06.....Test Method for Assessing the Current-Voltage Cycling Stability at 90 Degree C (194 Degree F) of Absorptive Electrochromic Coatings on Sealed Insulating Glass Units

E2241-06.....Test Method for Assessing the Current-Voltage Cycling Stability at Room Temperature of Absorptive Electrochromic Coatings on Sealed Insulating Glass Units

E2354-10.....Assessing the Durability of Absorptive Electrochromic Coatings within Sealed Insulating Glass Units

E2355-10.....Test Method for Measuring the Visible Light Transmission Uniformity of an Absorptive Electrochromic Coating on a Glazing Surface

F1233-08.....Standard Test Method for Security Glazing Materials and Systems

F1642-12.....Test Method for Glazing and Glazing Systems Subject to Airblast Loadings

F. Code of Federal Regulations (CFR):
16 CFR 1201-10.....Safety Standard for Architectural Glazing Materials

G. Glass Association of North America (GANA):
2010 Edition .....GANA Glazing Manual

2008 Edition .....GANA Sealant Manual

2009 Edition .....GANA Laminated Glazing Reference Manual

2010 Edition .....GANA Protective Glazing Reference Manual

H. International Code Council (ICC):
IBC .....International Building Code

I. Insulating Glass Certification Council (IGCC)

J. Insulating Glass Manufacturer Alliance (IGMA):
TB-3001-13 .....Guidelines for Sloped Glazing

TM-3000 ..... North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use

K. Intertek Testing Services – Warnock Hersey (ITS-WHI)

L. National Fire Protection Association (NFPA):
80-16 ..... Fire Doors and Windows

252-12 ..... Fire Tests of Door Assemblies

257-12 ..... Standard on Fire Test for Window and Glass Block Assemblies

M. National Fenestration Rating Council (NFRC)
1. Safety Glazing Certification Council (SGCC) 2012:
2. Certified Products Directory (Issued Semi-Annually).

N. Underwriters Laboratories, Inc. (UL):
9-08(R2009) ..... Fire Tests of Window Assemblies

263-14 ..... Fire Tests of Building Construction and Materials

752-11 ..... Bullet-Resisting Equipment.

O. Unified Facilities Criteria (UFC):
4-010-01-03(R2007)..... DOD Minimum Antiterrorism Standards for Buildings

P. U.S. Veterans Administration:
1. Physical Security Design Manual for VA Facilities (VAPSDG); Life Safety Protected
2. Architectural Design Manual for VA Facilities (VASDM)

Q. Environmental Protection Agency (EPA):
40 CFR 59(2014) ..... National Volatile Organic Compound Emission Standards for Consumer and Commercial Products

PART 2 - PRODUCT

2.1 GLASS:

A. Provide minimum thickness stated and as additionally required to meet performance requirements.
1. Provide minimum 6 mm (1/4 inch) thick glass units unless otherwise indicated.

B. Obtain glass units from single source from single manufacturer for each glass type.

C. Clear Glass:
1. ASTM C1036, Type I, Class 1, Quality q3.

D. Tinted Heat reflective and low emissivity coated glass:
1. ASTM C1036, Type I, Class 2, Quality q3.

2.2 HEAT-TREATED GLASS:

A. Roller Wave Limits for Heat-Treated Glass: Orient all roller wave distortion parallel to bottom surface of glazing, and provide units complying with the following limitations:
1. Measurement Parallel to Line: Maximum peak to valley 0.203 mm (0.008 inch).
2. Measurement Perpendicular to Line: Maximum 0.0254 mm (0.001 inch).
3. Bow/Warp: Maximum 50 percent of bow and warp allowed by ASTM C1048.

B. Clear Heat Strengthened Glass:
1. ASTM C1048, Kind HS, Condition A, Type I, Class 1, Quality q3.

C. Tinted Heat Strengthened Glass:
1. ASTM C1048, Kind HS, Condition A, Type I, Class 2, Quality q3.

D. Clear Tempered Glass:
   1. ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.

E. Tinted Tempered Glass.
   1. ASTM C1048, Kind FT, Condition A, Type I, Class 2, Quality q3.

F. Tempered Patterned Glass:
   1. ASTM C1048, Kind FT, Type II, Class 1, Form 3, finish, pattern and quality as indicated in construction documents.

