PROJECT MANUAL

INCLUDING CONSTRUCTION SPECIFICATIONS

for

V-S035, - TERMINAL C ASC LEVEL 2 EMERGENCY EGRESS (D/B)

ORLANDO INTERNATIONAL AIRPORT

Orlando, Florida 32827

CONTRACT DOCUMENTS

Issue Date

February 21, 2023

VOLUME 4 OF 10

GREATER ORLANDO AVIATION AUTHORITY

Documents Prepared and Submitted by:

HNTB Corporation

11346 Terminal C Service Rd., Orlando, FL 32824

Phone: (407) 825-1592

SECTION 08 35 13.23 - ACCORDION FOLDING FIRE DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section includes horizontal, accordion folding fire doors.

B. Related Requirements:

1. Section 05 50 00 "Metal Fabrications" for miscellaneous steel supports.
2. Section 09 91 23 “Interior Painting” for field painting track, soffit, chain guide and wall mounted striker posts.
3. Division 26 Sections for electrical connections.

1.3 QUALITY ASSURANCE

A. Installation shall be performed by factory trained and certified installers with a minimum of three years’ experience installing electrically operated accordion folding fire doors.

B. Fire doors shall be listed by Underwriters Laboratories for ratings as indicated, when tested in accordance with the requirements of UL 10B and NFPA 252.

C. Automatic closing system shall be listed by Underwriters Laboratories in accordance with the requirements of UL 864 and be listed for use with assembly in compliance with NFPA 80, Chapter 9. Motor operator shall be rated for continuous use with unlimited cycle duty.

D. Fire doors used for smoke and draft control shall bear the “S” mark on the fire door label and shall have an air leakage of less than 3 ft^3/ft^2 at 0.1 inch of water column pressure when tested in accordance with UL 1784 with an artificial bottom seal.

E. Fire doors used at the point of access to an elevator shall bear the “SE” mark on the fire door label and shall have an air leakage of less than 3 ft^3/ft^2 at 0.1 inch of water column pressure when tested in accordance with UL 1784 without an artificial bottom seal.

F. Fire Door shall be capable of resisting an air pressure differential up to 0.05 inches of water column.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer’s technical literature; include UL listing data.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content

C. Shop Drawings: Indicate construction and installation details and dimensions, including layout, electrical requirements, required stacking depth, height of header above finished floor, and requirements for anchorage and support of each door.

D. Operation and Maintenance Data: Operating manual, troubleshooting and repair methods, and wiring diagrams shall be provided as part of project close out procedure.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver to the job site in manufacturer's original, unopened package.

1.6 COORDINATION BY GENERAL CONTRACTOR

A. Coordinate with the following:

1. Fire Alarm System.
2. Electrical.
3. Pocket cover door (if required).
4. Floor and ceiling finish.

B. Assure accurate installation of header, jamb, and trim. Provide “As-Built” dimensions for opening and storage pocket. Supervise unloading and handling of materials.

C. Permanent power shall be in-place and ready for final connection when fire doors are erected. Assure access to and proper clearance for motor operators.

D. After testing the fire alarm system, automatic-closing fire doors shall be re-set to the original position.

E. Store boxes flat (not more than three high) in a dry area and protect from elements that may damage materials. Replace damaged materials at no cost to the owner.

1.7 WARRANTY

A. Materials and installation shall be warranted against defects in workmanship for a period of one (1) year from the date of substantial completion.

PART 2 - PRODUCTS

2.1 ACCORDION FIRE DOORS - GENERAL

A. Basis-of-Design Product: Subject to compliance with requirements, provide Won-Door Corporation, FireGuard or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

B. Provide power operated self-closing fire doors of configurations indicated on the drawings.

1. Fire rating as indicated.

C. Fire Rating: Fire Doors shall be listed by Underwriters Laboratory as special purpose fire doors having a fire protection rating as indicated in accordance with the requirements of UL 10B and NFPA 252.

D. Closing and Opening Operation: Automatic Closing System including motor operator and releasing devices shall be a Microprocessor-based system rated to UL864 (Releasing Device Control Unit) and shall commence closing upon activation by fire alarm system and/or by low battery charge.

1. Obstruction Detection: Contact with an obstruction shall cause the door to stop, reverse enough to remove pressure on the leading edge, pause, and then re-close when in an alarm condition.
2. Motor-assisted opening: While the door is opening under motor power, constant pressure to the leading edge in the direction of opening shall cause the door to continue to open until the leading edge is released.
3. Constant pressure to the leading edge while not under motor power shall prevent motor operation and allow the door to be opened manually.

E. Exit Hardware Operation: Provide fire exit hardware on both sides of door.

1. In emergency mode, a slight pressure on the hardware will cause the door to open a minimum of 32 inches, pause for 3 seconds, and then automatically close.
2. The open distance shall be field programmable, up to the entire opening width.
3. The pause before re-close shall be field programmable up to 30 seconds.
4. The exit hardware shall have the ability when not in the emergency (fire) mode to be used to open the door and move it back into the storage pocket.

2.2 COMPONENTS

A. Door Construction: Two parallel, accordion-type walls of panels independently suspended with no floor tracks, pantographs, or interconnections except at the lead-post.

1. Panels shall be formed of 24-gauge enamel coated steel V-grooved for strength and resilience. Panels shall be connected by full height 24-gauge enamel coated steel hinges. Panels shall be modular in design and capable of in-place repair.
2. Perimeter Seals: shall consist of continuous extruded vinyl sweeps attached to the top and bottom of the fire door to form a smoke and draft seal.
3. Hanging weight shall be 5.5 pounds per square foot when extended across the opening.
4. Finish: All steel parts factory applied enamel.
5. Color: Manufacturer’s standard.

6. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
    a. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

B. Suspension System: Two tracks, on 8 inch centers, attached to overhead structural support.

1. 0.125-inch aluminum.
2. Panel hangers: Panels supported from a steel hanger pin and a ball bearing roller.
3. Lead Post hangers: 8-wheel ball bearing trolley.

C. Power Supply: 120-volt power source to power supply for main power. On loss of AC power, the 12v/24v battery back-up system shall provide full operation capability.

D. Automatic Closing System shall be listed to UL864 including capability to send and receive signals from the Fire Control Panel and shall consist of the following:

1. Microprocessor based Electronic Control box with these features:
    a. Ability to monitor dual power sources continually for peak performance including:
        1) Detect a missing battery, bad battery, or low battery condition.
        2) Detect if the charging circuit is bad.
        3) Detect fuse failures.
        4) Detect high or low AC conditions.
    b. Ability to monitor the health of the drive train.
    c. Ability to monitor inputs including: Sticky door block, exit hardware, and patron hardware.
    d. Ability to run a “watch dog” monitoring circuit which will force a software restart in the event the software hangs, including the ability to track the number of resets that occur for diagnostic purposes.
    e. Ability to withstand voltages up to 120 volts AC on the fire alarm input circuit without damage including the ability to indicate that the alarm circuit has not been wired as a dry contact, “no voltage” circuit when errant voltages are applied to the circuit.
    f. Ability to communicate with other microprocessors in the assembly via an internal buss system.
    g. Ability to indicate trouble or supervised information both locally and at a remote location.
2. Motor Operator Assembly including: A DC gear-motor, drive sprocket, clutch, and position sensors. The motor shall drive the fire door by means of a chain attached to a stabilizer bar.
3. Leading Edge Obstruction Detector: shall be pressure sensitive such that each contact with an obstruction shall cause the door to stop, reverse enough to remove pressure on the leading edge, pause, and then re-close when in an alarm condition. The leading edge obstruction detector shall be fully functional at all times, including during the initial closing cycle.
4. Exit Hardware will be located on both sides of the fire door.

E. A key switch module shall be provided.

2.3 RELATED CONSTRUCTION

A. Track Support Construction: Provide supports attached to structure and mounting surface for tracks; comply with door manufacturer's instructions and recommendations. Headers shall be parallel with the finished floor within +/- 1/8" tolerance over the entire length of the opening.

B. Pocket Construction: Provide pocket for concealment of accordion folding fire door when open; comply with door manufacturer's instructions and recommendations to ensure pocket and soffit are built to the dimensions specified, plumb and level.

C. Pocket Door: Maintain full pocket clear width when pocket door is open.

D. Striker Recess: mount 16-gauge steel striker in wall recess deep enough to prevent striker from protruding beyond face of wall; construct recess to maintain fire rating of wall.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that adjacent construction is suitable for installation of door.

B. Verify that electrical utilities have been installed and are accessible.

C. Verify that door opening is plumb and header is level and of correct dimensions.

D. Notify Architect of any unacceptable conditions or varying dimensions.

3.2 INSTALLATION

1. Install fire doors in accordance with manufacturer's instructions, shop drawings, and NFPA 80.
2. Install fire doors plumb and level.
3. Installation shall be performed by factory trained and certified installers with a minimum of three years' experience installing electrically operated accordion folding fire doors.

3.3 ADJUSTING

1. Adjust door installation to provide uniform clearances and smooth, quiet, non-binding operation.
2. Test that all operations are functional and meet the requirements of local codes.

3.4 PROTECTION AND CLEANING

1. Protect installed work from damage.
2. Clean surfaces using manufacturer's recommended means and methods.
   a. Refer to Section 01 74 23 "Final Cleaning" for additional cleaning requirements.

END OF SECTION 08 35 13.23

SECTION 08 41 20 - STRUCTURAL GLASS FIN WALL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes: Glass, glazing and connections for interior structural point supported glass wall in accordance with the Contract Documents.

B. Related Sections:

1. Section 07 92 00 “Joint Sealants” – Sealants for glazing
2. Section 08 80 00 “Glazing” - Glass and Glazing
3. Section 05 12 00 “Structural Steel Framing” – Steel Supports
4. Section 05 50 00 “Metal Fabrications” – Steel connections

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Glass, glazing, system design, and accessories shall be provided by single manufacturer.

B. Single Source Installation: Provide installation by installer acceptable to the system manufacturer.

1. The installer shall supply and erect the complete structural glazing system, coordinate and maintain tolerances between structure and glazing system with individual suppliers and manufacturers, and install glazing system.

C. Where safety glass is indicated or required by authorities having jurisdiction, provide type of products which comply with ANSI Z97.1 and testing requirements of 16 CFR, Part 1201 for category II materials.

D. Pre-Installation Meeting: Meet at the project site with the representatives of the glass and glazing materials manufacturers, architectural exposed structural steel fabricator and erector, sealant manufacturer, the glazing installer, Architect's representative and Owner's representative. Review the glazing procedure and schedule, including the method of delivering and handling glass, and installing glazing materials. The chemical compatibility of all glazing materials and framing sealants with each other and with like materials used in glass fabrication shall be established.

1.4 SYSTEM DESCRIPTION

A. Design Requirements

1. Structural Performance: Structural glass fin wall shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to SEI/ASCE 7.
   a. Lateral Loads:
      1) Uniform load of 50 lbf/ ft. applied horizontally.
      2) Concentrated load of 200 lbf applied horizontally.
      3) Uniform and concentrated loads need not be assumed to act concurrently.
      4) Safety Glazing Impact load: Glazing shall comply with CPSC 16 CFR 1201 criteria for Category II.
   b. Deflection Limits: Deflection normal to glazing plane is limited to 1/360.
   c. Delegated Design: Design structural glass fin walls, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
2. Structural Glass Fin Wall System.
   a. Integral fittings shall be provided. Exterior fittings and plates are not permitted.
3. Spring plate members shall prevent high stress concentration at the hole positions and must accommodate:
   a. Negative and positive wind loading
   b. Seismic loads
   c. Thermal movement
   d. Construction tolerances
   e. Live load and dead load movements
4. Movement diaphragms of stainless steel and durable flexible discs must be incorporated in connections to accommodate oversize holes in spring plate members which allow for thermal movement and glass manufacturing tolerances.
5. The system shall provide unitized pre-fixing of all items to glass prior to erection.

1.5 SUBMITTALS

A. Product Data: Material description and installation instructions for tapes, compounds, gaskets and other materials.

B. Shop Drawings: Shop drawings shall clearly indicate materials and methods, indicate coordination with other trades.

C. Coordination Drawings: Clearly indicate locations and sizes of steel plates and shapes necessary for installation.

D. Samples:

1. Submit sample of glass and glazing materials required for the Project. Samples of glass shall be 12" x 12", samples of sealant or gasket shall be 12" long.
2. Submit sample of spring plate complete with glass, bolt and accessories.

E. Delegated-Design Submittal: For all-glass systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of all-glass systems.

F. Test Reports: Submit test reports from an independent laboratory in the United States certifying that the fully suspended structural glazing system proposed for use has been tested. The system tested must be similar in type of materials including face glass and glass fins and design indicated, utilizing integral bolted attachments into the glass.

G. Letter signed by the glass manufacturer clearly stating the glass and fittings to be used on the project are part of the manufacturer's system and are acceptable to the manufacturer and that they have reviewed the contract documents and will issue a project specific 12-year warranty including the entire system. Letters signed by the subcontractor for this section are not acceptable. System, including fittings and glazing, must be manufactured from one source.

1.6 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of the structural glass fin wall systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Warranty shall cover design integrity, weatherability and durability of the structural glass fin wall.
2. Partial multiple warranties of various project elements are not allowed. Warranty must include all aspects of the system including engineering, glass and fittings.
3. Warranty Period: 12 years.

B. Installer Warranty: Installer's standard form in which the installer agrees to replace or repair components of the structural glass fin wall system that do not comply with the requirements or that fail in workmanship within the specified warranty period.

1. Warranty Period: 5 years.

C. The Warranties submitted under this Section shall not deprive the Owner of other rights or remedies that the Owner may have under other provisions of the Contract Documents and the laws of governing jurisdictions and is in addition to and runs concurrently with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 STRUCTURAL GLASS FIN WALL SYSTEM

A. Basis of Design Product: Subject to compliance with requirements, provide Pilkington; PLANAR system or a comparable product by one of the following:

1. C.R. Laurence Company Co., Inc.
2. J.E. Berkowitz

3. Oldcastle Glass, Inc.

2.2 MATERIALS

A. Laminated Integral Bolt Structural Glass:

1. All glass must be fully tempered and heat soaked.
2. Laminated Glass (SLG1):
   a. Outer Leaf: Pilkington Optiwhite fully tempered and heat soaked glass.
      1) Thickness: 6 mm
   b. Inner Layer: DuPont Sentryglas
      1) Thickness: 1.52mm
   c. Inner Leaf: Pilkington Optiwhite, tempered and heat soaked glass.
      1) Thickness: 10 mm.
3. Glass must be certified to be tempered to a minimum compressive strength of 16,000 PSI.
4. All glass must be horizontally tempered eliminating tong marks.
5. All tempered glass must be heat soak tested to convert nickel sulfide inclusions from the alpha phase to the beta phase so that the glass will fracture in the test. Heat soak must comply with the European Din standard.
6. All edges will be ground flat with a frosted appearance unless otherwise noted.
7. All edgework, holes and notches in the tempered glass panels will be completed before tempering and shall comply with the requirements of Pilkington Architectural as stated below:
   a. Dimensional tolerance on panel size will be ± 1 mm of the theoretical dimension required.
   b. Squareness of each panel will be within 3 mm.
   c. Bow allowance is 0.1%.
   d. The positional tolerances on all holes will be ± 1 mm from a single datum point.
8. Flatness of glass: Average rollerwave distortion must be certified not to exceed an average of 0.0008 inches when measured from peak to valley. A site inspection for roller wave and bow tolerances should be from a minimum distance of 3 meters.
9. All glass must be manufactured in a factory where the quality control procedures are created under the terms of ISO 9000 and are independently monitored.
10. Prestress glass around holes to a level which is compatible with the design and use of the fittings. Check by differential surface refractometer on stress level.

B. Fittings:

1. Integral fittings shall be manufactured from stainless steel Grade 316.
   a. Basis of Design: Pilkington PLANAR Type 905 J.
   b. Countersunk bolts or Rotoule fittings are not permitted.
   c. 3. Finish: “As Machined”.
2. Spring plates shall provide a tolerance capability to accomodate the full range of movements shown below:

a. Thermal movements occurring as a result of differential coefficients of thermal expansion within the range specified. The components used within the system shall noiselessly withstand all thermal movements without any buckling, distortion, cracking, failure of joint seals or undue stress on the glass or fixing assemblies.
b. Deflection of edge beams due to loading applied after erection of the cladding to magnitude specified.
c. Maximum side sway of structure due to wind load to the magnitude specified or seismic movement to the degree specified.
d. Deflection due to self-weight of the structural glass fin wall system.
e. Inward and outward movements due to the design wind loads specified.

3. Exterior plates, caps, disks or buttons are not allowed.
4. Bushings: Nylatron Polyamide.
5. Gaskets: Fully vulcanized fiber, neoprene or precured silicone.

C. Rail Fittings

1. Material: Stainless-steel-clad aluminum.
2. Height:
   a. Top Rail: As indicated.
   b. Bottom Rail: As indicated.
3. Profile: As indicated.
4. End Caps: Manufacturer's standard precision-fit end caps for rail fittings.

2.3 MISCELLANEOUS MATERIALS

A. Applied Decorative Film: Pressure sensitive vinyl film suitable for application to glass substrates.

1. Basis of Design Product: Provide 3M; Crystal Glass Finishes – Dusted (7725SE-314) or approved product meeting all requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces receiving the Work. Verify dimensions of in-place and subsequent construction. Follow FGMA recommendations for inspection procedures. Do not begin work until unsatisfactory conditions have been corrected. Installation of work shall constitute acceptance of the related construction.

3.2 INSTALLATION OF GLASS:

A. Install in accordance with manufacturer requirements and shop drawings.

B. Employ only experienced glaziers who have had previous experience with the materials and systems being installed. Use tools and equipment recommended by the glass manufacturer.

C. Plate to plate joints of glass are sealed with silicone sealant. Joint dimensions shall be designed to be compatible with sealant properties and live load movement of the structure.

D. Bolt Torque: Torque bolts as specified on shop drawings using calibrated tool. Lock torqued bolts into position to prevent back-off. Reset calibrations regularly to ensure accurate torquing.

E. Maintain a minimum temperature of 40 degrees F. during glazing unless the manufacturer of the glazing material specifically agrees to application of this material at lower temperature. If job progresses or other conditions require glazing work when temperature is below 40 degrees F. (or below the minimum temperature recommended by the manufacturer), consult the manufacturer and establish the minimum provisions required to ensure satisfactory work.

F. Clean glazing connectors receiving glazing materials of deleterious substances which might impair the work. Remove protective coatings which might fail in adhesion or interfere with bond of sealants. Comply with manufacturer's instructions for final wiping of surfaces immediately before application of primer and glazing sealants. Wipe metal surfaces with xylol or toluol.

G. Inspect each unit of glass immediately before installation. Glass which has significant impact damage at edges, scratches or abrasion of faces, or any other evidence of damage shall not be installed.

H. Sealants: Prime surfaces to receive glazing sealants where required, in accordance with manufacturer's recommendations, using recommended primers.

I. Locate setting blocks, if required by the drawings, at the quarter points of sill, but no closer than 6 inches to corners of glass. Use blocks of proper sizes to support the glass in accordance with manufacturer's recommendations.

J. Provide spacers to separate glass from spring plates.

K. Set glass in a manner which produces greatest possible degree of uniformity in appearance. Face all glass, which has dissimilar faces, with matching faces in the same direction.

L. Use masking tape or other suitable protection to limit coverage of glazing materials to the surfaces intended for sealants.

M. Tool exposed surfaces of glazing materials.

N. Clean excess sealant from glass and support members immediately after application, using solvents or cleaners recommended by manufacturers.

3.3 INSTALLATION OF MISCELLANEOUS MATERIALS

A. Applied Decorative Film: Apply decorative film according to manufacturer’s requirements.

1. Locations: Provide decorative film as indicated in the Drawings.

~~3.3~~3.4 CURING, PROTECTION, AND CLEANING

A. Cure sealants in accordance with the manufacturer's instructions to attain maximum durability and adhesion to glass.

B. Clean all surfaces after installation, leaving all in a clean and workmanlike manner.

1. Refer to Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 08 41 20

SECTION 08 41 26 - ALL-GLASS INTERIOR STOREFRONTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. All glass storefront glazing.
2. Metal all glass storefront fittings.

B. Related Sections:

1. Division 05 Section "Structural Steel Framing" for steel support for all-glass systems.
2. Division 08 Section "Glazing" for general glass requirements.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: All-glass systems shall withstand the effects of the following performance requirements without exceeding performance criteria or failure due to defective manufacture, fabrication, installation, or other defects in construction.

B. Structural Performance: All-glass systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to SEI/ASCE 7.

1. Lateral Loads:
   a. Uniform load of 50 lbf/ ft. applied horizontally.
   b. Concentrated load of 200 lbf applied horizontally.
   c. Uniform and concentrated loads need not be assumed to act concurrently.
   d. Safety Glazing Impact load: Glazing shall comply with CPSC 16 CFR 1201 criteria for Category II.
2. Deflection Limits: Deflection normal to glazing plane is limited to 1/175 of clear span or 3/4 inch, whichever is smaller.

C. Delegated Design: Design all-glass systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.4 SUBMITTALS

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

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Adhesives and Sealants

C. Shop Drawings: Show fabrication and installation details, including the following:

1. Plans, elevations, and sections.
2. Details of fittings and glazing, including isometric drawings of patch fittings.
3. Door hardware locations, mounting heights, and installation requirements.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.