2.3 COATED GLASS:

A. Silicone Coated Spandrel Glass:
   1. ASTM C1048, Kind HS or FT, Condition B, Type I, Quality q3 with silicone coating applied over glass surface.
   2. Pattern as scheduled.

2.4 LAMINATED GLASS:

A. Laminated Glass: ASTM C1172. Two or more lites of glass bonded with polyvinyl butyral, ionomeric polymer, or cast-in-place and cured-transparent-resin interlayer complying with interlayer manufacturer's written instructions.

B. Interlayer: Use min. 0.75 mm (0.030 inch) thick interlayer for vertical glazing unless otherwise indicated in construction documents.

C. Interlayer: Use 1.5 mm (0.060 inch) thick interlayer for:
   1. Horizontal or sloped glazing.
   2. Acoustical glazing.
   3. Assemblies requiring heat strengthened or fully tempered glass.

D. Interlayer: Use 2.28 mm (0.090 inch) thick interlayer where required to meet performance requirements.

E. Interlayer Color: Clear, unless otherwise scheduled.

2.5 SECURITY GLAZING ASSEMBLY:

A. Blast Resistance: Provide exterior glazing units and interior security glazing units providing protection based upon hazard rating as scheduled, in accordance with ASTM F1642, and peak pressure and positive phase impulse indicated.

B. Laminated Glass Security Glazing Units: Fabricate from multiple lites of scheduled glass with polyvinyl butyral, ionomeric polymer, or cast-in-place and cured-transparent resin interlayers between the layers of glazing.

2.6 INSULATING GLASS UNITS:

A. Provide factory fabricated, hermetically sealed glass unit consisting of two panes of glass separated by a dehydrated air space and comply with ASTM E2190.

B. Assemble units using glass types specified in Insulating Glass Schedule.

2.7 FIRE PROTECTION AND FIRE RESISTANCE GLAZING:

A. Fire-Protection-Rated Glazing: Glazing units tested for use in fire door assemblies or fire windows, UL, ITS-WHI or equivalent listed and labeled by testing agency in accordance with IBC, for fire-protection ratings as indicated on construction documents, based upon positive-pressure testing per NFPA 257 or UL 9, and complying with NFPA 80.
   1. Hose-Stream Test: Units must comply, except units having fire-protection rating of 20 minutes.
   2. Labeling: Permanently label fire-protection-rated glazing units in accordance with IBC.
   3. Safety Glazing: Comply with 16 CFR 1201, Category II.

4. Fire-Protection-Rated Tempered Glass: For 20-minute fire-protection-rated door assemblies, of thickness scheduled.
5. Fire-Protection-Rated Laminated Ceramic Glazing: Units made from two lites of clear, ceramic glass, 8 mm (5/16 inch) total thickness, for rating scheduled.

B. Fire-Resistance-Rated Glazing: Glazing units tested for use in fire wall assemblies, UL, ITS-WHI or equivalent listed and labeled by testing agency in accordance with IBC for fire-resistance ratings of wall assemblies as indicated on construction documents, based upon testing according to NFPA 252 and ASTM E119 or UL 263.
1. Labeling: Permanently label fire-resistance-rated glazing units in accordance with IBC.
2. Safety Glazing: Comply with 16 CFR 1201, Category II.
3. Fire-Resistance-Rated Laminated Glass with Intumescent Interlayers: Units made from multiple lites of uncoated, ultra-clear low-iron float glass, in intumescent interlayers, of thickness and rating scheduled.
4. Fire-Resistance-Rated Double Glazing Units with Gel Fill: Units made from two lites of uncoated, fully tempered, ultra-clear (low-iron) float glass, with perimeter metal spacer and edge seal forming cavity filled with clear, fully transparent, heat-absorbing gel, of thickness and fire-protection rating scheduled.

2.8 GLAZING ACCESSORIES:

A. As required to supplement the accessories provided with the items to be glazed and to provide a complete installation. Ferrous metal accessories exposed in the finished work are to have a finish that will not corrode or stain while in service. Fire rated glazing to be installed with glazing accessories in accordance with the manufacturer's installation instructions.

B. Setting Blocks: ASTM C864:
1. Silicone type.
2. Channel shape; having 6 mm (1/4 inch) internal depth.
3. Shore A hardness of 80 to 90 Durometer.
4. Block lengths: 50 mm (2 inches) except 100 to 150 mm (4 to 6 inches) for insulating glass.
5. Block width: Approximately 1.6 mm (1/16 inch) less than the full width of the rabbet.
6. Block thickness: Minimum 4.8 mm (3/16 inch). Thickness sized for rabbet depth as required.

C. Spacers: ASTM C864:
1. Channel shape having a 6 mm (1/4 inch) internal depth.
2. Flanges not less 2.4 mm (3/32 inch) thick and web 3 mm (1/8 inch) thick.
3. Lengths: 25 to 76 mm (1 to 3 inches).
4. Shore A hardness of 40 to 50 Durometer.

D. Glazing Tapes:
1. Semi-solid polymeric based closed cell material exhibiting pressure-sensitive adhesion and withstanding exposure to sunlight, moisture, heat, cold, and aging.
2. Shape, size and degree of softness and strength suitable for use in glazing application to prevent water infiltration.
3. Complying with AAMA 800 for the following types:
   a. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
   b. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

E. Spring Steel Spacer: Galvanized steel wire or strip designed to position glazing in channel or rabbeted sash with stops.

F. Glazing Clips: Galvanized steel spring wire designed to hold glass in position in rabbeted sash without stops.

G. Glazing Points (Sprigs): Pure zinc stock, thin, flat, triangular or diamond shaped pieces, 6 mm (1/4 inch) minimum size.

H. Glazing Gaskets: ASTM C864:
1. Firm dense wedge shape for locking in sash.
2. Soft, closed cell with locking key for sash key.
3. Flanges may terminate above the glazing-beads or terminate flush with top of beads.

I. Lock-Strip Glazing Gaskets: ASTM C542, shape, size, and mounting as indicated.

J. Glazing Sealants: ASTM C920, silicone neutral cure:
1. Type S.
2. Class 25 or 50 as recommended by manufacturer for application.
3. Grade NS.
4. Shore A hardness of 25 to 30 Durometer.
5. VOC Content: For sealants used inside the weatherproofing system, not more than 250 g/L or less when calculating according to 40 CFR 59, (EPA Method 24).

K. Structural Sealant: ASTM C920, silicone acetoxy cure:
1. Type S.
2. Class 25.
3. Grade NS.
4. Shore a hardness of 25 to 30 Durometer.

L. Neoprene, EPDM, or Vinyl Glazing Gasket: ASTM C864.
1. Channel shape; flanges may terminate above the glazing channel or flush with the top of the channel.
2. Designed for dry glazing.

M. Color:
1. Color of glazing compounds, gaskets, and sealants used for aluminum color frames to match color of the finished aluminum and be nonstaining.
2. Color of other glazing compounds, gaskets, and sealants which will be exposed in the finished work and unpainted are to be black, gray, or neutral color.

N. Smoke Removal Unit Targets: Adhesive targets affixed to glass to identify glass units intended for removal for smoke control. Comply with requirements of local Fire Department.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Verification of Conditions:
1. Examine openings for glass and glazing units; determine they are proper size; plumb; square; and level before installation is started.
2. Verify that glazing openings conform with details, dimensions and tolerances indicated on manufacturer is approved shop drawings.

B. Review for conditions which may adversely affect glass and glazing unit installation, prior to commencement of installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

C. Verify that wash down of adjacent masonry is completed prior to erection of glass and glazing units.

3.2 PREPARATION:

A. For sealant glazing, prepare glazing surfaces in accordance with GANA Sealant Manual.

B. Determine glazing unit size and edge clearances by measuring the actual unit to receive the glazing.

C. Shop fabricate and cut glass with smooth, straight edges of full size required by openings to provide GANA recommended edge clearances.

D. Verify that components used are compatible.

E. Clean and dry glazing surfaces.

F. Prime surfaces scheduled to receive sealants, as determined by preconstruction sealant-substrate testing.

3.3 INSTALLATION – GENERAL:

A. Install in accordance with GANA Glazing Manual, GANA Sealant Manual, IGMA TB-3001, and IGMA TM-3000 unless specified otherwise.

B. Glaze in accordance with recommendations of glazing and framing manufacturers, and as required to meet the Performance Test Requirements specified in other applicable sections of specifications.

C. Set glazing without bending, twisting, or forcing of units.

D. Do not allow glass to rest on or contact any framing member.

E. Glaze doors and operable sash, in a securely fixed or closed and locked position, until sealant, glazing compound, or putty has thoroughly set.