1. Metal Finishes: 6-inch- long sections of patch fittings, accessory fittings, and other items.
2. Glass: 6 inches square, showing exposed-edge finish.

E. Fabrication Sample: For all-glass systems, made from 12-inch lengths of full-size components and showing details of the following:

1. Joinery.
2. Anchorage.
3. Glazing.

F. Delegated-Design Submittal: For all-glass systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Detail fabrication and assembly of all-glass systems.

G. Qualification Data: For qualified Installer and testing agency.

H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for all-glass systems.

I. Field quality-control reports.

J. Maintenance Data: For all-glass systems to include in maintenance manuals.

K. Warranty: Sample of special warranty.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer’s authorized representative who is trained and approved for installation of units required for this Project.

B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.

C. Engineering Responsibility: Prepare data for all-glass systems, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in systems similar to those indicated for this Project.

D. Source Limitations: Obtain all-glass systems from single source from single manufacturer.

E. Source Limitations for Glass: Obtain laminated glass from single source from single manufacturer for each glass type.

F. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA's "Laminated Glazing Reference Manual" and GANA's "Glazing Manual."

H. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

I. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation. Refer to Section 01 43 39 “Visual Mock-Up Requirements” for additional requirements.

1. Build mockup of typical 25-foot bay including supporting structure.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Designer specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with all-glass systems by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of all-glass systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including excessive deflection.
   b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
2. Warranty Period: 5 years.

B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form in which laminated- glass manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Five years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Manufacturers: Subject to compliance with requirements, provide C. R. Laurence all-glass storefront products or a comparable product by one of the following:

1. ACI Distribution; a division of Vitro America, Inc.
2. Alpha Door & Rail, Inc.
3. Arch Aluminum & Glass Co., Inc.
4. Blumcraft of Pittsburgh.
5. Oldcastle Glass, Inc.
6. Pilkington
7. Virginia Glass Products Corporation; a subsidiary of Virginia Mirror Company.
8. Vistawall Architectural Products; The Vistawall Group; a Bluescope Steel company.

2.2 GLASS AND GLAZING MATERIALS

A. Tempered Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type 1 (transparent flat glass), Quality-Q3. Provide products that have been tested for surface and edge compression according to ASTM C 1048 and for impact strength according to 16 CFR 1201 for Category II materials.

1. Glass Color: Ultra-Clear, Low Iron.
2. Thickness: As required by structural loads, but not less than 12.0 mm.

B. Laminated Glass (LG1): ASTM C 1172, Condition A (uncoated), Type I (transparent flat glass), Quality-Q3 with two plies of glass and an interlayer.

1. Kind: LT (laminated tempered).
2. Glass Color: Ultra-Clear, Low Iron.
3. High Strength Interlayer:
   a. Basis of Design: DuPont™ SentryGlas® Plus, as manufactured by DuPont™ Building Innovations™; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 0Hwww.DuPont.com/safetyglass
   b. Thickness: 0.060 inch
   c. Color: Clear
   d. Interlayer Physical Properties:
      1) Young’s Modulus: 43 kpsi, when tested in accordance with ASTM D5026

2) Tensile Strength: 5.0 kpsi, when tested in accordance with ASTM D638.
3) Elongation: 400%, when tested in accordance with ASTM D638
4) Flex Modulus: 50 kpsi, when tested in accordance with D790.
5) Heat Deflection Temperature at 0.46 MPa: 110 deg F, when tested in accordance with D648.

4. Glass Plies: Thickness required by structural loads, but not less than 6.0 mm thick, each.

C. Laminated Glass (LG2): ASTM C 1172, Condition A (uncoated), Type I (transparent flat glass), Quality-Q3 with two plies of glass and an interlayer.

1. Kind: LT (laminated tempered).
2. Glass Color: Ultra-Clear, Low Iron.
3. High Strength Interlayer:
   a. Basis of Design: DuPont™ SentryGlas® Plus, as manufactured by DuPont™ Building Innovations™; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 0Hwww.DuPont.com/safetyglass
   b. Thickness: 0.060 inch
   c. Color: Match IG2. Refer to Section 09 00 01 “Finish Key” for additional requirements.
   d. Interlayer Physical Properties:
      1) Young’s Modulus: 43 kpsi, when tested in accordance with ASTM D5026
      2) Tensile Strength: 5.0 kpsi, when tested in accordance with ASTM D638.
      3) Elongation: 400%, when tested in accordance with ASTM D638
      4) Flex Modulus: 50 kpsi, when tested in accordance with D790.
      5) Heat Deflection Temperature at 0.46 MPa: 110 deg F, when tested in accordance with D648.
4. Glass Plies: Thickness required by structural loads, but not less than 6.0 mm thick, each.

D. Back-Painted Glass (IG2)

1. Basis of Design: S.A. Bendheim, Ltd.; Back-Painted Glass or approved substitute.
2. Description: Ultra-clear low-iron float glass.
3. Color: Match P1 as indicated in Section 09 00 01” Finish Key”.
4. Thickness: Not less than 1/4 inch.
5. Edge treatment: Flat polished.

E. Glazing Cement and Accessories for Structural Glazing: Glazing cement, setting blocks, shims, and related accessories as recommended or supplied by railing manufacturer for installing structural glazing in metal subrails.

1. Glazing Cement: Nonshrinking organic cement designed for curing by passing an electric current through metal subrail holding glass panel, as standard with manufacturer.

F. Glazing Gaskets: Glazing gaskets and related accessories recommended or supplied by railing manufacturer for installing glass infill panels in post-supported railings.

G. Low Emitting Adhesives and Sealants

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

2.3 METAL FITTINGS

A. Rail Fittings

1. Material: Stainless-steel-clad aluminum.
2. Height:
   a. Top Rail: As indicated.
   b. Bottom Rail: As indicated.
3. Profile: As indicated.
4. End Caps: Manufacturer's standard precision-fit end caps for rail fittings.

B. Door Rail Systems: Provide door rail systems matching metal and finish of door fittings and rail fittings. Door rails shall allow for jamb adjustment in or out with standard hardware. System shall include, but not limited to, end caps, blocking, and preparation.

1. Profile: Square
2. Height: As indicated on drawings

2.4 PIVOT DOOR HARDWARE

A. General: Provide heavy-duty hardware units as indicated, scheduled or required for operation of each type of door, including the following items of sizes, numbers and type recommended by the manufacturer for the type of service required. Provide metal and finish for exposed parts to match the finish of the door rails.

B. Overhead Concealed Closer

1. Basis of Design: Provide C.R. Laurence Co.; 9100 Series Medium Duty extended spindle Overhead Concealed Door Closers and 9200 Series Heavy-Duty extended spindle or comparable product meeting all requirements.
2. Double acting to fit into 4-1/2" x 1-3/4" headers.
3. Secure to the center hung arm in the top door rail.
4. Provide top adjustable arm, bottom adjustable pivot and finished cover plate if required.
5. Comply with manufacturer’s recommendations for closer size, depending upon door size and anticipated frequency of use.

C. Panic Handles

1. Basis of Design: Provide C.R. Laurence Co.; PA100 or PA110
2. Description: interior operating panic handle in combination with exterior fixed pull handles designated by letters. Panic mechanism shall be concealed within stainless steel tubing. Entrance from exterior by a keyed cylinder.

2.5 FABRICATION

A. Factory assemble components and factory install hardware and fittings to greatest extent possible.

2.6 STAINLESS-STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

1. Run grain of directional finishes with long dimension of each piece.
2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
3. Directional Satin Finish: No. 4.

2.7 MISCELLANEOUS MATERIALS

A. Applied Decorative Film: Pressure sensitive vinyl film suitable for application to glass substrates.

1. Basis of Design Product: Provide 3M; Crystal Glass Finishes – Dusted (7725SE-314) or approved product meeting all requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Install all-glass systems and associated components according to manufacturer's written instructions.

B. Set units level, plumb, and true to line, with uniform joints.

C. Maintain uniform clearances between adjacent components.

D. Install joint sealants as specified in Division 07 Section "Joint Sealants".

END OF SECTION 08 41 26

SECTION 08 42 29.23 - SLIDING AUTOMATIC ENTRANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes exterior and interior, sliding, power-operated automatic entrances.

B. Related Requirements:

1. Section 08 71 13 "Automatic Door Operators" for automatic door operators furnished separately from doors and frames.

1.2 DEFINITIONS

A. AAADM: American Association of Automatic Door Manufacturers.

B. Activation Device: A control that, when actuated, sends an electrical signal to the door operator to open the door.

C. IBC: International Building Code.

D. Safety Device: A control that, to avoid injury, prevents a door from opening or closing.

E. For automatic door terminology, refer to BHMA A156.10 for definitions of terms.

1.3 COORDINATION

A. Coordinate sizes and locations of recesses in concrete floors for recessed sliding tracks that control automatic entrances. Concrete, reinforcement, and formwork requirements are specified elsewhere.

B. Templates: Distribute for doors, frames, and other work specified to be factory prepared for installing automatic entrances.

C. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish. Coordinate hardware for automatic entrances with hardware required for rest of Project.

D. Electrical System Roughing-in: Coordinate layout and installation of automatic entrances with connections to power supplies.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic entrances.

2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Adhesives and Sealants
3. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)

C. Shop Drawings: For automatic entrances.

1. Include plans, elevations, sections, hardware mounting heights, and attachment details.
2. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.
4. Indicate locations of activation and safety devices.
5. Include hardware schedule and indicate hardware types, functions, quantities, and locations.

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

1. Include Samples of hardware and accessories involving color or finish selection.

E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

F. Delegated-Design Submittal: For automatic entrances.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, manufacturer, and Certified Inspector.

B. Product Certificates: For each type of automatic entrance. Include emergency-exit features of automatic entrances serving as a required means of egress.

C. Product Test Reports: For each type of automatic entrance, for tests performed by a qualified testing agency.

D. Field quality-control reports.

E. Sample Warranties: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For automatic entrances, safety devices, and control systems to include in operation and maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer with company certificate issued by AAADM indicating that manufacturer has a Certified Inspector on staff.

B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation and maintenance of units required for this Project and who employs a Certified Inspector.

1. Maintenance Proximity: Not more than a 60-mile radius from Installer's place of business to Project site.

C. Certified Inspector Qualifications: Certified by AAADM.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of automatic entrances that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Structural failures including, but not limited to, excessive deflection.
   b. Faulty operation of operators, controls, and hardware.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
2. Warranty Period: Two years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer agrees to repair or replace components on which finishes fail in materials or workmanship within specified warranty period.

1. Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 AUTOMATIC ENTRANCE ASSEMBLIES

A. Source Limitations: Obtain sliding automatic entrances from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Power-Operated Door Standard: BHMA A156.10.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer to provide structural design of Automatic Sliding Entrance systems including details, shop drawings, and calculations complying with performance criteria.

B. Structural Performance: Automatic entrances shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Seismic Loads: As indicated on Drawings.
2. Wind Loads: As indicated on Drawings.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

D. Operating Temperature Range: Automatic entrances shall operate within minus 20 to plus 122 deg F.

E. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 1.25 cfm/sq. ft. of fixed entrance-system area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft..

F. Opening Force:

1. Power-Operated Doors: Not more than 50 lbf required to manually set door in motion if power fails, and not more than 15 lbf required to open door to minimum required width.
2. Breakaway Device for Power-Operated Doors: Not more than 50 lbf required for a breakaway door or panel to open.

G. Entrapment-Prevention Force:

1. Power-Operated Sliding Doors: Not more than 30 lbf required to prevent stopped door from closing.

2.3 SLIDING AUTOMATIC ENTRANCES

A. General: Provide manufacturer's standard automatic entrances including doors, sidelites, framing, headers, carrier assemblies, roller tracks, door operators, controls, and accessories required for a complete installation.

B. Sliding Automatic Entrance:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Biparting-Sliding Units:
      1) Besam Entrance Solutions; Subsidiary of ASSA ABLOY Entrance Systems.
      2) DORMA Automatics; Division of DORMA Group North America.
      3) Stanley Access Technologies, LLC; Division of Stanley Security Solutions.

2. Configuration: Biparting-sliding doors with two sliding leaves and sidelites where indicated.
   a. Traffic Pattern: Two way.
   b. Emergency Breakaway Capability: Sliding leaves and sidelites.
   c. Mounting: Between jambs.
3. Operator Features:
   a. Power opening and closing.
   b. Drive System: Chain or belt.
   c. Adjustable opening and closing speeds.
   d. Adjustable hold-open time between zero and 30 seconds.
   e. Obstruction recycle.
   f. On-off/hold-open switch to control electric power to operator, key operated.
4. Sliding-Door Carrier Assemblies and Overhead Roller Tracks: Carrier assembly that allows vertical adjustment; consisting of nylon- or delrin-covered, ball-bearing-center steel wheels operating on a continuous roller track, or ball-bearing-center steel wheels operating on a nylon- or delrin-covered, continuous roller track. Support doors from carrier assembly by cantilever and pivot assembly.
   a. Rollers: Minimum of two ball-bearing roller wheels and two antirise rollers for each active leaf.
5. Sliding-Door Threshold: Threshold members and bottom-guide-track system with stainless-steel, ball-bearing-center roller wheels.
   a. Configuration: No threshold across door opening and recessed guide-track system at sidelites.
6. Controls: Activation and safety devices according to BHMA standards.
   a. Activation Device: Motion sensor mounted on each side of door header to detect pedestrians in activating zone and to open door.
   b. Safety Device: Presence sensor mounted to underside of door header and two photoelectric beams mounted in sidelite jambs on one side of the door to detect pedestrians in presence zone and to prevent door from closing.
   c. Sidelite Safety Device: Presence sensor, mounted above each sidelite on side of door opening through which doors travel, to detect obstructions and to prevent door from opening.
   d. Opening-Width Control: Two-position switch that in the normal position allows sliding doors to travel to full opening width and in the alternate position reduces opening to a selected partial opening width.
7. Finish: Finish framing, door(s), and header with high-performance organic finish (two-coat fluoropolymer).
   a. Color: As selected by Architect from full range of industry colors and color densities.

2.4 ENTRANCE COMPONENTS

A. Framing Members: Extruded aluminum, minimum 0.125-inch-thick and reinforced as required to support imposed loads.
   1. Nominal Size: As indicated on Drawings.
   2. Extruded Glazing Stops and Applied Trim: Minimum 0.062-inch wall thickness.

B. Sidelite(s): 1-3/4-inch-deep sidelite(s) with minimum 0.125-inch-thick, extruded-aluminum tubular stile and rail members matching door design.

C. Headers: Fabricated from minimum 0.125-inch-thick extruded aluminum and extending full width of automatic entrance units to conceal door operators and controls. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.

1. Mounting: Concealed, with one side of header flush with framing.
2. Capacity: Capable of supporting doors up to 175 lb per leaf over spans up to 14 feet without intermediate supports.
    a. Provide sag rods for spans exceeding 14 feet.

D. Brackets and Reinforcements: High-strength aluminum with nonstaining, nonferrous shims for aligning system components.

E. Signage: As required by cited BHMA standard.

1. Application Process: Silk-screened.
2. Provide sign materials with instructions for field application after glazing is installed.

2.5 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Extrusions: ASTM B 221.
2. Sheet: ASTM B 209.

B. Steel Reinforcement: Reinforcement with corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Use surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.

C. Stainless-Steel Bars: ASTM A 276 or ASTM A 666, Type 304.

D. Stainless-Steel Tubing: ASTM A 554, Grade MT 304.

E. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304, stretcher-leveled standard of flatness, in entrance manufacturer's standard thickness.

F. Glazing: As specified in Section 08 80 00 "Glazing."

G. Sealants and Joint Fillers: As specified in Section 07 92 00 "Joint Sealants."

H. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout; complying with ASTM C 1107/C 1107M; containing no gypsum, of consistency suitable for application.

I. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

1. Apply in shop.

J. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.6 DOOR OPERATORS AND CONTROLS

A. General: Provide operators and controls, which include activation and safety devices, according to BHMA standards, for condition of exposure, and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.

B. Door Operators: Provide door operators of size recommended by manufacturer for door size, weight, and movement.

1. Door Operator Performance: Door operators shall open and close doors and maintain them in fully closed position when subjected to Project's design wind loads.
2. Electromechanical Operators: Concealed, self-contained, overhead unit powered by fractional-horsepower, permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor; with solid-state microprocessor controller; UL 325; and with manual operation with power off.

C. Motion Sensors: Self-contained, K-band-frequency, microwave-scanner units; fully enclosed by its plastic housing; adjustable to provide detection-field sizes and functions required by BHMA A156.10.

1. Provide capability for switching between bidirectional and unidirectional detection.
2. For one-way traffic, sensor on egress side shall not be active when doors are fully closed.

D. Presence Sensors: Self-contained, active-infrared scanner units; adjustable to provide detection-field sizes and functions required by BHMA A156.10. Sensors shall remain active at all times.

E. Photoelectric Beams: Pulsed infrared, sender-receiver assembly for recessed mounting. Beams shall not be active when doors are fully closed.

F. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

G. Door Position Sensors: Where required by the Access Control System, equip each operable panel, including breakaway sidelights, with high security surface mounted magnetic contacts.

1. Basis of Design Product: Provide Interlogix; 2707AD-L high security contacts with armored cable.

2.7 HARDWARE

A. General: Provide units in sizes and types recommended by automatic entrance and hardware manufacturers for entrances and uses indicated. Finish exposed parts to match door finish unless otherwise indicated.

B. Breakaway Device for Power-Operated Doors: Device that allows door to swing out in direction of egress to full 90 degrees from any operating position. Maximum force to open door shall be as stipulated in "Performance Requirements" Article. Interrupt powered operation of door operator while in breakaway mode.

C. Deadlocks: Deadbolt operated by exterior cylinder and interior thumb turn, with minimum 1-inch-long throw bolt; BHMA A156.5, Grade 1.

1. Cylinders: As specified in Section 08 71 00 "Door Hardware."
   a. Keying: Integrate into building master key system.

2.8 FABRICATION

A. General: Factory fabricate automatic entrance components to designs, sizes, and thicknesses indicated and to comply with indicated standards.

1. Form aluminum shapes before finishing.
2. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
3. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match framing, fabricated from stainless steel.
   a. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
   b. Reinforce members as required to receive fastener threads.
4. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

B. Framing: Provide automatic entrances as prefabricated assemblies. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site.

1. Fabricate tubular and channel frame assemblies with welded or mechanical joints. Provide subframes and reinforcement as required for a complete system to support required loads.
2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
3. Form profiles that are sharp, straight, and free of defects or deformations.
4. Provide components with concealed fasteners and anchor and connection devices.
5. Fabricate components with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
6. Fabricate exterior components to drain condensation and water passing joints within system to the exterior.

7. Provide anchorage and alignment brackets for concealed support of assembly from building structure.
8. Allow for thermal expansion of exterior units.

C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.

D. Door Operators: Factory fabricated and installed in headers, including adjusting and testing.

E. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated, according to GANA's "Glazing Manual."

F. Hardware: Factory install hardware to greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site. Cut, drill, and tap for factory-installed hardware before applying finishes.

1. Provide sliding-type weather stripping, mortised into door, at perimeter of doors.

G. Controls:

1. General: Factory install activation and safety devices in doors and headers as required by BHMA A156.10 for type of door and direction of travel.
2. Install photoelectric beams in vertical jambs of sidelites, with dimension above finished floor as follows:
   a. Top Beam: 48 inches.
   b. Bottom Beam: 24 inches.

2.9 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 ALUMINUM FINISHES

A. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of automatic entrances.

B. Examine roughing-in for electrical systems to verify actual locations of power connections before automatic entrance installation.

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

3.2 INSTALLATION

A. General: Install automatic entrances according to manufacturer's written instructions and cited BHMA standard for direction of pedestrian travel, including signage, controls, wiring, and connection to the building's power supply.

1. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
2. Where aluminum will contact dissimilar metals, protect against galvanic action by shop-painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
3. Where aluminum will contact concrete or masonry, protect against corrosion by shop-painting contact surfaces with bituminous coating.

B. Entrances: Install automatic entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.

1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
3. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within system to exterior.
4. Level recesses for recessed thresholds using nonshrink grout.

C. Door Operators: Connect door operators to electrical power distribution system.

D. Controls: Install and adjust activation and safety devices according to manufacturer's written instructions and cited BHMA standard for direction of pedestrian travel.

E. Glazing: Install glazing as specified in Section 08 80 00 "Glazing."

F. Sealants: Comply with requirements specified in Section 07 92 00 "Joint Sealants" to provide weathertight installation.

1. Set bottom-guide-track system, framing members and flashings in full sealant bed.

2. Seal perimeter of framing members with sealant.

G. Signage: Apply signage on both sides of each door as required by cited BHMA standard for direction of pedestrian travel.

H. Wiring within Automatic Entrance Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's written limitations on bending radii. Provide and use lacing bars and distribution spools.

3.3 FIELD QUALITY CONTROL

A. Certified Inspector: Engage a Certified Inspector to test and inspect components, assemblies, and installations, including connections.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Test and inspect each automatic entrance, using AAADM inspection forms, to determine compliance of installed systems with applicable BHMA standards.

C. Automatic entrances will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust hardware, moving parts, door operators, and controls to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.