F. Tempered Glass: Install with roller distortions in horizontal position unless otherwise directed.

G. Laminated Glass:
1. Tape edges to seal interlayer and protect from glazing sealants.
2. Do not use putty or glazing compounds.

H. Insulating Glass Units:
1. Glaze in compliance with glass manufacturer's written instructions.
2. When glazing gaskets are used, they are to be of sufficient size and depth to cover glass seal or metal channel frame completely.
3. Do not use putty or glazing compounds.
4. Do not grind, nip, cut, or otherwise alter edges and corners of fused glass units after shipping from factory.
5. Install with tape or gunnable sealant in wood sash.

I. Fire Protective and Fire Resistance Glass:
1. Wire Glass: Glaze in accordance with NFPA 80.
2. Other fire protective and fire resistant glass: Glaze in accordance with manufacturer’s installation instructions and NFPA 80.

3.4 INSTALLATION - WET/DRY METHOD (PREFORMED TAPE AND SEALANT)

A. Cut glazing tape to length and set against permanent stops, 5 mm (3/16 inch) below sight line. Seal corners by butting tape and dabbing with butyl sealant.

B. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.

C. Place setting blocks at 1/3 points with edge block no more than 152 mm (6 inches) from corners.

D. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to achieve full contact at perimeter of pane or glass unit.

E. Install removable stops, with spacer strips inserted between glazing and applied stops, 6 mm (1/4 inch) below sight line. Place glazing tape on glazing pane or unit with tape flush with sight line.

F. Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, but not more than 9 mm (3/8 inch) below sight line. Sealant type is to be compatible with glazing tape.

G. Apply cap bead of sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.5 INSTALLATION - WET METHOD (SEALANT AND SEALANT):

A. Place setting blocks at 1/3 points and install glazing pane or unit.

B. Install removable stops with glazing centered in space by inserting spacer shims both sides at 600 mm (24 inch) intervals, 6 mm (1/4 inch) below sight line.

C. Fill gaps between glazing and stops with sealant to depth of bite on glazing, but not more than 9 mm (3/8 inch) below sight line to ensure full contact with glazing and continue the air and vapor seal.

D. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.6 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT):

A. Cut glazing tape to length and install against permanent stops, projecting 1.6 mm (1/16 inch) above sight line.

B. Place setting blocks at 1/3 points with edge block no more than 150 mm (6 inches) from corners.

C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.

D. Install removable stops, spacer shims inserted between glazing and applied stops at 600 mm (24 inch) intervals, 6 mm (1/4 inch) below sight line.

E. Fill gaps between pane and applied stop with sealant to depth equal to bite on glazing, to uniform and level line. Sealant type is to be compatible with glazing tape.

F. Trim protruding tape edge.

3.7 INSTALLATION - INTERIOR WET METHOD (COMPOUND AND COMPOUND):

A. Install glazing resting on setting blocks. Install applied stop and center pane by use of spacer shims at 600 mm (24 inch) centers, kept 6 mm (1/4 inch) below sight line.

B. Locate and secure glazing pane using glazers' clips.

C. Fill gaps between glazing and stops with glazing compound until flush with sight line. Tool surface to straight line.

3.8 REPLACEMENT AND CLEANING:

A. Clean new glass surfaces removing temporary labels, paint spots, and defacement after approval by COR.

B. Replace cracked, broken, and imperfect glass, or glass which has been installed improperly.

C. Leave glass, putty, and other setting material in clean, whole, and acceptable condition.

3.9 PROTECTION:

A. Protect finished surfaces from damage during erection, and after completion of work. Strippable plastic coatings on colored anodized finish are not acceptable.

3.10 MONOLITHIC GLASS SCHEDULE:

A. Glass Type MG# 1: Clear fully tempered float glass.
   1. Unit Thickness: 6 mm (0.23 inch.
   2. Safety glazing label required.

3.11 LAMINATED GLASS SCHEDULE:

A. Glass Type LG# 1: Clear laminated glass with two (2) lites of fully tempered float glass.
1. Minimum Thickness of Each Glass Lite: 3 mm (0.12 inch).
2. Interlayer Thickness: 1.52 mm (0.060 inch).
3. Safety glazing label required.
4. Application: Interior glazing of units unless otherwise scheduled.