B. Readjust door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).

C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.5 CLEANING

A. Clean glass and metal surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.

1. Comply with requirements in Section 08 80 00 "Glazing" for cleaning and maintaining glass.

3.6 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of automatic entrance Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for

proper automatic entrance operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

1. Engage a Certified Inspector to perform safety inspection after each adjustment or repair and at end of maintenance period. Furnish completed inspection reports to Owner.
2. Perform maintenance, including emergency callback service, during normal working hours.
3. Include 24-hour-per-day, 7-day-per-week, emergency callback service.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic entrances.

END OF SECTION 08 42 29.23

SECTION 08 44 13 - GLAZED CURTAIN WALLS AND SKYLIGHTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Provide labor, materials, equipment and related items for work of this Section. Provide listed items, and those not specifically mentioned but necessary for a complete installation.

1. Extruded aluminum frames for exterior curtain walls, punched windows and skylights.
2. Extruded aluminum interior trim for curtain walls and punched windows.
3. Glass and glazing for systems provided under this Section.
4. Aluminum sheet panels and parapet caps.
5. Anchorage to building structure, including bracing of primary building structure if required for support of forces applied by work of this Section, and patching of fireproofing at anchors.
6. Sealants within work of this Section and at boundaries with work of other sections.
7. Thermal insulation at spandrel glass and other opaque materials within work of this Section.
8. Safing insulation and smoke seal at floor and roof edges, at work within this Section.
9. NFRC certification of all transparent glazing systems supplied under this Section.
10. Preconstruction testing.
11. ~~Three~~ Four performance mock-ups.
12. Visual mock-ups.
13. Source quality control testing.
14. Field quality control testing.
15. Florida Product Approval: systems specified in this Section, and specific products listed in this Section, are acceptable contingent on their having current Florida Product Approval, and their conformance to specified requirements.

B. Coordinate with work of other sections.

1. Section 01 25 00 Substitution Procedures.
2. Section 01 43 39 Visual Mock-up Requirements.

3. Section 01 74 19 LEED V4 Construction Waste Management and Disposal.
4. Section 01 74 23 Final Cleaning.
5. Section 01 81 13.14 Sustainable Design Requirements – LEED V4 BD+C.
6. Section 07 95 13.16 Exterior Expansion Joint Cover Assemblies.
7. Section 07 42 13.23 Metal Composite Material Wall Panels.
8. Section 08 41 13 Aluminum-Framed Entrances and Storefronts.
9. Section 08 42 29.23 Sliding Automatic Entrances.
10. Section 08 71 13 Automatic Door Operators.
11. Section 08 80 00 Glazing.

1.3 REFERENCES

A. Except as otherwise specified, comply with listed references. Where the building code incorporates a different edition of a reference, the building code governs.

B. Aluminum Association
   1. Aluminum Design Manual 2010.
   2. Aluminum Standards and Data 2013.

C. American Institute of Steel Construction (AISC): Specification for Structural Steel Buildings ANSI/AISC 360-10.

D. American Iron and Steel Institute (AISI), S100-2007 North American Specification for the Design of Cold-Formed Steel Structural Members.

E. American Society of Civil Engineers (ASCE)
   1. ANSI/ASCE 8-02 Specification for the Design of Cold-Formed Stainless Steel Structural Members.
   2. ASCE/SEI 7-10 Minimum Design Loads for Buildings and Other Structures.

F. American Welding Society (AWS) D1.1/D1.1M-04 Structural Welding Code--Steel.

G. American Concrete Institute (ACI) 318-11 Building Code Requirements for Structural Concrete.

H. American National Standards Institute (ANSI) Z97.1-2009 Safety Glazing Material Used in Buildings-Safety Performance Specifications and Methods of Test.

I. Glass Association of North America (GANA) Glazing Manual 2008.

J. United States General Services Administration TT-P-645B 1990 Primer, Paint, Zinc-Molybdate, Alkyd Type.

K. American Architectural Manufacturers Association (AAMA)
   1. AAMA 501.1-05 Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure.
   2. AAMA 2603-15 Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

3. AAMA 2605-13 Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
4. AAMA TIR A9-14 Metal Curtain Wall Fasteners.

L. ASTM International

1. A36/A36M-08 Standard Specification for Carbon Structural Steel.
2. A123/A123M-15 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. A500/A500M-13 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
4. A501/A501M-14 Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
5. A653/A653M-08 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
6. B449-93(2015) Standard Specification for Chromates on Aluminum.
7. C509-00 Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.
8. C794-01 Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
9. C864-05 Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
10. C1036-01 Standard Specification for Flat Glass.
11. C1048-97b Standard Specification for Heat-Treated Glass--Kind HS, Kind FT Coated and Uncoated Glass.
12. C1087-00(2011) Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems.
13. C1115-00 Standard Specification for Dense Elastomeric Silicone Rubber Gaskets and Accessories.
14. C1172-14 Standard Specification for Laminated Architectural Flat Glass.
15. C1248-08(2012) Test Method for Staining of Porous Substrate by Joint Sealants.
16. C1376-15 Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
17. C1401-14 Standard Guide for Structural Sealant Glazing.
18. C1521-13 Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.
19. D2244-15a Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.

20. D4214-07(2015) Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
21. E283-04 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
22. E330-02 Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
23. E331-00(2009) Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
24. E783-02(2010) Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
25. E1105-15 Standard Test Method for Field Determination of Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference.
26. E1300-04e1 Standard Practice for Determining Load Resistance of Glass in Buildings.
27. E2188-10 Standard Test Method for Insulating Glass Unit Performance.
28. E2189-10e1 Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units.
29. E2190-10 Standard Specification for Insulating Glass Unit Performance and Evaluation.
30. E2203-02 Standard Specification for Dense Thermoplastic Elastomers Used for Compression Seals, Gaskets, Setting Blocks, Spacers and Accessories.

M. International Firestop Council: Recommended IFC Guidelines for Evaluating Firestop Systems Engineering Judgments (EJ's), February 2007.

N. Insulating Glass Certification Council (IGCC) Certified Products Directory February 2016.

O. National Fenestration Rating Council (NFRC)
1. ANSI/NFRC 100-2014 Procedure for Determining Fenestration Product U-Factors.
2. ANSI/NFRC 200-2014 Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

P. Comply with the referenced codes, or where required by this Section exceed the codes. Nothing in this Section shall be construed as allowing or requiring noncompliance with codes.
1. 2014 Florida Building Code.
2. 2014 Florida Energy Conservation Code.
3. 2016 Code of the City of Orlando, Florida, amendments to the 2014 Florida Building Code.

1.4 SYSTEM DESIGN AND PERFORMANCE

A. Contract Documents define design intent and performance requirements. Details show preferred profiles. Provide final design.

B. Unless otherwise defined by Contract Documents, appearance of exposed elements, including width and depth, shall be consistent throughout project.

C. Unless otherwise defined by Contract Documents, overall thickness of each glass type, and component thicknesses of multiple layer glass types, shall be consistent throughout project.

D. Provide anchor adjustment capability for full range of specified tolerances for building structure. Minimum required adjustment is 0.5 inch (12.7 mm) in all directions at connections to wind girts, and one inch (25.4 mm) in all directions at all other locations.

E. Provide internal gutters and weep system to collect and drain water leakage and condensation to the exterior. Coordinate gutter and weep systems with other sections.

1. Unitized curtain walls shall have continuous spliced gutters at horizontal stack joints, with sealed end caps at termination conditions. Provide two continuous lines of weatherstrips at entire perimeter of each unit, in the planes of the outboard and inboard boundaries of stack gutters.

2. Stick built curtain walls and punched windows shall have an isolated gutter cavity at each glass perimeter, so that leakage is confined to and weeped from the opening of leakage origin.

3. Curtain walls that have two-piece interlocking vertical mullions shall have continuous subsills at starter conditions that collect and drain water to the outdoor side.

4. At skylights, provide internal gutters for control of water leakage. Provide continuous condensation gutters at glass perimeters. Condensation gutter intersections shall have sealed overlaps. Gutters shall convey water leakage and condensation to lowest point and drain water to exterior.

F. Glazing details shall permit glass replacement after initial construction, shall permit reuse of original gaskets, shall permit replacement glass of same nominal size as original glass, and shall not require cutting of framing members or removal of interior finishes. Vision glass in conventional frames shall be replaceable from interior. Spandrel glass shall be replaceable from exterior. Silicone supported vision glass shall be replaceable from exterior and/or interior.

G. Requirements of this Section apply equally to performance mock-ups, test specimens, and actual building. Variations in criteria over the surface of building, such as wind pressure, are taken into account in testing requirements. Test parameters and pass/fail criteria required for specific test conditions of mock-ups and specimens also apply to the actual building, without reduction or adjustment, for specified conditions and for equivalent conditions of equal or lesser severity.

1.5 MOVEMENTS

A. Net joint size is nominal joint size plus and minus fabrication tolerance and field tolerance. Assumed combined fabrication and field tolerance for joint design shall not be less than 0.1875 inch (4.8 mm). Provide movement joints with net sizes that allow for specified movements due to temperature change, story drift, and building structure live load deflection without exceeding movement capacities of joints or materials that seal them. Design for full values of all movements occurring simultaneously. No reductions shall be applied to individual movements or to combinations of movements.

B. Joint Movement Capacities

1. Sealant capacity in tension and compression shall be values published by the manufacturer, but not more than 50 percent of net joint size. Sealant capacity in shear shall be the value published by the manufacturer, but not more than 100 percent of net joint size.

2. A stack is a horizontal composed of interlocking frames. Stack closing capacity is the amount of movement relative to net joint size that would cause the frames to be in contact.

3. Stack opening capacity is maximum amount of movement relative to net joint size that maintains weather seals and structural integrity. Opening capacity shall be based on at least 0.375 inch (9.5 mm) overlap of metal parts after movement has occurred.

4. Where movements reduce joint size, movement capacity is (a) sealant capacity, (b) stack closing capacity or (c) the smaller value if both are applicable.

5. Where movements increase joint size, movement capacity is (a) sealant capacity, (b) stack opening capacity, or (c) the smaller value if both are applicable.

6. Where movements affect glass bite and edge clearance, bite shall not be less than 0.375 inch (9.5 mm) and edge clearance shall not be less than 0.25 inch (6.4 mm) after movement has occurred. Requirements for nominal bite are in Part 3 of this Section.

C. Thermal component of joint movement shall be based on minimum material temperature increase of 100 Fahrenheit degrees (55.6 Centigrade degrees) and decrease of 70 Fahrenheit degrees (38.9 Centigrade degrees) relative to nominal condition. Assume entire cross section of framing member has uniform temperature. Assume temperature of supporting structure does not change.

D. Story Drift

1. Design story drift is H/400 for airside and landside.

2. At the GTF pedestrian bridge, north/south drift between pedestrian bridge level and roof is 0.7 inch. East/west drift is negligible.

~~1.~~3. At the GTF within grids T5 to T8 and N1 to N4, drift between pedestrian bridge level and roof is 0.5 inch.

~~2.~~4. Cladding shall be designed for floor-to-floor relative displacement in any direction equal to story drift, except for GTF pedestrian bridge where drift is north/south only.

~~3.~~5. At any floor, design story drift shall be assumed to occur while floors immediately above and below are not displaced. For design story drift, glass shall not crack. Glass or other materials shall not fall to the indoor or outdoor side. There shall be no failure of, or damage to, framing members, anchors or non-glass infill materials. No structural component, trim component, or elastomeric gasket shall disengage, partially or completely. Weather sealants and structural sealants shall not fail adhesively or cohesively.

E. Structure Vertical Deflection

1. At airside and landside clerestories below the Boulevard skylight, design curtain wall top connection for 2.0 inches up and down structure movement. At the base of clerestory curtain walls, structure movement is 0.5 inch up and down, except 1.25 inch up and down between grid lines L13 and L15.
2. Airside design differential structure vertical deflection between successive floors, and between floor and roof, is L/360, not to exceed 0.5 inch.
3. Landside Structure Vertical Deflection
   a. At north and south elevations between grids L11 and L12, and between grids L16 and L17, design differential structure vertical deflection between successive floors is 0.5 inch. Design top connection at roof for 1.5 inch up and down structure movement.
   b. For punched windows at north and south elevations, support weight of windows on steel stud frames, not on beams or floor edges. Design vertical movement of steel stud frames is 3.0 inches downward relative to floor edges. Design vertical movement of steel stud frames is 2.0 inches downward and 3.0 inches upward relative to roof edges.
   c. At the east elevation along grid 17, design differential structure vertical deflection is 0.5 inch. Design top connection at roof for 1.5 inch up and down structure movement.
   d. At curtain walls that are parallel to grids N1 and S1, between grids L17 and L18, design differential structure vertical deflection between successive floors is 0.5 inch. Design top connection at Boulevard skylight for 2.0 inches up and down structure movement.
   e. At the sloping Prow curtain wall, design differential structure vertical deflection between successive floors is 0.5 inch. Design top connection at Boulevard skylight for 2.0 inches up and down structure movement.
   f. At landside west elevation between grids N1 and S1, design differential structure vertical deflection is 0.5 inch. Design top connection at Boulevard skylight for 2.0 inches up and down structure movement.
   g. At vestibule curtain walls, design differential structure vertical deflection is zero.

4. GTF Structure Vertical Deflection

a. Live load deflection of pedestrian bridge level beams at grids N1 and S1 is 0.4 inch.

b. Live load deflection of pedestrian bridge roof beams at grids N1 and S1 is 0.5 inch.

~~g.~~c. Live load deflection of floor and roof edges at west elevation along grid T5, between grids N1 and N4, is 0.4 inch.

~~4.~~5. Deflection at a given floor or roof shall be assumed to occur while floors immediately above and/or below do not deflect.

~~5.~~6. Cladding shall be designed so that movement due to structure vertical deflection, plus curtain wall thermal movement and tolerances, does not exceed joint movement capacities defined in this Section.

F. Wind Girt Deflections

1. At steel stud frames, wind girt deflection is L/360 inward and outward for design wind pressures.
2. At curtain walls, wind girt deflection is L/240 inward and outward for design wind pressures.
3. Wind girt vertical deflection is 1.0 inch up and down.

1.6 THERMAL PERFORMANCE

A. Winter Design Conditions: For conditions listed below, condensation formation on indoor surfaces (including surfaces covered by insulation) is acceptable only if resulting water would be contained and drained to exterior without wetting insulation, and without wetting indoor surfaces visible to building occupants.

1. Night
2. Outdoor air temperature: 32 °F (0.0 °C).
3. Wind speed 12.3 mph (5.5 m/s).
4. Indoor air temperature: 70 °F (21.1 °C).
5. Indoor relative humidity: 60 percent (50 percent nominal plus 10 percent tolerance).

B. U-Values

1. Overall U-factors for walls based on an area-weighted analysis shall not exceed values in the Energy Model Report for transparent and opaque areas.
2. Overall U-factors for skylights based on an area-weighted analysis shall not exceed values in the Energy Model Report.
3. Determine U-factors with THERM software for winter design conditions specified in this Section. Use glass and metal areas that apply to this project, not the model sizes of NFRC 100. U-factors determined in this way will not match the values determined for NFRC certification.

C. Solar Heat Gain Coefficients shall not exceed values in the Energy Model Report for walls and skylights.

D. Surface Temperature and U-factor Determination by Analysis

1. Submit surface temperature and dew point analysis performed with THERM software, showing compliance with specified thermal performance. Analytical models shall include adjacent materials, including metal and concrete, regardless of whether those materials are included in this Section. Exterior film coefficient shall be 4.579 Btu/h ft^2 F, and the radiation model shall be set to Black Body Radiation. Interior film coefficient (convection only) shall be 0.579 Btu/h ft^2 F, and the radiation model shall be set to Automatic Enclosure Model. For sloped glazing, comply with instructions for skylights in the THERM NFRC Simulation Manual. Identify temperatures for all surfaces, not just surfaces exposed to view. Analyze all details, by direct analysis or by comparison to representative details for which analysis is submitted. Required data includes:

a. Identification of dew point temperature for specified indoor air temperature and indoor relative humidity.

b. Color infrared plot with color legend.

c. Isothermal plot with maximum temperature set at dew point.

d. Locations of, and values for, coldest indoor surface temperatures at glass, metal, gaskets, sealants.

e. Tabulation identifying solid materials, conductivities and emissivities.

f. Tabulation identifying cavity dimensions, temperatures and emissivities.

g. Tabulation identifying boundary condition temperatures and film coefficients.

h. Tabulation of all shop drawing details, listing each detail that is analyzed correlated with other details whose performance is implied by comparison to the analyzed detail.

i. Computation of overall U-factors based on area-weighted averages of THERM U-factor results.

E. Outdoor Surface Temperatures: For a surface temperature range of 32 ºF (0.0 °C) to 160 °F (71 °C), there shall be no failure as defined under "WARRANTY" in this Section.

1.7 NFRC CERTIFICATION

A. Obtain NFRC Certification for transparent areas of all glazed systems supplied under this Section, using the “certified product” option or the “certified project” option.

B. Certification shall include ratings for U-factor, Solar Heat Gain Coefficient, and Visible Transmittance.

C. Certification shall include ratings for Air Leakage and Condensation Resistance.

D. Submit Certification Label Certificate for each certified system.

1.8 AIR AND WATER LEAKAGE

A. Air leakage test shall conform to ASTM E283 (laboratory) and ASTM E783 (field), modified to include measurement of exfiltration. Differential static test pressure shall be 6.24 PSF (299 Pa). Air infiltration and exfiltration of fixed wall area shall not exceed 0.06 CFM/ft^2 (1.10 m^3/hr-m^2) of projected exterior surface.

B. Water Leakage

1. Condensation is acceptable during water leakage tests. Water leakage is acceptable only if all of the following conditions are satisfied: (a) water is contained and drained to exterior; (b) there is no wetting of a surface that would be visible to building occupants; (c) there would be no staining or other damage to completed building or its furnishings. This definition of water leakage governs over other definitions in referenced documents.

2. Static water leakage test shall conform to ASTM E331 (laboratory) and ASTM E1105 Procedure A (field). Differential test pressure shall be 12 PSF (574 Pa). There shall be no unacceptable water leakage as defined in this Section.

3. Dynamic water leakage test shall conform to AAMA 501.1 except as otherwise specified in this Section. Differential test pressure shall be 12 PSF (574 Pa). There shall be no unacceptable water leakage as defined in this Section.

4. Completed portions of the building are required to pass chamber tests and hose tests as specified in Part 3 of this Section. There shall be no unacceptable leakage as defined in this Section.

1.9 LOADS

A. Wind Pressures

1. Cladding design wind pressures as determined by wind tunnel tests are shown on Drawings. Except as specified in this Section, these pressures shall not be reduced for any reason.

2. For surfaces not addressed by wind tunnel study, wind pressures shall be to ASCE/SEI 7-10, Chapter 30, Part 3: Buildings With h>60 ft. using the data below, but not less than values required by Structural Drawings.

a. Basic wind speed: 150 mph (67.0 m/sec).

b. Risk category: III.

c. Exposure category: C.

d. Directionality factor: 1.0.

e. Internal pressure coefficient: plus and minus 0.18.

f. Width of Landside wall zone 5: to Code, but not less than 60 feet.

g. Width of Airside wall zone 5: to Code, but not less than 12 feet.

~~g.~~ h. Width of GTF wall zone 5: to Code, but not less than 8 feet.

~~h.~~ i. Width of roof zones 2 and 3 at skylights: to Code, but not less than 8 feet.

i.j. Landside building height to Code, but not less than: areas 1 to 4 and 9 to 12, 105 feet; areas 5 to 8, 125 feet.

k. Airside building height to Code, but not less than: areas 14 to17, 24 and 25, 115 feet; areas 13, 18 to 23, and 26 to 33, 72 feet.

j.l. GTF building height to Code, but not less than 75 feet.

3. Lateral wind pressures on vertical fins and fork extrusions are shown in the wind tunnel report. Pressures on fins and fork extrusions occur simultaneously with pressures on adjacent wall surfaces. Do not reduce simultaneous pressures.

4. Design wind pressures for computation of deflections are 1.0 times ASD pressures. Except as specified in this Section, do not reduce pressures for computation of deflections for any reason, even if such a reduction is permitted by code.

5. Wind pressures act perpendicular to flat surfaces, regardless of surface orientation. Wind pressures act perpendicular to tangents of curved surfaces.

6. For framing at corners and at other edges formed by intersecting planes that supports load from both faces, design for three cases.

   a. Apply 85 percent of outward pressures at both faces simultaneously.

   b. Apply 95 percent of inward pressures at both faces simultaneously.

   c. Apply 75 percent of outward pressure (and separately inward pressure) on one face simultaneously with 75 percent of inward pressure (and separately outward pressure) on the other face.

   d. These reductions do not apply to glass, and do not apply to near-edge framing that supports load only from one face.

7. Air-permeable cladding has an outer surface with unsealed joints, open joints or openings that permit air flow, and an inner surface that is sealed against air flow. Both surfaces shall be designed for full design wind pressures.

B. Seismic Loads: Design of cladding for seismic loads is not required.

C. Concentrated Load: 200 pounds on skylight frames.

D. System shall be designed to support its own weight in combination with other specified pressures and loads.

E. Load combinations shall comply with the more stringent of code and ASCE/SEI 7.

1.10 STRUCTURAL CRITERIA

A. At pressures and loads from zero to 150 percent of design values:

1. Framing member residual deflection after pressure or load is removed shall not exceed 1/1000 times distance between supports or 2/1000 times cantilever length.

2. At anchors, framing member deflection relative to building structure shall not exceed 0.187 inch (4.7 mm), nor 0.125 inch (3.2 mm) after pressure or load is removed.

3. Upon reversal of pressure or load direction, relative movement between two components that are fastened or clamped together shall not exceed 0.187 inch (4.7 mm).
4. There shall be no disengagement, failure or gross permanent distortion of any component, including glass and gaskets.

B. At 50 percent of design pressures, glass maximum deflection relative to supported glass edges shall not exceed one inch (25.4 mm).

C. At 100 percent of design pressures and loads:
1. Net deflection perpendicular to enclosure surface for framing members shall not exceed: within one glass opening, 1/175 times length of glass edge, not to exceed 0.75 inch (19mm); 1/175 times distance between supports for spans less than 162 inches (4115 mm); 1/240 times distance between supports plus 0.25 inch (6.35 mm) for spans exceeding 162 inches; 2/175 times cantilever length, not to exceed 0.375 inch (9.5 mm).
2. Net deflection of framing members parallel to enclosure surface shall not exceed smaller of: 0.125 inch (3.2 mm) due to dead load; 1/360 times distance between supports, not to exceed 0.375 inch (9.5 mm) for wind and seismic load (includes vertical members at corners).
3. Net deflection parallel and perpendicular to enclosure surface for framing members at perimeter sealant joints shall not exceed smallest of: values specified above; 50 percent of nominal joint width, regardless of whether sealant is in tension, compression or shear; movement capacity of sealant.
4. Maximum deflection of a metal panel, with or without stiffeners, shall not exceed 0.01 times the shorter panel dimension.
5. Interior window sill trim shall not deflect more than 0.125 inch (3.2 mm) when subjected to a concentrated force of 25 pounds (111 N) at any point. Residual deflection after force is removed shall not exceed 0.062 inch (1.6 mm).

1.11 STRUCTURAL DESIGN METHOD

A. Except as otherwise specified, allowable stress design (ASD) and load and resistance factor design (LRFD) are acceptable.

B. For allowable stress design, allowable stress shall not be increased by 1/3 or any other value for individual loads or load combinations, regardless of whether such an increase is permitted by code or other references.

C. Allowable stress design (ASD) shall be used for structural silicone.

1.12 COMPONENT DESIGN AND PERFORMANCE

A. Framing Members
1. Glass, sealants and interior finishes shall not be assumed to contribute to framing member strength, stiffness or lateral stability.
2. Compression flanges of flexural members shall be assumed to receive effective lateral bracing only from (a) anchors to building structure and (b) intersecting

members that restrain the compression flange against lateral movement or twisting. Points of contraflexure shall not be regarded as lateral braces or as end points of an unbraced length; unbraced length shall be the distance between effective lateral braces.

3. Only true tubes shall be analyzed as tubes for determination of allowable stress (ASD) or factored limit state stress (LRFD). True tubes have a continuous boundary of solid metal (no joints) enclosing a hollow cavity.
4. Flexural strength for lateral-torsional buckling of an individual open (non-tubular) shape, or two or more open shapes that are constrained between brace points to deflect and rotate together, may be determined by the Direct Strength Method using finite strip analysis with the material specifications in Part 1 of this Section. Determine critical stress with CUFSM software. For multiple shapes, determine moment and stress in each shape based on relative flexural stiffness of additive (not composite) sections. Determine separate critical stresses for front and back flanges in compression. Multiple open shapes that are not constrained to move together shall be designed as independent beams.
5. Where a framing member reaction is resisted by a continuous element, maximum assumed effective length of resisting element shall be four times the bearing length, but not more than one foot (305 mm).
6. Splice joints that permit movement shall be assumed to have zero moment capacity.
7. Where a framing member runs continuously past a deflecting support, combined deflection of member and support shall not exceed specified limits.
8. Thermal breaks shall be assumed to have no ability to transfer shear stress for composite action of flexural members. Elements joined by a thermal break shall be assumed to act separately.

B. Fasteners

1. General Requirements
    a. Tension shall be taken as sum of direct tension plus tension due to prying.
    b. Allowable shear shall be reduced for a fastener with nominal diameter “d” that is not slip-critical, is loaded in shear (with or without tension), and passes through a shim stack or other filler with total thickness “t.” For nominal diameter less than 0.25 inch, minimum reduction shall be zero percent for t=d, varying linearly to 100 percent for t=2d. For nominal diameter 0.25 inch or greater, minimum reduction shall be 15 percent for t=0.25, varying linearly to 100 percent for t=2d. Such reduction shall be in addition to other applicable reductions. An acceptable alternative method is to assume that shims provide no resistance to fastener bending, compute fastener bending stress with cross sectional properties based on root diameter, add bending stress to tension stress, and evaluate tension/shear interaction. Allowable stress for bending shall be the same as allowable stress for tension.

c. Unless otherwise specified, combined tension and shear shall be evaluated according to an interaction formula in which each term equals the square of actual force divided by the square of allowable force. Sum of terms shall not exceed 1.0.

2. Steel Bolts and Screws

a. For allowable stress design, capacities of carbon steel and stainless steel bolts and screws shall be based on the more stringent of code and AAMA TIR-A9 Metal Curtain Wall Fasteners.

b. For stainless steel fasteners, design shall be based on yield stress of 30 ksi (207 N/mm^2) and ultimate tensile stress of 75 ksi (517 N/mm^2). Approval to use greater strength may be requested by submitting manufacturer's data sheets and certifications.

3. Cast-in and Post-Installed Anchors in Concrete and Concrete Masonry Units

a. For evaluation of anchor capacity, comply with the most stringent of: ACI 318; ICC-ES Report; manufacturer design rules. It is acceptable to determine anchor capacity with software provided by the manufacturer. Assume cracked concrete.

b. Products that self-drill are not acceptable. Screws in plugs and powder actuated fasteners are not acceptable. Acceptable products that self-thread are identified in Part 2 of this Section.

4. Aluminum fastener capacities shall comply with Aluminum Design Manual.

C. Weatherproofing sealants shall not experience adhesive or cohesive failure. Sealants shall withstand movements up to the limits prescribed by manufacturers. Exposed sealant surface shall not crack or bubble. Sealant and primers shall not stain adjacent materials. Sealants shall be used only if manufacturers' adhesion, compatibility and stain tests yield favorable results. Sealants shall not be placed against edge of laminated glass interlayer.

D. Structural Silicone

1. Wind pressure shall be supported in tension or shear, but not tension and shear simultaneously.

2. Stress in structural silicone due to dead load shall not exceed 1.0 psi (6.89 kPa).

3. Stress in structural silicone due to all loads shall not exceed 20 psi (0.138 MPa) at design pressures and loads. There shall be no load reduction for load combinations.

4. Structural silicone shall not be applied to edges of insulating glass or to edges of laminated glass.

5. A glass or panel unit shall not be attached by structural silicone on both sides of a movement joint.

6. Ultimate tensile strength of structural silicone and the substrates to which it adheres for static loading at 160 degrees F (71 degrees C) shall be at least 60 psi (0.414 MPa).

7. Where a mock-up is tested to 1.5 times design pressures and loads, structural silicone and related structural components shall not fail.
8. On the building, structural silicone shall not experience adhesive or cohesive failure.
9. If structural silicone products other than those specified are proposed, perform preconstruction testing as required by this Section.

E. Glass

1. Wind pressure shall be treated as short duration load, and gravity loads shall be treated as long duration load, as defined by ASTM E1300.
2. Probability of glass breakage upon first application of design pressures shall not exceed 8/1000 for vertical glass, and 1/1000 for sloped and horizontal glass. Glass strength shall comply with code and ASTM E1300.
3. Provide heat treated glass. Annealed glass is not acceptable.
4. Where insulating glass is supported by structural silicone, tensile stress at narrowest point of secondary seal shall not exceed 20 psi (0.138 MPa) at design pressure. If secondary seal products other than those specified are proposed, perform preconstruction testing as required in this Section. Glass lamination, coating and ceramic frit shall withstand specified design and test pressures without failure.
5. Glass provided for performance mock-ups shall be identical (including strength) to glass provided for corresponding zone on building. Mock-up glass is required to support up to 1.5 times design pressures without breakage. It is recognized that any one glass plate can break at any pressure. A limited amount of breakage of mock-up glass is acceptable, provided that replacement glass with the same nominal strength eventually passes all tests. If glass in a specific mock-up opening breaks twice during attempts to complete one test, or 3 times for any combination of tests, the mock-up fails, redesign of the framing and/or glazing system is required, and testing must be repeated from the beginning of the test sequence.
6. Insulating glass shall be qualified to ASTM E2190.
7. Insulating glass in vision and spandrel areas shall not experience fogging, wetting or staining within the sealed space, spacer corrosion, spacer migration, adhesive or cohesive failure of primary or secondary edge seal.
8. Insulating glass shall not experience decrease in the air space dimension due to chemical reaction of desiccant with entrapped air.
9. Glass lamination shall not delaminate, stain or discolor.
10. Glass coating shall not crack, peel, stain or discolor.
11. Glass shall not experience spontaneous breakage.
12. Glass maximum deflection relative to supported edges at 50 percent of specified design pressures shall not exceed one inch. Glass deflection at 1.5 times design pressures shall be limited to prevent disengagement from frame.

13. Spandrel glass opacifier shall not crack, peel, wrinkle, delaminate, stain or discolor.

F. Snap-engaged components shall be secured against migration, and shall not serve any structural function, such as retention of glass or panels. Joints in continuous snap covers and other continuous trim shall have splice sleeves of same material and finish as cover or trim. Snap-engaged metal components shall not disengage when subjected to a concentrated force of 10 pounds (44.5 N) or during mock-up structural tests. Snap-engaged plastic components are not permitted, except as nonstructural thermal improvement for interior trim.

G. Fins and Fork Extrusions: Fins and fork extrusions that project to the outdoor side of vertical mullions may have snap engagements, but must be fastened with screws to prevent vertical migration and disengagement. The attachments shall allow removal and reinstallation of the extrusions without causing damage.

H. Skylights

1. Provide internal gutters for control of water leakage. Provide continuous condensation gutters at glass perimeters. Condensation gutter intersections shall have sealed overlaps. Gutters shall convey water leakage and condensation to lowest point and drain water to exterior.
2. Provide continuous bearing of exterior glass retainers on rafters and cross bars.
3. Provide continuous recessed pockets for wet seals at glass perimeters.
4. Structural silicone shall adhere to glass indoor surface, not to glass edge.

I. Thermal Breaks

1. Dead load of glass and panels shall not be carried through thermal breaks.
2. Pour-and-debridge thermal breaks in sill or gutter shall be capped with sealant, including six inch (15.2 cm) vertical sealant return at jambs.
3. Thermal breaks shall not split, crack or fracture. Thermal breaks shall not experience shrinkage or other deformation to the extent that frames are distorted or water leakage occurs. Extruded aluminum frames with integral thermal breaks shall conform to specified tolerances for one-piece aluminum extrusions.

1.13 PRECONSTRUCTION TESTING

A. Structural Silicone and Insulating Glass Secondary Seal

1. If structural silicone products or insulating glass secondary seal products other than those specified are proposed, perform tensile tests. Provide test specimens and pay laboratory fees. Pay fees and expenses for one observer to witness tests. Prior to scheduling tests, submit technical data for proposed silicones and request approval to proceed with tests.
    a. Specimens shall consist of a single line of silicone with dimensions 2.0x0.5x0.5 inch bonded to two glass rectangles. Proposed spacer material shall be in contact with one 2.0x0.5 inch surface. Fully cure specimens at room temperature. Immerse specimens in water for 7 days.

b. Test minimum of 3 specimens each at 75 +/- 5 degrees F (24 +/- 3 degrees C) and 160 +/- 5 degrees F (71 +/- 3 degrees C). Increase tensile stress in silicone to 60 psi (0.414 MPa) in one minute or less. Maintain 60 psi for minimum of one minute.

c. Specimens shall not experience adhesive or cohesive failure, partial or total. All specimens must pass.

d. Submit laboratory report for approval.

B. Adhesion, Compatibility and Stain Tests

1. Provide to sealant manufacturers samples of all substrates that are in contact with sealant, regardless of whether adhesion must be achieved.

2. For substrates that must support adhesion, submit for record sealant manufacturers' reports of adhesion tests conducted in accordance with ASTM C794. Report shall specifically acknowledge suitability for structural silicone application where applicable.

3. For substrates that are in contact with sealant, submit for record sealant manufacturers' reports of compatibility tests for sealants and primers conducted in accordance with ASTM C1087.

4. For concrete, masonry and other porous materials submit for record sealant manufacturers' reports of stain test performed in accordance with ASTM C1248.

C. Spandrel Shadow Box

1. Spandrel shadow box assembly shall demonstrate by test that appearance is not affected by formation of residue on indoor glass surface.

2. Construct two identical test specimens, each consisting of a full size spandrel glass unit in its aluminum frame, mounted in a test chamber with the same back-up materials intended for the building. Glass, glazing materials, aluminum finish, insulation, backup material, and backup finish shall be identical to production material, except that glass shall be uncoated. Store one specimen indoors; this is the control. Subject the second specimen to a cycled test.

3. Test shall consist of alternate heating and cooling. Mount thermocouples on center of outdoor glass surface, at center of air space midway between glass and backup, and on center of back-up surface. Heat source shall be infrared lamps mounted on a rack in a rectangular grid. With specimen and light rack standing vertically and parallel to each other, turn on lamps and adjust distance to specimen so that air space temperature stabilizes at 200 degrees F plus or minus 10 degrees F (93 degrees C plus or minus 6 degrees C). Maintain stabilized temperature for minimum one hour. Record thermocouple readings. Turn lamps off and allow specimen to cool until glass temperature is 80 degrees F (27 degrees C) or cooler. Record thermocouple readings. Turn lamps on and repeat for 300 cycles. Examine specimen at 50 cycle intervals and record any residue on indoor glass surface or change in outdoor appearance. At 100 cycle intervals, photograph specimen and control side by side, indoors with artificial light and outdoors with sunlight. After 300 cycles, remove specimens from

chamber; record and photograph any residue on indoor glass surface or on aluminum frame.

4. The specimen passes only if there is no visible change in outdoor appearance and no residue forms on the indoor glass surface. If specimen fails, revise glass type and/or spandrel details and retest.

1.14 INFORMATIONAL SUBMITTALS: Provide the following submittals for information only. Promptly provide additional information and clarifications upon request.

A. Provide scope drawings with bid packages. Quality and content of scope drawings shall be same as required for shop drawing submittals. Scope drawings shall include partial elevations, partial plans, wall sections, and details listed below.

1. Curtain wall and punched window mullions at vision and spandrel, typical, inside corner, outside corner, and jamb.
2. Curtain wall and punched window horizontals at vision and spandrel, starter sill, intermediate, head with movement joint and stack.
3. Parapet cap.
4. Curtain wall and punched window fixed and expansion anchors.
5. Curtain wall vertical fins and fork extrusions.
6. Single pitch and Boulevard skylights, GTF pedestrian bridge skylight: rafters, crossbars, ridge, valley, curbs, anchors.

B. Prior to submitting documents for approval, submit itemized list of deviations from Contract Documents. Identify specification page and paragraph, or architectural drawing sheet, elevation, plan, section or detail for each item. If there are no deviations, provide written statement of full compliance with architectural drawings and specifications. Failure to provide an itemized list of deviations or statement of full compliance shall, at reviewers' discretion, be cause for return of submittals without review.

C. Submit with structural calculations scale drawings of aluminum extrusions, with sufficient dimensions to permit verification of section properties.

D. Submit with shop drawings scale drawings of gaskets and weatherstrips, with dimensions and identification of materials.

E. Submit full size dimensioned drawing of insulating glass edge with identification of primary and secondary seals.

F. Submit sealant manufacturers' test reports confirming sealant adhesion, compatibility and absence of staining, and acceptability for structural silicone application, based on test specimens submitted for this project. Submit application and quality control procedures for sealants.

G. Submit reports for quality control uniform pressure tests of shop applied structural silicone.

H. Submit reports for field hose tests and chamber tests.

I. Submit reports for field adhesion tests of weatherproofing sealants.

J. Submit reports for adhesion tests of field applied structural silicone.

K. Submit reports for field tests of internal gutters.

L. Submit qualification of insulating glass to ASTM E2190.

M. Submit NFRC Certification Label Certificate for transparent area of each glazing system supplied under this Section.

N. Submit laboratory test reports for shadow box spandrel assembly.

O. Submit reports for tests of shop assembled units for resistance to water leakage with static air pressure.

P. Submit quality control heat soak test reports for tempered glass, as required in Source Quality Control.

Q. Submit off-line quality control color measurement data for heat-treated coated visual mock-up glass and production glass, as required in Source Quality Control.

R. Submit roll wave and millidiopter data for heat-treated visual mock-up glass and production glass, as required in Source Quality Control.

S. Submit bow and warp data for heat-treated visual mock-up glass and production glass, as required in Source Quality Control.

T. Sustainable Design Submittals: Provide informational submittals to Section 01 8113.14 “Sustainable Design Requirements – LEED V4 BD+C.”

1.15 ACTION SUBMITTALS: Action submittals shall be complete and in required form. Resubmittals shall include requested corrections and shall respond to previous comments. Each revised sheet shall bear a revision date and number. Revisions shall be flagged with conspicuous revision symbols and numbers. Failure of submittals to be complete, in the proper form, responsive to comments, or identify revisions shall be cause for disapproval and return of documents without review. Failure of review comments to note a noncompliance with plans and specifications shall not relieve the Contractor from his obligation to comply. Failure of review comments to note a noncompliance on a given submittal shall not preclude a directive to comply on future submittals.

A. Submit shop drawings showing materials in place on building. Drawings shall include elevations, floor plans, sections and full size details. Details shall be fully drawn (not outlined) and annotated. Provide scaled drawings with scale identified. Paper drawings shall be printed to correct scale on 24x36 inch paper. Electronic drawings shall be formatted to print to correct scale on 24x36 inch paper. Drawings shall include the following information.

1. Joinery and internal seals.
2. Glass and metal thicknesses.
3. Metal alloy, temper and finish.
4. Glass strength, tint, coating, frit pattern, and frit color.
5. Fastener alloy, strength, finish, diameter, length and spacing.
6. Glazing materials identification.

7. Sealants identification by product name and color.
8. Relative layout of walls, beams, columns and slabs with dimensions noted.
9. Dimensioned position of glass edge relative to metal daylight.
10. Provisions for movements; details for movement joints in maximum open and closed positions.
11. Gutter and weep system.
12. Locations of, and details for, embedded anchors.
13. Identification of, and details for, thermal insulation, safing insulation and smoke seal.
14. Weld information and weld symbols conforming to AWS conventions.
15. Glazing details applicable to replacement glass, with outline of procedure for glass replacement.
16. Provisions for adjustment of anchors relative to tolerances of building structure; details for anchors in maximum up/out and in/down positions.
17. Florida Product Approval report numbers.

B. Submit structural calculations prepared in compliance with referenced documents and this Section. Calculations shall be legible and shall be cross-referenced to shop drawings to make calculations readily understandable and reviewable. Test reports are not an acceptable substitute for calculations. Calculations shall include:

1. Table of contents.
2. Sequentially numbered pages.
3. Calculation of design loads.
4. Input and output for analyses performed by software.
5. Analysis of framing members and metal panels.
6. Analysis of anchors, including anchors embedded in concrete.
7. Section property computations for framing members.
8. Analysis of stress in structural silicone.
9. Seal and signature of professional engineer licensed in Florida. Provide seal and signature on first page of every submittal, not just on a final or record submittal.

C. Perimeter Fire Containment Engineering Judgments

1. Submit a separate Engineering Judgment for each unique perimeter fire containment condition on this project.
2. Engineering Judgments shall comply with International Firestop Council (IFC) Guidelines, and shall be provided by a firestop manufacturer’s qualified technical personnel, a Fire Protection Engineer, or an independent testing agency that provides listing services for firestop systems.

3. In addition to compliance with IFC Guidelines, Engineering Judgments shall be cross-referenced to specific shop drawing details for this project.

D. Submit glass strength analysis for compliance with ASTM E1300. For cold-bent glass, point-supported glass, and other glass that is beyond the scope of ASTM E1300, submit finite element analysis. Stress induced by cold-bending shall be treated as long-duration stress. Stresses determined by finite element analysis shall not exceed allowable stresses for glass surfaces and glass edges in the appendices of ASTM E1300.

E. Submit shop drawings and structural calculations for performance mock-ups. The required content is the same as for actual building.

F. Submit laboratory reports for performance mock-ups, including as-built shop drawings.

G. Submit request to waive reglazing demonstration on mock-ups (Contractor option).

H. Submit request to perform tensile test on substitute structural silicone or insulating glass secondary seal silicone (if Contractor makes a substitution request). Submit laboratory report if test is performed.

I. Submit surface temperature and dew point analysis performed with THERM software, and computation of overall U-factors.