3.12 INSULATING LAMINATED GLASS SCHEDULE (FORCE PROTECTION AND PHYSICAL SAFETY):

A. Glass Type IL# 1: Low-E-coated, clear insulating laminated glass.
1. Overall Unit Thickness: 25.5 mm (1 1/32 inch).
2. Outdoor Lite: Clear annealed float glass, except heat-strengthened float glass where required, and fully tempered float glass where indicated.
a. Minimum Thickness of Outdoor Lite: 6 mm (0.23 inch).
3. Interspace Content: Argon.
4. Indoor Lite: Clear laminated glass with two lites of annealed float glass, except heat-strengthened float glass where required, and fully tempered float glass where indicated.
a. Minimum Thickness of Each Glass Lite: 3 mm (0.12 inch).
b. Interlayer Thickness: 0.76 mm (0.030 inch).
5. Low-E Coating: Sputtered on second surface.
6. Visible Light Transmittance: 61 percent minimum.
7. Solar Heat Gain Coefficient: 0.26 maximum.
8. Safety glazing label required.
9. Windborne debris-resistant glazing unit required.
10. Blast Resistance: Provide units meeting the following:
a. GP Value 1 .

B. Glass Type IL# 2: Low-E-coated, silicone -coated clear insulating laminated glass for skylights.
1. Overall Unit Thickness: 25.5 mm (1 1/32 inch).
2. Outdoor Lite: Clear annealed float glass, except heat-strengthened float glass where required, and fully tempered float glass where indicated.
a. Minimum Thickness of Outdoor Lite: 6 mm (0.23 inch).
3. Interspace Content: Argon.
4. Indoor Lite: Clear laminated glass with two lites of annealed float glass, except heat-strengthened float glass where required, and fully tempered float glass where indicated.
a. Minimum Thickness of Each Glass Lite: 3 mm (0.12 inch).
b. Interlayer Thickness: 0.76 mm (0.030 inch).
5. Low-E Coating: Sputtered on second surface.
6. Silicone Coating Color and Frit Pattern: 100 percent coverage, dark.
a. Coating location: Silk-screened on third surface.
7. Visible Light Transmittance: 0 percent minimum.
8. Safety glazing label required.
9. Blast Resistance: Provide units meeting the following:
a. GP Value 1 .

3.13 FIRE-PROTECTIVE AND FIRE-RESISTANCE GLAZING SCHEDULE:

A. Glass Type FR# 1: Fire-protection-rated tempered glass.
1. Thickness: 6 mm (0.23 inch).
2. Rating: 20 minutes.
3. Application: Fire-protection-rated door assemblies with openings not over 0.65 sq. m (100 sq. in.).

B. Glass Type FR# 2: Fire-protection-rated laminated ceramic glazing.
1. Thickness: 10 mm (0.39 inch) 12 mm (0.47 inch).
2. Rating: 45- 60- 90- minute.

3. Application: Fire-protection-rated door and window assemblies.

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SECTION 08 90 00

LOUVERS AND VENTS

PART 1 - GENERAL

1.1 DESCRIPTION:

A. This section specifies fixed and operable wall louvers, door louvers and wall vents.

1.2 RELATED WORK:

A. Color of finish: See Construction documents.

1.3 SUBMITTALS:

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Shop Drawings:
   1. Each type, showing material, finish, size of members, method of assembly, and installation and anchorage details.

C. Manufacturer's Literature and Data:
   1. Each type of louver and vent.

D. Color samples.

1.4 APPLICABLE PUBLICATIONS:

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. The Master Painters Institute (MPI):
   Approved Product List – Updated Monthly

C. ASTM International (ASTM):

A240/A240M-14	Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
A653/A653M-13	Steel Sheet Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process
A1008/A1008M-13	Steel, Sheet, Carbon, Cold Rolled, Structural, and High Strength Low-Alloy with Improved Formability
B209-14	Aluminum and Aluminum Alloy, Sheet and Plate
B209M-14	Aluminum and Aluminum Alloy, Sheet and Plate (Metric)
B221-14	Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
B221M-13	Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes (Metric)
D1187/D1187M-97(R2011)	Asphalt-Base Emulsions for Use as Protective Coatings for Metal

D. National Association of Architectural Metal Manufacturers (NAAMM):
   AMP 500-06 ..... Metal Finishes Manual

E. National Fire Protection Association (NFPA):
   90A-15 ..... Installation of Air Conditioning and Ventilating Systems

F. American Architectural Manufacturers Association (AAMA):

2605-13 .....High Performance Organic Coatings on Architectural Extrusions and Panels

G. Air Movement and Control Association, Inc. (AMCA):
500-L-07 .....Testing Louvers

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Aluminum, Extruded: ASTM B221M (B221).