J. Sustainable Design Documentation Submittals: Refer to Section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C.”

1. Product Data: Documentation for Leadership Extraction Practices in the following: Leadership Extraction Practices for Recycled Content.
2. Product Data: Documentation for Low Emitting Materials.
    a. Low Emitting Materials for Paints and Coatings.
    b. Low emitting Materials for Adhesives and Sealants.
3. Product Certificates: Provide the following:
    a. Environmental Product Declarations (EPD’s).
    b. Corporate Sustainability Reporting (CSR’s).

K. Samples

1. Submit for approval 3 sets of labeled samples of each type and color of metal finish, on 12 inch (305 mm) long sections of extrusion shapes and 12 inch (305 mm) squares of sheet aluminum. Samples shall show extremes of color and texture variation. Samples will be reviewed for color and texture only. Compliance with other requirements is the responsibility of the Contractor.
2. Submit for approval 3 sets of labeled 12 inch (305 mm) square samples of each type of glass. Provide at project site visual mock-up using full size glass, for evaluation of color range and distortion of reflected image.
3. Submit on request samples that show fabrication techniques and workmanship for component parts.

4. Provide production material conforming to approved samples.

1.16 QUALIFICATIONS

A. Aluminum Fabricator: Company specializing in fabrication of architectural aluminum extrusions and sheet with minimum 10 years of experience. Engineer who does structural design shall have minimum 10 years of experience designing architectural aluminum.

B. Glass Supplier and Fabricator: Companies specializing in manufacture of flat glass and fabrication of architectural glass with minimum 10 years of experience.

C. Gasket Supplier: Company specializing in manufacture of products specified in this Section with minimum 10 years of experience.

D. Sealant Supplier: Company specializing in manufacture of products specified in this Section with minimum 10 years of experience.

E. Installer: Company specializing in performing work of this Section with minimum 10 years of experience.

1.17 MOCK-UPS

A. Performance Mock-ups

1. Provide labor and materials to build and test ~~three~~ four performance mock-ups as shown on Drawings.

a. Mock-up #1: Airside north elevation at grid A4, approximate dimensions 16 feet wide by 29 feet high, no corner return.

b. Mock-up #2: Boulevard skylight and clerestory, south elevation at grid L14, approximate dimensions 17 feet wide by 13 feet high vertical surface, 17 feet wide by 23 feet sloping surface, no corner return.

c. Mock-up #3: Skylight at curtain wall corner, south and east elevations at grids L17 and S7.5, approximate dimensions south elevation 20 feet wide by 26 feet high, east elevation 20 feet wide by 26 feet high, projected roof area 20 feet by 16 feet.

~~c.~~d. Mock-up #4: GTF pedestrian bridge north elevation curtain wall and skylight, approximate width 16 feet (starting at grid line T3 and extending four glass bays to the east), approximate height of curtain wall 30 feet (starting at elevation 121'-8", extending upward three glass openings plus the sloping skylight gutter), approximate length of skylight along slope 20 feet (starting at gutter and extending three glass openings up the slope).

2. Mock-ups shall accurately represent project conditions including joint sizes, anchors, materials, finishes and seals, except there shall be no indoor seal at boundaries of test specimen and chamber, even if a seal is intended for the actual building. Install sufficient thermal insulation and safing insulation to demonstrate details of installation.

3. Each mock-up shall be glazed with one consistent set of gaskets. Use of multiple gasket profiles and/or thicknesses at Contractor's discretion is not permitted.

4. Prior to tests, remove and reglaze selected glass units, using the details and procedures intended for glass replacement on the actual building. Reglazed units must satisfy test criteria. Contractor may submit for approval request to waive this requirement for glass supported by structural silicone.
5. Provide at least one extra glass unit for each type and size on mock-ups. Glass that breaks during testing shall be replaced with the same type glass. If glass in a specific mock-up opening breaks twice during attempts to complete one test, or 3 times for any combination of tests, the mock-up fails, redesign of the framing and/or glazing system is required, and testing must be repeated from the beginning of the test sequence.
6. Construct mock-ups in accordance with approved shop drawings. Deviations from or additions to details shown on drawings are subject to approval.
7. Pay laboratory fees. Coordinate chamber availability, shipping schedules and mock-up construction schedules with laboratory.
8. Minimum Content of Laboratory Reports for Performance Mock-ups
    a. For air infiltration and exfiltration tests: numerical value of air flow readings; allowable values.
    b. For water tests that result in leakage: schematic elevation with identification of leak locations; descriptions of leaks.
    c. For structural tests: schematic elevation with identification of gage locations; explanation of gage reference surface (chamber steel or test specimen component); numerical data for maximum deflection and residual deflection; allowable values.
    d. As-built shop drawings of test specimen.
9. If failures occur, revise and retest mock-ups. Modifications shall be realistic in terms of project conditions, shall maintain standards of quality and durability, and are subject to approval.
10. If failures necessitate retests, pay fees and expenses for Architect and consultant to witness retests.
11. Mock-ups are subject to observation by Owner, Architect and their consultants during construction and testing. Provide notification at least two weeks before beginning construction of mock-ups. Provide materials and personnel for prompt continuous construction of mock-ups. Delays in mock-up construction due to lack of materials or personnel could result in the Contractor being charged for fees and travel expenses of observers.
12. The testing laboratory shall not perform any of the following functions.
    a. Act as consultant to a contractor for this project.
    b. Modify Contract Document requirements.
    c. Modify mock-up configuration.
    d. Dismantle mock-ups until notified that no further testing is required.

13. Undocumented tests are not permitted. All test results and all remedial work shall be documented in the laboratory report.
14. Mock-up Design Pressures
    a. Mock-up #1: 40 psf outward and 45 psf inward.
    b. Mock-up #2: 30 psf inward and outward.
    c. Mock-up #3: 40 psf inward and outward.
    ~~c.~~d. Mock-up #4: 45 psf inward and outward.
15. Maximum test pressures are 1.5 times design pressures.

B. Performance Mock-up Tests
1. Testing Sequence
    a. Uniform air pressure at 50% of inward design pressure, 10 second hold.
    b. Air leakage inward and outward.
    c. Resistance to water leakage with static pressure.
    d. Resistance to water leakage with dynamic pressure; this may require multiple steps with wind generator at different locations.
    e. Structural tests at 50% and100% of inward design pressure, 10 second holds.
    f. Structural tests at 50% and 100% of outward design pressure, 10 second holds.
    g. Repeat resistance to water leakage with static pressure. If this test results in failure, after corrections are made repeat structural tests at 50% and 100% inward design pressure, and 50% and 100% outward design pressure, then repeat this test.
    h. Structural tests at 75% and 150% of inward design pressure, 10 second holds.
    i. Structural tests at 75% and 150% of outward design pressure, 10 second holds.
2. For air leakage tests, inward chamber air leakage shall be accurately determined, not estimated. Outward chamber air leakage may be assumed to be the same as inward leakage.
3. For water leakage tests, there shall be no unacceptable water leakage as defined in this Section.
4. Where test sequence or test failure requires successive water leakage tests, the only means used to drain water from internal cavities shall be gravity drainage through weep system for a minimum of 15 minutes. Air pressure, removal of parts or other means of draining water shall not be used.
5. For dynamic water tests, wind generator shall have a minimum of three blades, and minimum propeller diameter of 12 feet (3.7 m). Width of area tested shall not exceed two times propeller diameter. Perform separate test for each two-

diameter segment, or fraction thereof. For a mock-up with two vertical faces meeting at an outside corner, perform separate tests on each face with the engine centerline perpendicular to the glass planes.

6. Structural tests shall conform to ASTM E330. Pressures shall be held for at least 10 seconds. Deflection gages shall be set to zero prior to each application of pressure. Deflection gage readings shall be recorded after each application of pressure. Specified deflection and set limitations apply to one application of pressure, not to cumulative effects of two or more loadings.

C. Glass Visual Mock-ups

1. Comply with applicable requirements of Section 01 43 39 Visual Mock-up Requirements.
2. Provide at project site visual mock-ups using full size glass, for evaluation of color and appearance of reflected image. Samples shall have production size (maximum), thickness, tint, coatings and heat treatment. For transparent spandrels, provide production backup surface. Provide color, roll wave, millidiopter and bow/warp data for mock-up glass. Color, roll wave, millidiopter and bow/warp data for approved mock-up glass shall be used as a pass/fail benchmark for production glass, subject to limitations in Source Quality Control of this Section.
3. Mount each sample in a separate frame, in a nominally vertical position. Each frame shall have provision for rotation about horizontal and vertical axes. Frame mounted samples shall be in an open area that is not shaded from sunlight. Outdoor surfaces of samples shall face southeast, south or southwest. Rotate samples as needed for design team to evaluate glass appearance for a variety of lighting conditions.
4. Provide zebra board with diagonal stripes of alternating black and white color. Width of stripes shall be 4 to 6 inches (10 to 15 cm) and shall be uniform. Provide unobstructed viewing area of at least 50 feet (15 m) between glass and zebra board. Bottom edge of zebra board shall be level with bottom edge of glass. Dimensions of zebra board shall be at least 8 feet wide by 8 feet high (2.4 m by 2.4 m). Position zebra board as needed for design team to evaluate reflected image. Maintain viewing area, samples and zebra board in unobstructed condition throughout construction.
5. Design team shall evaluate glass samples for color and appearance of reflected image. Accepted glass samples shall be retained as a standard for production material. Provide additional samples if requested by design team.

D. Visual Mock-ups: Provide visual mock-ups as shown on Drawings, to Section 01 43 39 Visual Mock-up Requirements.

E. Protect materials in transit and stored materials from damage.

F. Replace damaged materials.

1.18 SEQUENCING

A. Coordinate with requirements of material and personnel hoists. Defer installation at obstructed areas, and install materials when obstructions are removed.

1.19 WARRANTY

A. Provide written warranty agreeing to repair or replace defective materials and workmanship during warranty period. Defective materials and workmanship include, but are not limited to:

1. Water leakage.
2. Air leakage exceeding specified limits.
3. Structural failure.
4. Sealant (including structural silicone) loss of adhesion, loss of cohesion, cracking or discoloration.
5. Disengagement of gaskets, weatherstrips, trim or other components.
6. Deterioration or discoloration of metal finish.
7. Glass breakage including: secondary breakage caused by falling glass; spontaneous breakage of heat treated glass.
8. Failure of insulating glass edge seal as evidenced by frost, condensation, water, dust, corrosion or coating damage within sealed air space.
9. Insulating glass spacer migration.
10. Delamination or discoloration of laminated glass or panels.
11. Cracking, peeling or discoloration of glass coating.
12. Delamination, cracking, wrinkling, peeling, discoloration or staining of glass opacifier.
13. Loss of glass bite due to shifting of glass.
14. Loss of glass bearing on setting blocks due to shifting of glass and/or blocks.
15. Collapse of thermal insulation or safing insulation.

B. Warranty does not include damage caused by vandalism, or natural conditions exceeding the performance requirements. Warranty and its enforcement shall not deprive Owner of other action, right or remedy.

C. Warranty period for entire system shall be 5 years from date of substantial completion. System warranty includes materials and labor.

D. Certain materials are required to have special warranties. Special warranties shall not limit or reduce requirements of system warranty. Special warranties may originate, in part or in whole, with manufacturers or fabricators and pass through Contractor to Owner. Warranties as written or interpreted by manufacturers or fabricators shall not limit or reduce special warranty requirements of this Section.

1. Insulating glass that experiences failure of edge seal as defined in this Section shall be replaced at no charge (material only) for minimum 10 year period beginning on date of manufacture.
2. Insulating glass that has a structural edge seal (a seal that transfers load from outer glass ply to inner glass ply) that experiences adhesive or cohesive failure of the structural bond between glass substrates shall be replaced at no charge (material only) for a minimum 10 year period beginning on date of manufacture.
3. Glass whose coating cracks, peels or discolors shall be replaced at no charge (material only) for minimum 10 year period beginning on date of manufacture.
4. Laminated glass that delaminates shall be replaced at no charge (material only) for minimum 10 year period beginning on date of manufacture.
5. Spandrel glass and ceramic silk-screened glass whose opacifier delaminates, cracks, peels, discolors, or stains shall be replaced at no charge (material only) for minimum 10 year period beginning on date of manufacture.
6. Paint that cracks, peels, fades in excess of specified limits or chalks in excess of specified limits shall be replaced at no charge (material and labor) for minimum 5 year period beginning on date of application.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel

1. Hot rolled shapes and plates shall conform to ASTM A36/A36M.
2. Tubing shall conform to ASTM A500 or A501.
3. Stainless steel bars and sheet shall be 300 series alloy. Minimum thickness is: 0.062 inch (1.5 mm) for frames; 0.031 inch (0.79 mm) for trim covers; 0.012 inch (0.30 mm) for concealed flashing; 0.015 inch (0.38 mm) for exposed flashing.
4. Non-tubular cold formed carbon steel with thickness 0.168 inch (4.27 mm) or less shall conform to ASTM A653/A653M.

B. Aluminum

1. Acceptable alloy and temper combinations for extrusions subject to fabrication, finish and structural requirements are: 6063-T5; 6063-T6; 6061-T6. Other alloys of the 6xxx series and other tempers may be submitted for approval. Nominal wall thickness of 0.125 inch (3.2 mm) or greater is acceptable for structural extrusions; wall thickness less than 0.125 inch (3.2 mm) may be acceptable and is subject to approval. Minimum nominal wall thickness for nonstructural trim is 0.062 inch (1.6 mm).
2. Acceptable alloy and temper combinations for sheet and plate subject to fabrication, finish and structural requirements are: 3003-H14; 5005-H14. Other alloys of the 3xxx, 5xxx and 6xxx series and other tempers may be submitted

for approval. Minimum nominal thickness is 0.04 inch (1.02 mm) for flashing and 0.125 inch (3.2 mm) for parapet caps and all other applications.

C. Glass

1. Glass shall conform, as a minimum, to the following standards.
   a. Flat glass shall conform to ASTM C1036, quality q3.
   b. Heat-treated flat glass shall conform to ASTM C1048, except that surface compression of heat strengthened glass shall be 4000 to 7000 psi (27.6 to 48.3 MPa) for 6 mm thickness, 5000 to 8000 psi (34.5 to 55.2 MPa) for 8 mm and 10 mm thicknesses. Direction of roll wave shall be consistent for the entire project.
   c. Tempered and laminated glass shall conform to ANSI Z97.1.
   d. Coated glass shall conform to ASTM C1376.
   e. Laminated glass shall conform to ASTM C1172.
2. Provide safety glazing as required by code.
3. Provide heat strengthened vision and spandrel glass. Provide fully tempered glass only where safety glass is mandatory, where design pressures exceed capacity of heat strengthened glass, and where required by this Section. Annealed glass is not acceptable.
4. Glass Edge Treatment: Heat treated glass shall have seamed edges.
5. Insulating glass shall have double edge seals. Primary seal shall be extruded polyisobutylene continuously bonded to glass surfaces and stainless steel spacer, including corners. Minimum width of primary seal shall be 0.062 inch (1.6 mm). Secondary seal shall be Momentive IGS 3723 or Dow Corning 982. Secondary seal shall completely cover spacer with no gaps or voids, and shall be continuously bonded to both plates of glass. Unfilled spaces between primary and secondary seals shall not exceed one inch long by 3/32 inch wide. At least 50 percent of spacer internal volume shall contain desiccant. All desiccant may be at two sides of a unit. Where insulating glass is supported by structural silicone, secondary seal shall be designed to transfer specified pressures from outdoor glass to indoor glass. Insulating glass shall be qualified to ASTM E2190. Each unit shall be labeled to IGCC Certified Products Directory minimum label requirements, and to Florida Building Code Section 2406.3. Each insulating unit shall have an STC rating of 39 or greater.
6. Laminated glass shall consist of two layers of heat strengthened glass with equal thickness. Tempered glass is acceptable only if design requirements exceed capacity of heat strengthened glass. Minimum interlayer nominal thickness shall be 0.060 inch (1.52 mm).
   a. Basis of design at vision glass: Kuraray SentryGlas.
   b. Basis of design at spandrel glass: Eastman Saflex.
7. Heat treated glass shall be subjected to quality control measures to minimize inclusions that could result in spontaneous breakage. Such inclusions are

defined as material defects by this Section. Installed heat treated glass that experiences spontaneous breakage shall be replaced (material and labor) under warranty provisions. Perform heat soak test on all tempered glass as required in Source Quality Control of this Section.

8. Spandrel glass and ceramic silk-screened glass shall be opacified with ceramic frit.

9. Each glass unit shall be identified in accordance with Florida Building Code Section 2403.1. Safety glazing shall be identified in accordance with Florida Building Code Section 2406.3.

D. Glass Schedule

1. Silk Screen Frit Density, Color and Dot Diameter

   a. Frit #1 density: 20%, basis of design Viracon V-175 High Opacity White, 1/16 inch diameter.

   b. Frit #2 density: 40%, basis of design Viracon V-175 High Opacity White at vertical glass, V-903 Subdued Gray at skylight glass, 1/16 inch diameter.

   c. Frit #3 density: 60%, basis of design Viracon V-903 Subdued Gray, 1/8 inch diameter.

2. Insulating Glass Spacer: black stainless steel.

3. Glass Heat Treatment: All glass is heat treated. Annealed glass is not acceptable. Provide heat strengthened glass, except provide fully tempered glass only where required for safety or performance. Perform heat treatment before low-e coating is applied.

4. Glass Type GL-1 basis of design: Insulating, laminated, all glass layers PPG Starphire 6 mm (minimum) thickness, monolithic outdoor, Viracon VNE 13-63, 13.2 mm air space, laminated indoor, two layers of Starphire, 1.52 mm clear SentryGlas interlayer.

5. Glass Type GL-2 basis of design: Insulating, laminated, all glass layers PPG Starphire 6 mm (minimum) thickness, monolithic outdoor, Viracon VNE 13-63, frit #2 V-175 High Opacity White on surface #2, 13.2 mm air space, laminated indoor, two layers of Starphire, 1.52 mm clear SentryGlas interlayer.

6. Glass Type GL-3 basis of design: Insulating, laminated, all glass layers clear 6 mm (minimum) thickness, monolithic outdoor, Viracon VNE 1-63, 13.2 mm air space, laminated indoor, two layers of clear glass, 1.52 mm clear SentryGlas interlayer.

7. Glass Type GL-4 basis of design: Insulating, laminated, all glass layers clear 6 mm (minimum) thickness, monolithic outdoor, Viracon VNE 1-63, no frit zero to 8 feet, frit #1 V-175 High Opacity White on surface #2 above 8 feet, 13.2 mm air space, laminated indoor, two layers of clear glass, 1.52 mm clear SentryGlas interlayer.

~~7.~~8. Glass Type GL-4A basis of design: Laminated, both glass layers clear 6 mm (minimum) thickness, 1.52 mm clear SentryGlas interlayer.

~~8.~~9. Glass Type GL-5 basis of design: Insulating, laminated, all glass layers clear 6 mm (minimum) thickness, monolithic outdoor, Viracon VNE 1-63, frit #2 V-175 High Opacity White on surface #2, 13.2 mm air space, laminated indoor, two layers of clear glass, 1.52 mm clear SentryGlas interlayer.

~~9.~~10. Glass Type GL-6 basis of design: Insulating, laminated, all glass layers clear 6 mm (minimum) thickness, monolithic outdoor, Viracon VNE 1-63, frit #2 V-903 Subdued Gray on surface #2, 13.2 mm air space, laminated indoor, two layers of clear glass, 1.52 mm clear SentryGlas interlayer, VLT 36%.

~~10.~~11. Glass Type GL-7 basis of design:Insulating, laminated, all glass layers 6 mm (minimum) thickness, monolithic outdoor Optigray, Viracon VNE 30-63, frit #3 V-903 Subdued Gray on surface #2, 13.2 mm air space, laminated indoor, 1.52 mm clear SentryGlas interlayer, outboard layer Optigray, inboard layer clear glass, VLT 12%.

~~11.~~12. Glass Type GL-8 basis of design: Insulating, laminated, all glass layers 6 mm (minimum) thickness, monolithic outdoor Gray, Viracon VNE 3-63, frit #3 V903 Subdued Gray on surface #2,13.2 mm air space, laminated indoor, 1.52 mm clear SentryGlas interlayer, outboard layer Gray, inboard layer clear glass, VLT 6%.

~~12.~~13. Glass Type GL-9 basis of design: Insulating, laminated, all glass layers PPG Starphire 6 mm (minimum) thickness, monolithic outdoor Viracon VNE 13-63, Frit #2 V-175 High Opacity White on surface #2, 13.2 mm air space, laminated indoor, two layers of Starphire, 1.52 mm clear PVB interlayer, Medium Gray Viraspan full surface frit on surface #6.

~~13.~~14. Glass Type GL-10 basis of design: Insulating, laminated, all glass layers PPG Starphire 6 mm (minimum) thickness, monolithic outdoor Viracon VNE 13-63, 13.2 mm air space, laminated indoor, two layers of Starphire, 1.52 mm clear PVB interlayer, Medium Gray Viraspan full surface frit on surface #6.

~~14.~~15. Glass Type GL-11 basis of design: Insulating, laminated, all glass layers clear 6 mm (minimum) thickness, monolithic outdoor Viracon VNE 1-63, Frit #2 V-175 High Opacity White on surface #2, 13.2 mm air space, laminated indoor, two layers of clear glass, 1.52 mm clear PVB interlayer, Medium Gray Viraspan full surface frit on surface #6.