B. Stainless Steel: ASTM A240/A240M, Type 302B.

C. Galvanized Steel Sheet: ASTM A653/A653M; G90 min.

D. Carbon Steel and Sheet: ASTM A1008/A1008M (interior use louvers only).

E. Aluminum, Plate and Sheet: ASTM B209M (B209); alloy 3003 or 5005 with temper as required for forming.

F. Fasteners: Fasteners for securing louvers and wall vents to adjoining construction, except as otherwise specified or indicated in construction documents, to be toggle or expansion bolts of size and type as required for each specific type of installation and service condition.
1. Where type, size, or spacing of fasteners is not shown or specified, submit shop drawings showing proposed fasteners, and method of installation.
2. Fasteners for louvers, louver frames, and wire guards to be of stainless steel or aluminum with same finish as louvers.
3. Fasteners for louvers, louver frames and wire guards within mental health areas to be non-removable/tamper-proof type.

G. Inorganic Zinc Primer: MPI No. 19.

H. Bituminous Coating: ASTM D1187/D1187M; cold applied asphalt mastic emulsion.

2.2 EXTERIOR WALL LOUVERS:

A. General:
1. Provide fixed type louvers of size and design shown.
2. Heads, sills and jamb sections are to have formed caulking slots or be designed to retain caulking. Head sections are to have exterior drip lip, and sill sections an integral water stop.
3. Furnish louvers with sill extension or separate sill as shown.
4. Frame is to be mechanically fastened or welded construction with welds dressed smooth and flush.

B. Performance Characteristics:
1. Weather louvers are to have a minimum of 40 percent free area and to pass 2286 mm/s (450 fpm) free area velocity at a pressure drop not exceeding 1.27 mm (0.05 inch) water gage and carry not more than 0.283 g (0.01 ounces) of water per square meter (square foot) of free area for 15 minutes when tested per AMCA Standard 500-L.
2. Louvers are to bear AMCA certified rating seals for air performance and water penetration ratings.

C. Aluminum Louvers:
1. General: Frames, blades, sills and mullions (sliding interlocking type); 2 mm (0.078-inch) thick extruded 6063-T5 or –T52 aluminum. Blades to be drainable type and have reinforcing bosses.
2. Louvers, fixed: Make frame sizes 13 mm (1/2-inch) smaller than openings. Single louvers frames are not to exceed 1676 mm (66 inches) wide. When openings exceed 1676 mm (66 inches), provide twin louvers separated by mullion members.

3. Louvers are to withstand the effects or gravity loads and the following wind loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors.
   a. Wind load acting inward or outward of not less than 1.7 kPa (36 psf).

2.3 CLOSURE ANGLES AND CLOSURE PLATES:

A. Fabricate from 2 mm (0.078-inch) thick stainless steel or aluminum.

B. Provide continuous closure angles and closure plates on inside head, jambs and sill of exterior wall louvers.

C. Secure angles and plates to louver frames with screws, and to masonry or concrete with fasteners as indicated in construction documents.

2.4 WIRE GUARDS:

A. Provide wire guards on outside of all exterior louvers, except on exhaust air louvers.

B. Fabricate frames from 2 mm (0.078-inch) thick extruded or sheet aluminum designed to retain wire mesh.

C. Wire mesh to be woven from not less than 1.6 mm (0.063-inch) diameter aluminum in 13 mm (1/2-inch) square mesh.

D. Miter corners and join by concealed corner clips or locks extending not less than 57 mm (2-1/4 inches) into rails and stiles. Equip wire guards over 1219 mm (4 feet) in height with a mid-rail constructed as specified for frame components.

E. Fasten frames to outside of louvers with aluminum or stainless steel devices of same finish as louvers designed to allow removal and replacement without damage to the wire guard or the louver.

2.5 BLANK-OFF PANELS:

A. Insulated laminated panels consisting of an insulating core surfaced on back and front with metal sheets and attached to back of louver with clips on screws and gasketed or sealant sealed perimeter. Panel finish is to be same finish applied to louvers.
   1. Thickness: 50 mm (2 inches).
   2. Aluminum sheet for aluminum louver 0.81 mm (0.032 inch) minimum.
   3. Insulating Core: Extruded-polystyrene foam.