~~15.~~16. Glass Type GL-12 basis of design: Insulating, laminated, all glass layers PPG Starhpire 6 mm (minimum) thickness, monolithic outdoor Viracon VNE 13-63, frit #2 V-903 Subdued Gray on surface #2, 13.2 mm air space, laminated indoor, two layers of Starphire, 1.52 mm clear SentryGlas interlayer, VLT 40%.

E. Glazing System

1. Gasket system shall consist of a dense gasket against one glass face, and a cellular gasket against the other glass face, or dense gaskets against both glass faces. Refer to Glazing Materials and Glazing regarding injection molded corners and sealing of gasket corner joints.

2. Structural silicone system shall consist of structural silicone at interior glass face, and an exterior silicone weather seal. Where glass is not supported by structural silicone, provide gasket system; either or both gaskets may be replaced by a recessed backer and silicone seal. Refer to FABRICATION regarding shop assembly of four-side structural silicone system.
3. Weight of each glass unit shall rest on setting blocks that are supported by a metal frame. Stacking of glass units over a shared dead load support is not acceptable.

F. Elastomers

1. Gaskets, weatherstrips, glazing blocks and other elastomeric components shall conform to the following standards.
   a. Cellular neoprene and EPDM: ASTM C509, test for resistance to flame propagation not required.
   b. Dense neoprene and EPDM: ASTM C864.
   c. Dense silicone: ASTM C1115, Type C for glazing, Type T for expansion joints.
   d. Dense thermoplastic rubber: ASTM E2203.
   e. Straightness tolerance for extended legs of wiper gaskets is 0.062 inch in a one foot gage length (1.5 mm in 30 cm). Waviness or rippling exceeding this tolerance is not acceptable.
2. Gaskets and Weatherstrips Except at Structural Silicone
   a. Cellular gaskets shall be extruded black neoprene or EPDM with hardness of 40 +/- 5 durometer. Design cellular gaskets to provide 20% to 35% compression.
   b. Dense gaskets shall be black extrusions with Shore A hardness of 75 +/- 5 for hollow profiles and 60 +/- 5 for solid profiles. Gaskets shall be silicone, neoprene, EPDM or thermoplastic rubber.
   c. Provide glazing gaskets with injection-molded corners where gaskets can be installed to metal frame before glass is set.
   d. Compression gaskets shall be designed to produce a force against the glass surface of 4 to 10 pounds per linear inch (0.70 to 1.75 N/mm).
3. Glazing gaskets, sealant backers, and glass spacer pads in contact with structural silicone shall be black extruded dense silicone.
4. Gaskets that maintain glass face clearance while serving as a backer for a silicone weather seal may have a friction fit. All other gaskets and weatherstrips, including backers for structural silicone, shall have a continuous spline or a continuous groove that engages a matching groove or leg on the aluminum frame.
5. Expansion Joints at Walls

a. Provide continuous aluminum extrusions with pockets to receive continuous elastomeric snap-in primary and secondary gaskets. Basis of design is Balco type FCVS Silicone.

b. Primary gasket shall be extruded dense silicone or thermoplastic. Secondary gasket shall be extruded dense EPDM or thermoplastic.

c. Minimum rated movement capacity is 50 percent of nominal joint width in compression, and 50 percent of nominal joint width in tension.

d. Provide primary gasket color as selected by Architect.

6. Setting Blocks

a. Setting blocks shall be dense extruded silicone with hardness of 85 +/- 5 durometer Shore A. Minimum length is 0.1 inch for each square foot (27 mm for each square meter) of glass area, but not less than 4 inches (102 mm). Minimum width is glass unit thickness. Setting blocks shall be equidistant from glass centerline, with block centerlines between glass eighth points and quarter points. Distance from vertical glass edge to nearest edge of setting block shall not be less than 6 inches (152 mm) where glass width is at least 32 inches (813 mm).

b. Shims used in conjunction with setting blocks shall be of the same material, hardness, length and width as the blocks.

c. Setting blocks and chairs shall be secured against migration.

7. Side Blocks

a. Provide side blocks at both jambs, between midheight and top corner of glass. Blocks shall be 55 +/- 5 durometer Shore A dense silicone. Block width shall be 0.125 inch (3 mm) less than nominal glass edge clearance.

b. Side blocks are not required where glass is continuously sealed with silicone at two or more edges.

G. Glazing Tape: Saint-Gobain Performance Plastics V2100 Thermalbond Tape is acceptable as a glass spacer pad when used in conjunction with structural silicone, subject to compatibility tests.

H. Anchors in Concrete and Masonry

1. Anchors embedded in concrete and masonry shall be prime painted or hot dip galvanized rolled steel, or hot dip galvanized cold formed steel.

2. Strength of embedded anchors shall be developed by integral projections, welded deformed bars, or headed studs.

3. At masonry, through bolts are acceptable provided that bearing plates are used at both masonry surfaces. Expansion bolts are acceptable provided they are designed for use in masonry.

4. Expansion bolts are acceptable in concrete.

5. Hilti Kwik HUS-EZ and Powers Wedge-Bolt are acceptable in concrete.

6. Fasteners that are self-drilling are not acceptable. Screws in plugs and powder actuated fasteners are not acceptable.

I. Fasteners

1. Fastener requirements are applicable to screws, bolts, nuts, washers, rivets and pins.
2. Stainless steel 300 series fasteners are required at the following locations, and are acceptable at all locations.
   a. Locations with exposure to outdoor air.
   b. Joinery of aluminum frames, regardless of exposure.
   c. Glazing pockets.
   d. Internal cavities that act as gutters, or that potentially contain water resulting from leakage or condensation.
3. Carbon steel and 400 series stainless steel fasteners with zinc plating, cadmium plating or Stalgard coating are acceptable at locations where 300 series stainless steel is not required. Mill finish carbon steel and mill finish 400 series stainless steel fasteners are not acceptable.
4. Aluminum bolts are acceptable for fastening aluminum parts. Provide alloy and temper 2024-T4, 6061-T6, or 7075-T73. Finish for exposed aluminum fasteners shall be the same as for the aluminum parts being fastened.
5. Provide helical spring washer, nylon patch, or liquid thread lock at all bolted connections.
6. Powder actuated fasteners are not acceptable.

J. Shims

1. Separate surfaces designed for relative movement with friction reducing pads. Pads shall have minimum 0.062 inch (1.6 mm) thickness, shall reduce friction to permit movement, shall be resistant to wear, and shall be positively retained in position (open ended slots are not acceptable). Pads shall not be subjected to heat damage from welding or cutting, or to excessive pressure from overtightening of bolts.
2. Shims that transfer shear forces (tending to slide one shim against another) shall be steel plates, set in a staggered pattern and fillet welded to each other and to adjacent steel surfaces. Shims and welds shall be structurally designed to support applied loads.
3. Plastic shims are acceptable at static connections for which shims transfer only compressive forces.
4. Wood shims are not acceptable.

K. Provide weep hole filters if needed to comply with performance requirements. Weep hole filters shall be 20 to 45 pores per inch PVC coated open cell urethane foam.

L. Sealants: Listed products are acceptable subject to tests. Provide colors as selected by Architect.

1. Sealants required for non-structural exposed outdoor seals at perimeters of metal panels and stone panels, and acceptable for other non-structural seals.
    a. Momentive Silpruf NB.
    b. Dow Corning 756 SMS.
2. Sealants acceptable for non-structural seals at locations other than perimeters of metal panels and stone panels.
    a. Momentive Silpruf, Silpruf LM.
    b. Dow Corning 790, 791, 795.
    c. Tremco Spectrem 1 and Spectrem 2.
3. Sealants acceptable for shop-applied structural seals.
    a. Momentive UltraGlaze SSG4400, SSG4600.
    b. Dow Corning 983.
    c. Tremco Proglaze II.
4. Sealants acceptable for shop-applied and field-applied structural seals.
    a. Momentive Silpruf, UltraGlaze SSG4000.
    b. Dow Corning 795, 995.
5. Oil base sealants are not acceptable.
6. Sealant back-up materials shall be polyethylene foam, urethane foam or extruded silicone as recommended by sealant manufacturer. Back-up shall not absorb water, and shall not emit gas, even if punctured.
7. Coordinate with other sections to assure compatibility of intersecting sealants.

M. Thermal Breaks
1. Thermal breaks that are integral to extruded aluminum frames shall be continuous polyamide nylon 66 or continuous polyurethane. Minimum separation of outdoor and indoor metal shall be 0.37 inch (9.5 mm); increase separation as required to comply with specified thermal performance.
    a. Polyamide nylon 66 shall be reinforced with minimum 25 percent glass fibers and shall be mechanically locked to extrusions with closely spaced crimps.
    b. Polyurethane shall be poured into a cavity of a single extrusion. The extrusion shall be debridged after the polyurethane hardens. The cavity shall have closely spaced indentations to mechanically lock the polyurethane against slippage in the cavity.
2. Thermal breaks that are fastened and clamped between two layers of metal shall be rigid PVC or one of the materials specified for glazing gaskets in this Section.

N. Thermal Insulation

1. Insulate spandrels and other nonvision areas with Thermafiber FireSpan 90, Roxul CurtainRock 80, or approved equal having 3.0 inch (76 mm) minimum nominal thickness. Minimum R-value for insulation alone shall be 12.6 ($ft^2 \cdot h \cdot ^\circ F$)/Btu (2.2 {$m^2 \cdot K$}/W). Provide FSP or FSK adhered vapor barrier consisting of minimum 0.0005 inch (12.7 micron) aluminum foil, fiberglass scrim, and polyethylene film or Kraft paper. Locate foil surface flush with innermost surface of vertical framing members. Butt joints are acceptable provided that both pieces of insulation are attached to, and are in contact with, continuous steel reinforcement located on the outboard side of insulation. Each piece of insulation shall be retained at a minimum of two opposite edges.
2. Framing Covers
    a. Apply above and below safing insulation, for full height of insulated openings, minimum 2.0 inch (51 mm) thick and minimum 8 inch (203 mm) wide strips of insulation (framing covers) against vertical framing members, with minimum 1.0 inch overlaps of adjacent insulation.
    b. Each framing cover shall be retained at a minimum of two points with steel impaling pins (see “Attachment of Insulation”), steel fasteners with washers, or Thermafiber Impasse Spiral Anchors.
    c. Framing covers shall also be placed against any intermediate horizontal or vertical framing members within an insulated opening, where the framing would otherwise be unprotected from fire on the indoor side.
3. Attachment of Insulation
    a. Steel impaling pins are acceptable. Pins may be welded to steel framing or to steel sheet. Pins may have integral bases that are fastened with steel screws. Attachment of pins with adhesive is not acceptable.
    b. Thermafiber Impasse Hangers are acceptable. Hangers shall be fastened to framing with steel screws.
    c. Attachment of insulation with tape or adhesive is not acceptable.
    d. Maintain 1.0 inch (25 mm) nominal air space between insulation and glass.
4. Provide continuous horizontal metal brace against outboard surface of thermal insulation, at the level of safing insulation. Fasten brace to vertical frames. Brace shall have sufficient stiffness to prevent bowing of thermal insulation.
5. Seal edges, joints, punctures and tears in vapor barrier with aluminum foil tape. Tape insulation to framing before placement of framing covers. Apply tape over clinch shields, washers, spiral anchors and other hardware at penetrations of foil backing. Apply tape at perimeters of framing covers.

O. Safing Insulation and Smoke Seal
1. Fill void at floor and roof edges with Thermafiber Safing Insulation, Roxul Safe, or approved equal. Thickness shall be four inches (102 mm) minimum top to bottom. Cut safing insulation wider than opening to provide compression fit recommended by manufacturer.

2. Completely coat top surface of safing insulation with 3M FireDam Spray 200, SpecSeal AS200 Elastomeric Spray, Hilti CP 672 Firestop Joint Spray or approved equal. Coating shall overlap floor and wall a minimum of 0.5 inch (13 mm). Provide minimum wet thickness 0.125 inch (3 mm). Comply with manufacturer requirements for temperature and condition of substrates at time of installation.
3. The smoke-sealed joint shall be tested to UL 2079 for air leakage. The L-rating shall not exceed 5 cfm per linear foot (0.00775 m^3/s m) of joint at 0.30 inch of water (7.47 Pa) for ambient temperature and elevated temperature tests.
4. Where safing and smoke seal are interrupted at a stairwell, shear wall, or any other condition that prevents continuity, provide vertical safing, and smoke seal on the protected side, to close gaps between horizontal lines of safing at successive floors. Where needed to maintain continuity, provide safing and smoke seal between exterior wall and beams, columns and other structure surfaces where floor slabs are interrupted or do not occur.
5. Place safing insulation, and if needed additional strips of safing insulation, horizontally and vertically as needed to protect anchors from exposure to fire at the floor below the anchor. Provide at least two inch insulation cover for anchor components.

P. Primers

1. Coat aluminum surfaces in contact with masonry, concrete or steel with prime paint or bituminous paint.
2. Prime paint carbon steel parts of anchors, embedded anchors, reinforcement and supports. After field welding, remove weld slag and touch up primed surface.
3. Provide minimum dry film thickness of one mil (0.0254 mm) for paint and 30 mils (0.762 mm) for bituminous paint. Prime paint shall conform to GSA specification TT-P-645B 1990.

Q. Flashing

1. Acceptable materials are stainless steel sheet and aluminum sheet. Aluminum is required to have a shop-applied bituminous coating where it contacts dissimilar materials.
2. Provide sealed lap joints, end dams and transitions to gutters.

R. Delivery Time for Replacement Glass: After completion of construction, delivery time for replacement glass shall not exceed 16 weeks.

2.2 FABRICATION

A. Perform fabrication and assembly as much as possible in the shop.

B. Exposed work shall have continuous lines. Joints in exposed work shall be accurately fitted and rigidly secured.

C. Welding shall be in accordance with recommendations of the American Welding Society and shall be done with electrodes and by methods recommended by suppliers

of alloys being welded. Welds behind finished surfaces shall be done so as to minimize distortion. Discoloration of a finished surface due to welding or any other process is unacceptable. Weld spatter and welding oxides on finished surfaces shall be removed by descaling and/or grinding.

D. Weld beads on exposed surfaces shall be ground and finished to match and blend with finish on adjacent metal. Grinding and polishing of nonferrous metal shall be done only with clean wheels and compounds free from iron and iron compounds. Soldering and/or brazing are not acceptable.

E. Provide exposed fasteners only where shown on approved shop drawings. Exposed fastener heads shall be finished to match fastened material.

F. Provide specified finishes on exposed surfaces. Provide specified galvanized finish or shop-applied prime paint on concealed steel.

G. Systems with glass supported at all edges by structural silicone shall be unitized and shall be fully assembled, including silicone and glass, in the shop.

2.3 TOLERANCES

A. Tolerances in the Aluminum Association Aluminum Standards and Data are applicable to finished, fabricated and assembled materials, except that flatness tolerance for aluminum sheet panels shall be half of standard sheet tolerance. Maintain stricter tolerances where required for proper fit of components.

B. Fabrication tolerances for frames of shop-assembled and shop-glazed window and skylight frames are:

1. Overall length and width: 0.062 inch (1.6 mm).
2. Deviation from square: 0.125 inch (3.2 mm).
3. Open gap at nominal hairline joint: 0.062 inch (1.6 mm) maximum.
4. Offset (in/out) between adjacent nominally flush surfaces: 0.031 inch (0.8 mm).

2.4 PAINTED ALUMINUM FINISH

A. General Requirements

1. Paint shall be supplied by a licensed formulator.
2. Application of shop-applied finish shall be performed under specifications issued by licensed formulator, by an applicator approved by formulator.
3. Color shall match approved samples. Samples shall show extremes of color range.
4. Pretreatment of metal surfaces shall be done in accordance with procedures recommended by formulator.
5. VOC’s shall be captured and converted to water vapor by an oxidizer.
6. Touch-up of painted aluminum is permitted only with written permission from the Architect. Unless touch-up is authorized, replace damaged material with new material. Touch-up shall be done with PPG Coraflon ADS air dry two-coat system.

7. Provide colors as selected by Architect.

B. Outdoor Surfaces

1. Painted aluminum finish shall be factory oven cured four coat finish based on Kynar 500 or Hylar 5000 Fluoropolymer resin.
2. Formulation shall have at least 70% Kynar 500 or Hylar 5000 resin in residual solids.
3. Pigmented organic coatings for extrusions, structural shapes, sheet or plate, spray applied in the factory, shall meet requirements of AAMA 2605.
4. Warranty
   a. Color changes shall not exceed 5 Delta E units as defined by ASTM D2244 for specified special warranty period.
   b. Chalking shall not exceed a number 8 rating as defined by ASTM D4214 for specified special warranty period.
   c. Paint film shall not crack or peel during specified special warranty period.

C. Indoor Surfaces

1. Specified finish for outdoor surfaces is acceptable for indoor surfaces.
2. Where outdoor and indoor parts can be finished separately, factory oven cured acrylic or polyester paint is acceptable for indoor surfaces.
3. Acrylic and polyester pigmented organic coatings for extrusions, structural shapes, sheet or plate, spray applied in the factory, shall meet requirements of AAMA 2603.

2.5 ALUMINUM FINISH AT STRUCTURAL SILICONE

A. Mill finish is not acceptable at structural silicone bonding surfaces.

B. Aluminum surface to which structural silicone will be adhered shall have a finish that demonstrates by test the ability to satisfy specified requirements. Subject to testing, acceptable finishes are:

1. Paint conforming to AAMA 2605 or AAMA 2603.
2. Alodine conversion coating conforming to ASTM B449 Class 1.

2.6 STEEL FINISHES

A. Cold formed carbon steel with thickness 0.168 inch (4.27 mm) or less shall be hot dip galvanized to meet or exceed requirements of classification G90 of ASTM A653/A653M.

B. Cold formed carbon steel with thickness exceeding 0.168 inch (4.27 mm) and hot rolled steel shall be prime painted in conformance with GSA Specification TT-P-645B, or hot dip galvanized in conformance with ASTM A123/A123M.

C. Corrosion of galvanized steel surfaces is not acceptable in any amount, including “storage stain” and “white rust.” Store galvanized steel in a dry indoor environment. Protect galvanized steel during shipping, storage, handling and fabrication from conditions that promote corrosion.

D. Stainless steel exposed surfaces shall have number 8 polished finish.

2.7 SOURCE QUALITY CONTROL

A. Glass

1. Heat Soak Test: Perform heat soak test on all tempered glass. Hold glass at 550±18 degrees F (290±10 degrees C) for minimum 2 hours. Record quantity and sizes tested, dwell time and quantity of breaks (if any). Submit records in electronic pdf format for information only.
2. Color Measurement
   a. Measure color of coated glass with spectrophotometers. Measure color from the uncoated side.
   b. Perform continuous on-line color measurement across the entire glass surface on the coating line. Perform off-line quality control checks on a minimum of one unit every four hours and at each product change on the heat treating line.
   c. The color target shall be established by the coater.
   d. Color variation shall not exceed 4.5 Delta E*ab units as defined by ASTM C1376, except the target shall be as defined in this Section, not units installed on a building. Remove from production any non-conforming glass.
   e. Record all off-line quality control check data and submit it in electronic pdf format for information only.
3. Distortion Measurement of Heat-Treated Glass
   a. Measurement device shall be Osprey LiteSentry.
   b. Measure all coated and uncoated heat-treated glass at the end of the heat treatment line, in a horizontal position with glass supported on rollers.
   c. Roll wave peak to valley distortion for leading edge, central area, and trailing edge shall not exceed the highest values for units used on an approved visual mock-up, or 0.003 inch for central area, and 0.008 inch for leading and trailing edges, whichever is less.
   d. For measurements taken over at least 90 percent of the area of each unit, distortion shall not exceed the highest value for units used on an approved visual mock-up, or ±120 millidiopters, whichever is less.
   e. Remove from production non-conforming glass.
   f. Record all roll wave and millidiopter data, and submit it in electronic pdf format for information only.
4. Bow and Warp Tolerance for Heat-Treated Glass
   a. Bow and warp shall not exceed one half of the values listed in ASTM C1048.
   b. Measure at least one unit per hour.

c. Record bow and warp data, and submit it in electronic pdf format for information only.

B. Test shop applied structural silicone by applying outward design pressure for at least 30 seconds. Test minimum 10 percent of units, using random selection throughout production. Record date of test, results and identification marking of unit tested. Mark each unit so that structural silicone batch numbers and date of application can be traced. Submit test data for information only.

C. Perform specified water leakage test with static pressure on minimum 2 percent of shop assembled curtain wall units, using random selection throughout production. Record date of test, results and identification marking of unit tested. Submit test data for information only.

D. Inspect materials and workmanship to assure compliance with Contract Documents. Provide access to storage and manufacturing facilities for observation by Owner and Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that structure and site conditions are ready to receive work of this Section.

B. Perform layout based on established benchmarks.

3.2 INSTALLATION

A. Install materials in accordance with approved shop drawings and Florida Product Approval reports. Provide labor, material, equipment and supervision necessary for complete installation.

B. Field Tolerances

1. Provide anchor adjustment capability for full range of specified tolerances for building structure, but not less than one inch (25 mm) in all directions, except 0.5 inch (12 mm) in all directions at connections to wind girts.
2. Work of this Section shall be within the following tolerances.
3. Deviation from plumb, level or dimensioned angle shall not exceed 0.125 inch per 12 feet (3.2 mm per 3658 mm) of length of any member, 0.25 inch (6.4 mm) in any total run in any line.
4. Deviation from theoretical position in plan or elevation, including deviation from plumb, level or dimensioned angle, shall not exceed 0.375 inch (9.5 mm) total at any location. Change in deviation shall not exceed 0.125 inch for any 12 foot (3.2 mm per 3658 mm) run in any direction.
5. Maximum offset from true alignment between two metal components placed end to end shall not exceed 0.062 inch (1.6 mm).
6. Open gap at nominal hairline joint between metal components shall not exceed 0.062 inch (1.6 mm).

7. Variation of width of reveal formed by overlapping metal components shall not exceed plus or minus one half of nominal reveal width, or 0.125 inch, whichever is less.
8. Maximum offset between glass framing members at corners of glazing pocket shall not exceed 0.031 inch (0.8 mm).

C. Anchorage

1. Anchor component parts by bolting and welding. Install captured slip pads between moving parts.
2. Provide noncorrosive separators between dissimilar materials.
3. Remove weld slag and apply prime paint over welds. Prime paint exposed portions of embedded anchors. Touch up shop applied primer that is damaged by welding or other causes.
4. Where slots or oversize holes are provided for adjustment only, secure connection after final adjustment. Interlocking serrations in extruded aluminum brackets and washers are acceptable. Steel weld washers with 0.25 inch (6 mm) minimum thickness are acceptable with steel brackets. Special washers or nuts that rely on friction and/or surface indentation of fastened part are not acceptable.
5. Remove temporary shims and fasteners. Leave expansion joints free to move as designed.

D. Clean surfaces to be sealed. Cleaning solvent shall be isopropyl alcohol. Install backers, primers and sealant in accordance with shop drawings, test results and manufacturer recommendations. Dry tool sealants as separate operation after application. Immediately remove masking.

E. Install thermal insulation, vapor barrier, and safing insulation with specified supports. Install smoke seal. Surfaces to which smoke seal is applied shall be clean, dry and free from frost and dust. Maintain temperature required for application and drying of smoke seal.

3.3 GLAZING

A. Inspect frame for proper dimensions and squareness. Adjust frame and/or glass size as required to meet specified requirements.

B. Clean glazing pocket before setting glass. Cleaning solvent shall be isopropyl alcohol. Setting blocks shall be equidistant from glass centerline, with block centerlines between glass eighth points and quarter points. Distance from vertical glass edge to nearest edge of setting block shall not be less than 6 inches (152 mm) where glass width is at least 32 inches (813 mm). Side blocks shall be located between midheight and top corner of glass. Side blocks, setting blocks and chairs shall be positively retained in position.

C. Install gaskets with injection molded corners where indicated on shop drawings. Where gasket joints occur, tightly butt ends and seal with compatible sealant. Gasket joints shall not occur at locations other than corners.

D. Inspect glass before installation. Do not install glass that does not conform to this Section. Replace glass that is broken or damaged.

E. Except as otherwise specified, comply with GANA Glazing Manual. Provide minimum nominal glass bite of 0.5 inch (12.7 mm), but not less than glass bite required for structural silicone. Where joint movement will result in variable glass bite, increase nominal bite to provide 0.375 inch (9.5 mm) minimum bite and 0.25 inch (6.4 mm) minimum edge clearance after worst combination of movements. Design for full values of all movements occurring simultaneously. Provide minimum nominal glass face clearance of 0.187 inch (4.8 mm).

F. Remove and replace stops and apply sealants as required for complete glass installation.

G. Defer glazing of openings that are obstructed during construction. Glaze such openings when obstructions are removed.

H. Clean, prime and mask at structural silicone joints during same day on which silicone is applied.

I. Temporarily clamp glass during cure of structural silicone. After sufficient cure, remove clamps and fill gaps in silicone.

J. Mask glass and aluminum during application of structural silicone. Remove masking immediately after tooling sealant.

K. Structural silicone shall not be applied to edges of insulating glass units, or to edges of laminated glass units. Sealants used as weather seals shall not be placed against edge of laminated glass interlayer.

3.4 FIELD QUALITY CONTROL

A. Provide site supervision and Field Quality Control requirements for the Installer. Provide Field Quality Control staff having adequate prior experience with all specific products and materials to complete the specified systems and to integrate specified systems with adjacent construction. BECxA shall provide an initial BECx checklist. Installers for work of this Section shall provide completed BECx checklist with weekly updates verifying all specific locations of the work, specific locations of repairs and descriptions of repairs. BECx checklist shall be completed in its entirety by installers of work of this Seciton and shall be submitted to the Contractor, Architect, Owner and BECxA on a consistent weekly basis.

B. Hose Tests

1. Perform field hose tests for resistance to water leakage prior to installation of interior finishes and interior sealant joints. Test areas shall be selected by Architect. Area of each test area shall be at least 400 ft^2 (37 m^2). There shall be no unacceptable water leakage as defined in this Section. Provide powered scaffold, hose, water supply and manpower to perform at least 23 successful tests, plus any unsuccessful tests. Water testing shall be conducted early in construction schedule. Construction sequence shall include provisions for timely completion of test areas. Remedial measures shall maintain standards of quality and durability and are subject to approval.

2. Test Areas
   a. Airside vertical curtain walls, five locations, three at hold rooms or retail, one at a boarding pier, one at the Hub clerestory.
   b. Airside Boulevard skylight, two locations, one at the ridge, one at a roof edge. Interior scaffolding is required for observers.
   c. Landside vertical curtain walls, six locations, one at the east elevation, one at the north elevation between grids L11 and L12, one at the south elevation between grids L16 and L17, one at the west elevation between grids N1 and S1, one at north Boulevard clerestory, one at south Boulevard clerestory. Interior scaffolding is required for observers.
   d. Landside punched windows, two locations, one at the north elevation consisting of two windows each at Departures Level and Domestic Arrivals Bridge Level, and one at the south elevation consisting of two windows each at Domestic Arrivals Bridge Level and Arrivals Level.
   e. Landside Boulevard skylight, four locations, one at the ridge and three at roof edges. Interior scaffolding is required for observers.
   f. Landside single pitch skylight, four locations including high edge and low edge, one each at north and south skylights between grids L16 and L17, one each at north and south skylights between grids L11 and L12. Interior scaffolding is required for observers.
   g. GTF vertical curtain wall, one location, pedestrian bridge north elevation, pedestrian bridge level to skylight gutter.
   ~~f.~~h. GTF skylight, two locations, one at the ridge, one extending upward along the slope from the gutter.
   ~~g.~~i. Do not use the same areas for hose tests and chamber tests.
   ~~h.~~j. Test areas include boundaries with work of other sections. Coordinate test requirements with other sections.
3. Conduct test with Monarch Type B-25 #6.030 brass nozzle and 3/4 inch diameter hose. Water pressure to nozzle shall be in the range 30 to 35 psi. Working upward from bottom of test area, direct water at 5 foot long segments of glazing seals, frame joints and perimeter joints, moving slowly back and forth on each segment for minimum of 5 minutes. Where a framing member is between two glass units and its width does not exceed 4 inches, both lines of glazing seal may be tested as one segment by centering the spray on one glazing seal while moving in one direction, and centering the spray on the other glazing seal while moving in the opposite direction. Sustained spraying at one point while the nozzle remains stationary is acceptable. Tip of nozzle shall be 12 inches from specimen exterior surface. Nozzle shall generally be perpendicular to specimen surface, but shall be tilted to any angle that maximizes exposure of a given joint to water flow rate and kinetic energy. Continuously check for leakage on indoor side. If necessary to pinpoint leak

sources, perform additional testing. Repeated testing of joints is acceptable. The use of masking to pinpoint leaks is acceptable.

4. Provide scaffolding, ladders or lifts to allow close observation of all portions of test specimens.
5. Check completed areas below test area, and report any leaks that occur. A test that results in leakage at a completed area below a designated test area is a failure.
6. Submit, for information only, reports that contain dates of tests, elevation drawings of test areas with locations relative to grid lines (including any lower areas where leaks occur), and location of each leak.

C. Chamber Tests

1. Perform field chamber tests for resistance to water leakage prior to installation of interior finishes and interior sealant joints. Test areas shall be selected by Architect. Area of each test area shall be at least 400 ft^2 (37 m^2). Where the area of a single test is limited by the size of the water spray rack, it is acceptable to test in several steps by moving the spray rack to successive positions on a grid pattern, moving from low edge to high edge. There shall be no unacceptable water leakage as defined in this Section. Provide powered scaffold, hose, water supply, water spray rack, pressurized chamber on indoor side with access hatch, manometer, air blower and manpower to perform at least six successful tests, plus any unsuccessful tests. Water testing shall be conducted early in construction schedule. Construction sequence shall include provisions for timely completion of test areas. Remedial measures shall maintain standards of quality and durability and are subject to approval.
2. Test Areas
   a. Airside vertical curtain walls, four locations, three at hold rooms or retail, one at a boarding pier.
   b. Landside vertical walls, two locations, one at the east elevation, one at the north elevation between grids L16 and L17.
   ~~b.~~c. GTF vertical curtain wall, one location at pedestrian bridge, extending two glass openings upward from pedestrian bridge level.
   ~~c.~~d. Do not use the same areas for hose tests and chamber tests.
   ~~d.~~e. Test areas include boundaries with work of other sections. Coordinate test requirements with other sections.
3. Chambers shall be free-standing and shall be at least 3 feet deep to allow observers to stand inside during tests. Provide ladders or lifts inside chambers to allow close inspection of full height of specimens. Chambers that require observers to view specimens through clear or translucent windows or membranes are not acceptable.
4. Conduct tests to ASTM E1105 except as modified by this Section, using Procedure “A” uniform pressure difference. Test pressure and pass/fail criteria shall be as required by this Section, without any adjustment or reduction.

5. Check completed areas below test area, and report any leaks that occur. A test that results in leakage at a completed area below a designated test area is a failure.

6. Submit, for information only, reports that contain dates of tests, elevation drawings of test areas with locations relative to grid lines (including any lower areas where leaks occur), and location of each leak.

D. Perform adhesion testing of weatherproofing sealants. Use Destructive Procedure Tail Method "A" and frequency of testing as defined by ASTM C1521. Adhesive failure is not acceptable as the sealant is stretched a predetermined amount. The standard requires stretching of sealant to two times its rated movement capacity. If sealant manufacturer recommends more than two times, use manufacturer recommendation. Submit reports for information only, using the form in ASTM C1521.

E. Perform field adhesion tests on each floor on at least 10 percent of glass openings with field applied structural silicone. Use Destructive Hand Pull Tab Method "A" as defined in ASTM C1401, Appendix X2. Adhesive failure is not acceptable, regardless of percent elongation. Sealant shall be pulled until cohesive tearing occurs. For any opening that fails test, replace structural silicone at entire glass perimeter, and perform test on all openings within 20 feet of failed opening. For any floor with two or more failures, perform test on 100 percent of openings. Submit, for information only, reports that contain locations of tests and information required by ASTM C1401.

F. Test internal gutters on each floor by temporarily plugging weep holes and filling with water. After minimum of fifteen minutes, inspect for water leakage. Correct deficiencies and retest until successful tests are achieved. Remove weep hole plugs. Test each type of internal gutter at minimum of 2 widely separated locations on each floor. For any gutter that fails test, perform test on all similar gutters within 50 feet of failed gutter. For any floor with 4 or more failures of a given gutter type, perform test on 100 percent of gutters of that type. Submit, for information only, reports that contain dates of tests, elevation drawings of test areas with locations relative to grid lines, and results.

3.5 PROTECTION, CLEANING AND WASTE DISPOSAL

A. Protect materials against damage and contamination. Clean surfaces during and at conclusion of construction to Section 01 7423 Final Cleaning.

B. Periodically remove from the site debris, excess materials and unused tools and equipment. At conclusion of construction, leave premises in clean condition. Manage and dispose of wastes to Section 01 7419 LEED V4 Construction Waste Management and Disposal.

END OF SECTION 08 4413

SECTION 08 56 67 - BULLET-RESISTANT TRANSACTION WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Bullet-resistant fixed steel transaction window assemblies.

1.3 REFERENCES

A. American Welding Society (AWS) D1.3/D1.3M - Structural Welding Code - Sheet Steel.

B. ASTM International (ASTM) A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

C. Underwriters Laboratories (UL) 752 - Bullet Resisting Equipment.

1.4 SYSTEM DESCRIPTION

A. Design Requirements:

1. Provide window frames of “non-ricochet type" intended to permit capture and retention of attacking projectile, lessening potential of random injury or lateral penetration.
2. Two way "natural voice" communication permitted by design of vertical side frames and glazing technique.

1.5 SUBMITTALS

A. Shop Drawings: Include window profiles and sizes, type and spacing of frame anchors, reinforcement size and locations, details of joints and connections, and welding details.

B. Product Data: Include product description for window assemblies including bullet-resistant ratings.

C. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content

D. Samples: 2-inch x 2-inch coating samples showing available colors.

E. Closeout Submittals:

1. Maintenance Data: Include instructions for cleaning of glazed panels.

1.6 QUALITY ASSURANCE

A. Transaction Window Assemblies: Ballistic Level 3 tested to UL 752.

1.7 DELIVERY, STORAGE AND HANDLING

A. Store window assemblies upright in protected, dry area, off ground or floor, with at least 1/4-inch space between individual units.

B. Do not cover with non-vented coverings that create excessive humidity.

C. Remove wet coverings immediately.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide products by ARMORTEX Inc. or comparable product by one of the following:

1. Creative Industries, Inc.
2. C.R. Laurence Co., Inc.
3. Diebold, Inc.
4. Total Security Solutions

2.2 MATERIALS

A. Steel Sheet:

1. ASTM A1008/1008M, cold rolled, free from scale, pitting, coil breaks, and other surface defects.
2. Recycled content: Minimum 25 percent.

B. Bullet-Resistant Composite: UL Listed Bullet Resistant Composite of UL Ballistic Level equal to specified frame ballistic protection level.

C. Glazing:

1. UL Listed laminated glass as specified in Section 08 80 00 “Glazing”.
2. Bottom edge of glazing panel provided with 18 gage stainless steel cap.

D. Track and Hangers:

1. Stainless steel 12 gage track guard and guide.
2. Aluminum 1500 series sliding roller track and wheeled hangers.

2.3 FABRICATION

A. Frames:

1. Fabricate from 16 gage steel lined with bullet-resistant composite.

2. Bullet-resistant rating equivalent to or greater than glazing.
3. Weld frame corners; knock-down and mechanical joints not acceptable.
4. Frame modules capable of being joined with other frame modules to form continuous line.
5. Replacement of glazing from secure side of window, not requiring removal of frame from opening.

B. Shelf: Minimum 2 inches thick with recessed dip tray, full width of window x minimum 12 inches deep, centered under glazing, covered with 18 gage stainless steel.

C. Dip Tray: Model RMDT1016, 16 gage stainless steel, 10 x 16 inches to outside edge of flanges, clear 1-5/8 inch open depth under glazing.

D. Welding: In accordance with AWS D1.3/D1.3M. Grind exposed welds flush and smooth.

E. Finish work neat and free from defects.

F. Allowable Tolerances: Plus or minus 1/16 inch for frame opening width, height, diagonal dimensions, and overall width and height (outside to outside).

2.4 FINISHES

A. Steel:

1. Dress tool marks and surface imperfections to smooth surfaces.
2. Clean and chemically treat steel surfaces.
3. Apply manufacturer’s standard polyester powder coat, sprayed and baked, custom color to match Architect’s sample.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install window assemblies in accordance with manufacturer’s instructions and approved Shop Drawings.

B. Set plumb and level.

C. Secure to adjacent construction using fastener type best suited to application.

D. Field alterations to window assemblies not permitted unless approved in advance by manufacturer and Architect.

3.2 ADJUSTING

A. Touch up minor scratches and abrasions in finish coat to match factory finish.

END OF SECTION 08 56 67

SECTION 08 65 30 - SOUND CONTROL WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes: Steel Acoustical Noise Control View Windows.

B. Related Sections

1. Section 08 80 00 “Glazing”.
2. Section 09 96 00 “High-Performance Coatings”.

1.3 REFERENCES

A. ASTM A 1008 - Standard Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

B. ASTM A 569 - Standard Specification for Steel, Carbon, (0.15 Maximum Percent), Hot- Rolled Sheet and Strip, Commercial Quality.

C. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process.

D. ASTM B 117 - Standard Method of Salt Spray (Fog) Testing.

E. ASTM D 1735 - Standard Practice for Testing Water Resistance of Coating Using Water Fog Apparatus.

F. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne-Sound Transmission Loss of Building Partitions.

G. ASTM E 336 - Standard Test Method for Measurement of Airborne Sound Insulation in Buildings.

H. ASTM E 413 - Classification for Determination of Sound Transmission Class.

I. HMMA 840 – Installation and storage of Hollow Metal Doors and Frames; Hollow Metal Manufacturers Association.

1.4 SYSTEM DESCRIPTION

A. Design requirements: Acoustical window assemblies to include frames, glass and gasketing system required to achieve specified performance requirements.

B. Performance requirements: Sound Transmission Coefficient rating (STC) for installed assembly, when tested in accordance with ASTM E 90 and ASTM E 413.

1.5 SUBMITTALS

A. Product data: Indicate window materials and construction.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C” for Leadership Extraction Practices for the following:
   a. Extended Producer Responsibility
   b. Recycled content

C. Shop drawings: Indicate window opening criteria, elevations, sizes, type; identify and detail cutouts.

D. Quality assurance submittals:

1. Test Reports:
   a. Certified laboratory reports, performed in accordance with ASTM E 90 and ASTM E 413, from independent testing laboratory qualified under the National Voluntary Laboratory Accreditation Program (NVLAP) supporting compliance of assemblies to specified requirements.
   b. Minimum five (5) field tests, performed in accordance with ASTM E 336 and ASTM E 413 by five separate independent testing agencies, substantiating acoustical performance when installed at no less than five (5) FSTC ratings below the specified STC rating.
2. Certificates:
   a. Contractor's certification that:
   b. Products of this section, as provided, meet or exceed specified requirements.
   c. Manufacturer of products of this section meets specified qualifications.
   d. Manufacturer's instructions: Printed installation instructions for each component.

E. Closeout submittals:

1. Warranty documents, executed by manufacturer in Owner's name.
2. Operation and maintenance data for assembly components.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer: Minimum five (5) years-documented experience producing systems specified in this section.
2. Installer: Minimum five (5) years documented experience producing systems specified in this section, and approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store frames in accordance with requirements of HMMA 840.

B. Remove wraps or covers from frames upon delivery at the building site; clean and touch-up scratches or disfigurement caused by shipping or handling promptly with rust inhibitive primer.

C. Store windows on planks or dunnage in a dry location; store in a vertical position spaced by blocking.

D. Store units covered to protect them from damage, but permitting air circulation.

PART 2 - PRODUCTS

2.1 SOUND CONTROL WINDOWS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Krieger Steel Products. Model NCV-3825L-47 for 45+ STC requirements or comparable approved product by one of the following.

1. Acoustical Surfaces, Inc.
2. Soundproof Windows, Inc.
3. Viracon.

2.2 MATERIALS

A. Steel sheet: One of the following:

1. Cold-rolled steel sheet conforming to ASTM A 1008, commercial quality.
2. Hot-rolled steel sheet conforming to ASTM A 569, pickled and oiled, commercial quality.

B. Galvanized steel sheet: ASTM A 653/A 653M, commercial quality, minimum G60 zinc coating.

C. Acoustical material: Manufacturer's standard for required STC rating.

D. Primer: Meeting ASTM B 117 salt spray for 150 hours, and ASTM D 1735 water fog test for organic coatings for 200 hours.

E. Glazing: Clear tempered acoustical glass.

2.3 COMPONENTS

A. Frames: Fabricate in accordance with Architect-approved shop drawings, and as follows:

1. Frames for interior use: Fabricate from steel sheet, minimum 14 gage thickness.
2. Frames for exterior use: Fabricate from galvanized steel sheet, minimum 14 gage thickness.
3. Form frame members straight, and of uniform profile through lengths, as welded units with integral trim, of sizes and profiles indicated.
   a. Weld contact edges of joints closed tight.
   b. Miter perimeter trim faces and weld continuously.

4. When shipping limitations so dictate, fabricate frames for large openings in sections designed for assembly in the field; install alignment plates or angles, of same material and gage as frame, at each joint.
5. Jamb anchors:
   a. Fabricate of same material as frame material; weld anchors inside each jamb for wall anchorage.
   b. Provide anchor types for indicated adjacent wall construction:
      1) Frames for installation in masonry walls:Adjustable jamb anchors, 16 gage, T-shape type.
      2) Frames for installation in stud partitions: Horizontal 16 gage steel “zee” sections to attach metal studs, welded inside each jamb.
6. Plaster guards: Fabricate from minimum 22 gage steel; weld in place at hardware mortises on frames to be set in plaster, masonry, or concrete openings.
7. Stops:
   a. Where integral stops are indicated, form minimum 5/8 inch in depth.
   b. Butt stop joints.

B. Glass and Glazing

1. Tempered Acoustical glass shall be furnished in the thickness required to meet the STC ratings but not less than 1/4". The manufacturer will supply all glazing materials.