2.6 WALL VENTS:

A. Fabricate exterior wall vents from either 4.7 mm (0.185-inch) thick aluminum plate or 6 mm (1/4-inch) thick cast iron, perforated in diamond lattice pattern, with not over 19 mm (3/4-inch) openings.

B. Vents are to have aluminum screen frame with aluminum alloy insect screening mounted on back of vent by means of 19 mm x 5 mm (3/4-inch by 3/16-inch) top and bottom bars screwed to grille.

C. Vent Frames in Masonry: Fabricate of 45 mm x 30 mm x 5 mm (1-3/4 inch by 1-1/4 inch by 3/16-inch) steel angles bolted with 6 mm (1/4-inch) diameter expansion bolts at jambs.

2.7 AIR INTAKE VENTS:

A. Fabricate exterior louvered wall ventilators for fresh air intake for air conditioning units from extruded aluminum, ASTM B221M (B221). Form with integral horizontal louvers and frame, with drip extending beyond face of wall and integral water stops.

B. Provide aluminum closures where shown for inside face of dummy vents.

C. Provide 0.8 mm (0.032-inch) thick aluminum sleeves in cavity walls where indicated in construction documents.

2.8 BRICK VENTS:

A. Vents are to be of size shown formed of approximately 3 mm (0.125 inch) thick cast aluminum, or 3 mm (0.118 inch) extruded aluminum.

B. Provide vents complete with aluminum screen frame with corrosion resistant insect screening mounted on back of vent.

C. Provide vents with required anchors.

2.9 FINISH:

A. In accordance with NAAMM Metal Finishes Manual: AMP 500-505

B. Aluminum Louvers Air Intake Vents; Wire Guards; and Blank Off Panels:
1. Organic Finish: AAMA 2605 (Fluorocarbon coating) with total dry film thickness of not less than 0.03 mm (1.2 mil), color as indicated in See Construction documents.

C. Aluminum Wall Vents, and Brick Vents: Sand blasted satin finish.

D. Stainless Steel: Mechanical finish No. 4 in accordance with NAAMM Metal Finishes Manual.

E. Steel: Surfaces of steel work, for which no other finish is specified, are to be cleaned free from scale, rust, oil and grease, and then given a light colored prime paint after fabrication, except ferrous metals concealed in finished work. Paint all contact surfaces of assembled work (except welded contact surfaces) with an additional shop coat of similar paint.

2.10 PROTECTION:

A. Provide protection for aluminum against galvanic action wherever dissimilar materials are in contact, by painting the contact surfaces of the dissimilar material with a heavy coat of bituminous coating (complete coverage), or by separating the contact surfaces with a performed synthetic rubber tape having pressure sensitive adhesive coating on one side.

B. Isolate the aluminum from plaster, concrete and masonry by coating aluminum with zinc-chromate primer.

C. Protect finished surfaces from damage during fabrication, erection, and after completion of the work. Strippable plastic coating on colored anodized; organic finish is not approved.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Set work accurately, in alignment and where indicated in construction documents. Install plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.

B. Furnish setting drawings and instructions for installation of anchors and for the positioning of items having anchors to be built into masonry construction. Provide temporary bracing for such items until masonry is set.

C. Provide anchoring devices and fasteners as shown and as necessary for securing louvers and vents to building construction as specified. Power actuated drive pins may be used, except for removal items and where members would be deformed or substrate damaged by their use.

D. Set wall louvers and vents in masonry walls during progress of the work. If wall louvers and vents are not delivered to job in time for installation in prepared openings, make provision for later installation. Set in cast-in-place concrete in prepared openings.

3.2 CLEANING AND ADJUSTING:

A. After installation, all exposed prefinished and plated items and all items fabricated from stainless steel and aluminum are to be cleaned as recommended by the manufacturer and protected from damage until completion of the project.

B. All movable parts, including hardware, are to be cleaned and adjusted to operate as designed without binding or deformation of the members, so as to be centered in the opening of frame, and where applicable, to have all contact surfaces fit tight and even without forcing or warping the components.

C. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Contracting Officer Representative (COR) damaged units and replace with new units.

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