C. Fire-Resistant Glazing:

1. Fire and Safety-Rated Laminated Glass: Fire rated, wireless, optically clear glazing material with intumescent interlayers for use in impact safety rated locations such as doors, transoms, borrowed lites and wall applications.
   a. Basis of Design: Provide Vetrotech - Fire-Rated Glass & Systems; Contraflam 45.
2. Fire Rating: 45 minute rated 3/4 inch thick fire resistant glazing material.
3. Individual lites shall be permanently identified with a listing mark.
4. Glazing material installed in “Hazardous Locations” (subject to human impact) shall be certified to meet the applicable requirements for fire rated assemblies referenced in ANSI Z97.1 Standard for Safety Glazing Materials Used in Buildings and/or CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials.
5. Minimum Visible Daylight Transmission: 82 percent.

2.4 FINISHES

A. Finish: All tool marks and surface imperfections shall be removed and exposed faces of all welded joints shall be dressed smooth. Assemblies shall be treated and shall be coated on all accessible surfaces with a rust-inhibitive primer which meets ASTM B117 salt spray for 150 hours, and ASTM D1735 water fog test for organic coatings for 200 hours, and which is fully cured prior to shipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of conditions:

1. Prior to installation, check and correct frames for size, squareness, alignment, twist and plumb.
2. Verify openings are in accordance with approved shop drawings.

B. Installer's examination:

1. Have installer of this section examine conditions under which construction activities of this section are to be performed, then submit written notification if such conditions are unacceptable.
2. Transmit two copies of installer's report to Architect within 24 hours of receipt.
3. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.
4. Beginning construction activities of this section indicates installer's acceptance of conditions.

3.2 INSTALLATION

A. Install units in accordance with approved shop drawings and manufacturer's printed installation instructions; in addition, install steel components in accordance with HMMA 840.

B. Oversize assemblies:

1. Weld field joints in accordance with AWS D1.1 and approved shop drawings.
2. Finish exposed field welds smooth; touch-up with rust inhibitive primer.

C. Fill voids between concealed side of frame and adjacent wall construction with dense fiberglass or lightweight gypsum plaster in accordance with approved shop drawings or manufacturer's printed installation instructions.

D. Finish surfaces having abrasion damage smooth; touch-up with rust inhibitive primer.

E. Install glass & gasketing systems in accordance with manufacturer's printed instructions.

F. Field painting is specified in Section 09 96 00 “High-Performance Coatings”.

3.3 FIELD QUALITY CONTROL

A. Engage and pay for the field services of manufacturer's authorized representative to:

1. Inspect completed installation of the frame assemblies.
2. Issue certified statement of compliance of installed frame assemblies to Architect- approved shop drawings.

B. Engage and pay for the services of independent testing agency to:

1. Test frame assemblies selected by Owner or Architect in accordance with ASTM E 336.
2. Issue certified report-documenting compliance of installed frame assemblies to specified acoustical performance requirements.

C. Notify Architect a minimum of seven (7) calendar days prior to scheduled testing dates.

3.4 MAINTENANCE

A. Instruct the Owner's Maintenance Personnel regarding the proper operation and maintenance of these Noise Control Windows.

END OF SECTION 08 65 30

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Intent: The intent of this Section is to provide finish hardware for the proper operation and control of all wood, hollow metal, and aluminum doors in the Project. Prior to bidding, notify the Architect of any doors that do not have hardware meeting this intention.

B. This Section includes, but is not necessarily limited to furnishing and installing complete, the following:

1. Finish hardware for proper operation, function, control and protection of all doors, as required.

C. Related Sections:

1. Section 08 11 13 "Hollow Metal Doors and Frames"
2. Section 08 11 19 "Stainless Steel Doors and Frames"
3. Section 08 33 23 “Overhead Coiling Doors”
4. Section 08 33 26 “Overhead Coiling Grilles”
5. Section 08 41 13 “Aluminum-Framed Entrances and Storefronts”
6. Division 28 Physical Access Control System Section

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Extended Producer Responsibility
2. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)
   b. Corporate Sustainability Reporting (CSR’s)

C. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with

doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.

b. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.

c. Content: Include the following information:

1) Identification number, location, hand, fire rating, size, and material of each door and frame.

2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.

3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.

4) Fastenings and other pertinent information.

5) Explanation of abbreviations, symbols, and codes contained in schedule.

6) Mounting locations for door hardware.

7) List of related door devices specified in other Sections for each door and frame.

2. Wiring Diagrams: For electrified hardware items specified for this Project, Provide complete wiring diagrams along with riser drawings and elevations, showing locations where such material is to be installed. Wiring Diagrams shall be submitted with Hardware Schedule. Verify and coordinate with the electrical systems installer.

a. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Architectural Hardware Consultant.

B. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for door hardware on doors located in accessible routes.

C. Warranty: Special warranty specified in this Section.

D. Florida Building Code: Provide Miami-Dade Notice of Authorization (NOA) if required by authority having jurisdiction. Engineering Reports that opening meet requirement for wind load, water infiltration and impact as required in FBC.

1.5 CLOSEOUT SUBMITTALS

A. Operations and Maintenance Data: Provide two copies in accordance with Division 01 and include:

1. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
2. Catalog pages for each product.
3. Name, address, and phone number of local representative for each manufacturer.
4. Parts list for each product. Final approved hardware schedule, edited to reflect conditions as-installed.
5. Final keying schedule
6. Copies of floor plans with keying nomenclature
7. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
8. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
9. Any specialized tools needed to maintain the hardware.

1.6 QUALITY ASSURANCE

A. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:

1. For door hardware, an Architectural Hardware Consultant (AHC).

B. Source Limitations: Obtain each type of door hardware from a single manufacturer.

C. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated.

D. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg of water.

E. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with [the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
2. Comply with the following maximum opening-force requirements:
   a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.

b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

G. Keying Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." In addition to Owner, Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

1. Requirements for keyways provided in permanent cores.
2. Requirements for access control.
3. Address and schedule for delivery of permanent cores.

H. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Inspect and discuss preparatory work performed by other trades.
3. Review sequence of operation for each type of electrified door hardware.
4. Review required testing, inspecting, and certifying procedures.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

C. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

D. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.8 COORDINATION

A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.9 WARRANTY

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

1. Failures include, but are not limited to, the following:
   a. Structural failures including excessive deflection, cracking, or breakage.
   b. Faulty operation of doors and door hardware.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
   a. Exit Devices: Three years from date of Substantial Completion.
   b. Locksets: Five years from date of Substantial Completion.
   c. Manual Closers: 10 years from date of Substantial Completion.

1.10 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and products equivalent in function and comparable in quality to named products.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.
2. References to BHMA Designations: Provide products complying with these designations and requirements for description, quality, and function.

2.2 HINGES

A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. IVES Hardware.
   b. Hager.
   c. Bommer Industries, Inc.
2. Requirements:
   a. Exterior out-swinging door butts shall be stainless steel and shall have stainless steel hinge pins. All doors to have non-rising pins.
   b. Hinges shall be sized in accordance with the following:
      1) Height:
         a) Doors up to 41" wide: 4-1/2" inches.
         b) Doors 42" to 48" wide: 5 inches.
   c. Width: Sufficient to clear frame and trim when door swings 180 degrees.
   d. Number of Hinges: Furnish 3 hinges per leaf to 7'-6" in height. Add one hinge for each additional 30 inches of height.

2.3 CONTINUOUS HINGES

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

1. IVES Hardware.
2. Markar.
3. Pemko.

B. Requirements:

1. Aluminum Geared
   a. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.
   b. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by testing agency acceptable to authority having jurisdiction.

2.4 ELECTRIC POWER TRANSFERS

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

1. Von Duprin EPT.
2. Securitron CEPT

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires sufficient to accommodate electric function of specified hardware.
2. Power transfer hinges are not allowed.

2.5 PIVOTS

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

1. IVES Hardware.
2. Rixson.
3. Dorma.

B. Requirements:

1. Provide pivot sets complete with oil-impregnated top pivot, unless indicated otherwise.
2. Where offset pivots are specified, Provide one intermediate pivot for doors less than 91 inches (2311 mm) high and one additional intermediate pivot per leaf for each additional 30 inches (762 mm) in height or fraction thereof. Intermediate pivots spaced equally not less than 25 inches (635 mm) or not more than 35 inches (889 mm) on center, for doors over 121 inches (3073 mm) high.
3. Provide appropriate model where pivot sets are scheduled at fire rated openings.

2.6 FLUSH BOLTS

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

1. Ives Hardware.
2. Burns.
3. Rockwood.

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch steel or brass rods at doors up to 90 inches in height. For doors over 90 inches in height increase top rods by 6 inches for each additional 6 inches of door height. Provide dust-proof strikes at each bottom flush bolt.

2.7 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Mortise Locks: Minimum 3/4-inch latchbolt throw.

C. Lock Backset: 2-3/4 inches, unless otherwise indicated.

D. Lock Trim:

1. Operating Device: Lever with 2 1/8” diameter roses.
2. All inside thumb pieces are to have ADA thumbturns.

E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.

F. Electronic Options: Provide electronic locks where specified. Electronic locks are to incorporate a request to exit switch (REX) in the lever.

G. Mortise Locks: BHMA A156.13; Grade 1; stamped steel case with steel or brass parts; Series 1000.

1. Manufacturers: Subject to compliance with requirements provide products by one of the following:
   a. Corbin Russwin ML2000 Series; an ASSA Abloy company.
   b. Marks Series 5; a Marks USA company.

2.8 COMBINATION LOCKS

A. Lock Functions: As indicated in door hardware schedule.

B. Rim Device: FF-L-2890 compliant.

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

1. LOCKMASTERS, INC.
2. No Substitutions – Owner Standard.

2.9 ELECTRONIC STRIKES

A. Provide electric strikes designed for use with type of locks shown at each opening.

B. Where required, provide electric strikes UL Listed for fire doors and frames.

C. Provide fail-secure type electric strikes, unless specified otherwise.

D. Coordinate voltage and provide transformers and rectifiers for each strike as required.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. HES 8500 Series; an ASSA Abloy Company.

2.10 MAGNETIC LOCKS

A. Surface Magnetic Locks: ANSI/BHMA A156.23.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Schlage Electronics; an Allegion company.
   b. Securitron; an ASSA Abloy Company.

B. Magnetic locks to include minimum holding force of 1200 LBF. Provide magnetic locks equipped with SPDT Magnetic Bond Sensing device, where specified, to monitor whether sufficient magnetic holding force exists to ensure adequate locking and SPDT

Door Status Monitor device, where specified, to monitor whether door is open or closed. Provide bond sensors fully concealed within electromagnet to resist tampering or damage.

C. Provide fasteners, mounting brackets, and spacer bars required for mounting and details.

D. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of magnetic locks for each individual leaf. Switches control both doors simultaneously at pairs. Locate controls as directed by Architect.

2.11 EXIT DEVICES AND AUXILIARY ITEMS

A. Exit Devices and Auxiliary Items: BHMA A156.3.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Von Duprin 35A/98 Series; an Allegion company.
   b. No Substitutions – Owner Standard.
2. Additional Requirements:
   a. Strikes: Rim and surface vertical rods are to be provided with roller strikes. Devices without roller strikes will not be acceptable. Provide manufacturers standard strike for concealed vertical rod devices.
   b. Touchpad is to extend minimum of one half of door width, but not the full length of exit device rail.
   c. Provide flush, tapered end-cap with two-point attachment to door.
   d. All non-rated exit devices on exterior doors shall incorporate cylinder dogging. Exit devices with access control are to be supplied less dogging.
   e. Thru-bolting is not recommended provided the door is specified with proper reinforcement to accept surface mounted exit device.
   f. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrical requirements.
   g. Where lever trim is provided it is to be break-away type.
   h. Provide electrical options as scheduled.

2.12 LOCK CYLINDERS

A. Lock Cylinders: BHMA A156.5; Grade 1. Tumbler type, constructed from brass or bronze.

1. Cylinders and cores are to be furnished and supplied into the Owner’s existing Corbin Russwin large format 6 pin removable core key system with L4 keyway.
2. O-bitted cores are to be provided to the Owner for keying.
3. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
   a. 12 construction change (day) keys.

2.13 KEYING

A. Keying System:

1. Owner will perform keying of lock and cylinders.
2. Stamping: Permanently inscribe each key with a visual key control number and include the following notation: "DO NOT DUPLICATE."

B. Quantity: In addition to one extra key blank for each lock, provide the following:

1. Cylinder Change Keys: Three.
2. Permanent Control Keys: Three.
3. Interchagable Core Construction Keys: Twelve.

2.14 OPERATING TRIM

A. Operating Trim: BHMA A156.6; brass or stainless steel, unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. IVES Hardware; an Allegion company.
   b. Rockwood Manufacturing Company.
   c. Trimco.

2.15 ACCESSORIES FOR PAIRS OF DOORS

A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Provide bar type coordinating devices surface applied to the underside of the stop at the frame head.

1. Coordinators to be prime coat to receive same finish paint as the door frame.
2. Provide filler bar of the correct length to span the entire width of the opening. Provide appropriate brackets for parallel arm closers and surface vertical rod panics.

B. Astragals: BHMA A156.22.

2.16 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Parallel arm closers to have forged steel forearms. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. LCN 4040XP Series; an Allegion company.
   b. No Substitutions – Owner Standard.
2. Additional requirements:
   a. All Closers UL Certified to be in compliance with UBC 7.2 and UL 10C.
   b. Door closer cylinders shall be of high strength cast construction to provide low wear operating capabilities of internal parts throughout the life of the installation.

c. Door closers shall incorporate tamper resistant non-critical screw valves of V-slot design to reduce possible clogging from particles within the closer. Closers shall have separate and independent screw valve adjustments for latch speed, general speed, and hydraulic backcheck. Backcheck shall be properly located so as to effectively slow the swing of the door at a minimum of 10 degrees in advance of the dead stop location to protect the door frame and hardware from damage.
d. Closers with pressure relief values will not be acceptable.
e. Closer cylinders, arms, adapter plates, and metal covers shall have a powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117.
f. Coordinate closer installation with overhead stop where required, provide special templates if required by manufacturer.
g. Provide brackets or plates required for proper Installation of door closers.

2.17 Automatic operators

A. Low energy automatic operators: BHMA A156.19.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. LCN Senior Swing
   b. Horton 4000LE Series.
2. Requirements:
   a. Provide low energy automatic operator electro mechanical units complying with ANSI A156.19.
   b. Provide units with manual off/auto/hold-open switch, push and go function to activate power operator, vestibule interface delay, electric lock delay, hold-open delay adjustable from 2 to 30 seconds, and logic terminal to interface with accessories, mats, and sensors.
   c. Provide drop plates, brackets, or adapters for arms as required for details.
   d. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.
   e. Provide units with inputs for smoke evacuation doors, where specified, which allow doors to power open upon fire alarm activation and hold open indefinitely or until fire alarm is reset, presence detector input, which prevents closed door from opening or door that is fully opened from closing, hold open toggle input, which allows remote activation for indefinite hold open and close second time input is activated, vestibule inputs, which allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

2.18 DOOR STOPS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. IVES Hardware; an Allegion company.
   2. Rockwood Manufacturing Company.
   3. Trimco.

B. Provide wall stops wherever possible. Provide convex type.

C. Provide floor stops only where specified.

2.19 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:
   1. Glynn-Johnson
   2. Rixson

B. Requirements:
   1. Provide heavy duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide overhead stop for interior doors and at any door that swings more than 140 degrees before striking wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop.
   2. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

2.20 Door Gasketing

A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. National Guard Products.
      b. Zero Manufacturing.
      c. Reese Weatherstriping

2.21 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. National Guard Products.
      b. Zero Manufacturing.
      c. Reese Weatherstriping

2.22 SILENCERS

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

1. IVES Hardware; an Allegion company.
2. Rockwood Manufacturing Company.
3. Trimco.

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified

2.23 METAL PROTECTIVE TRIM UNITS

A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch-thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. IVES Hardware; an Allegion company.
   b. Rockwood Manufacturing Company.
   c. Trimco.
2. Additional Requirements:
   a. All protective plates are to be beveled on all four edges and have countersunk screw holes.

2.24 AUXILIARY DOOR HARDWARE

A. Auxiliary Hardware: BHMA A156.16.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. IVES Hardware; an Ingersoll-Rand company.
   b. Rockwood Manufacturing; an ASSA Abloy company.
   c. Trimco.

2.25 DOOR POSITION SWITCHES

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

1. Sentrol 2700 Series High Security Concealed Magnetic Contacts.

B. Requirements:

1. Provide surface mount switches on secure side of door.

2.26 FABRICATION

A. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

B. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:
   a. Wood or Machine Screws: For the following:
      1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
      2) Strike plates to frames.
      3) Closers to doors and frames.
   b. Steel Through Bolts: For the following unless door blocking is provided:
      1) Surface hinges to doors.
      2) Closers to doors and frames.
      3) Surface-mounted exit devices.
3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.27 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

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

3.2 PREPARATION

A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Owner will replace construction cores with permanent cores after acceptance.

E. Thresholds: Set thresholds for doors indicated in full bed of sealant complying with requirements specified in Section 07 92 00 "Joint Sealants."

F. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

G. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

H. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

I. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.4 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DEMONSTRATION

A. Contractor to instruct owner’s personnel to adjust, operate, and maintain door hardware and door hardware finishes.

3.7 DOOR HARDWARE SCHEDULE

A. The hardware sets listed below represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process.

HARDWARE SET: EAC-01
EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE
4	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-HH-9847-EO-SNB-CON	626	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-HH-9847-NL-OP-110MD-SNB-CON	630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
2	EA	OH STOP	100S	630	GLY
2	EA	SURF. AUTO OPERATOR	4642 CS WMS	689	LCN
2	EA	BOLLARD	BPA-SM (6X6X45 ANGLE TOP, PREP FOR SPECIFIED ACTUA	630	WIK
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ACTUATORS ONLY OPERABLE WHEN DOOR IS DOGGED. ALWAYS FREE EGRESS.

HARDWARE SET: EAC-02

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE
4	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-HH-9847-EO-SNB-CON	626	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-HH-9847-NL-OP-110MD-SNB-CON	630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
2	EA	BLADE STOP SPACER	4040-61	689	LCN
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	KEY SWITCH	653-14 NS	630	SCE

2	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER	630	SEN

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. PANICS MAY BE DOGGED (MADE PUSH/PULL) ELECTRONICALLY OR VIA KEYSWITCH. ALWAYS FREE FOR EGRESS.

HARDWARE SET: EAC-03

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7215 SET	626	IVE
2	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-HH-98-NL-OP-110MD-SNB-CON	630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
1	EA	BLADE STOP SPACER	4040-61	689	LCN
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	KEY SWITCH	653-14 NS	630	SCE
1	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER	630	SEN

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. PANICS MAY BE DOGGED (MADE PUSH/PULL) ELECTRONICALLY OR VIA KEYSWITCH. ALWAYS FREE FOR EGRESS.

HARDWARE SET: EAC-03A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7215 SET	626	IVE
2	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	RX-HH-98-L-E996-06-FSE-CON	630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
	EA	SURFACE CLOSER	4040 EDA SRI	689	LCN
1	EA	CUSH SHOE SUPPORT	SRI 4040-30	689	LCN
1	EA	BLADE STOP SPACER	SRI 4040-61	689	LCN
1	EA	FIRE/LIFE HOLDER	SEM 7820	689	LCN
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. PANICS MAY BE DOGGED (MADE PUSH/PULL) ELECTRONICALLY OR VIA KEYSWITCH. ALWAYS FREE FOR EGRESS.

HARDWARE SET: EAC-04

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE
4	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	KEYED REMOVABLE MULLION	KR4954	689	VON
1	EA	DELAYED PANIC HARDWARE	CX-HH-98-EO-SNB-CON	630	VON
1	EA	ELEC DELAYED PANIC HARDWARE	CX-HH-98-L-E996-03 SS-FSE-630-CON	630/630	VON
3	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
2	EA	BLADE STOP SPACER	4040-61	689	LCN
1	EA	MULLION SEAL	8780N	N	ZER
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER

4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		
			WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

OPERATIONAL DESCRIPTION: DOOR NORMALLY CLOSED AND LOCKED. VALID CARD READ ALLOWS ENTRY FROM PULL SIDE. VALID CARD READ FROM PUSH SIDE OF DOOR TEMPORARLY DISABLES CX DEVICE ALLOWING EXIT. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM. ALARM MUST RESET AT THE OPENING.

HARDWARE SET: EAC-04A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE
4	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
2	EA	DELAYED PANIC HARDWARE	CX-HH-3547A-EO	626	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
2	EA	BLADE STOP SPACER	4040-61	689	LCN
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

OPERATIONAL DESCRIPTION: DOOR NORMALLY CLOSED AND LOCKED, EXIT ONLY. ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM. ALARM MUST RESET AT THE OPENING.

HARDWARE SET: EAC-04B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7215 SET	626	IVE
1	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	DELAYED PANIC HARDWARE	CX-HH-98-EO-SNB-CON	630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
1	EA	BLADE STOP SPACER	4040-61	689	LCN
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, NO ENTRY. PUSH SIDE - ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: EAC-05

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7215 SET	626	IVE
2	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC DELAYED PANIC HARDWARE	CX-HH-98-L-E996-03 SS-FSE-630-CON	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
1	EA	BLADE STOP SPACER	4040-61	689	LCN
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

OPERATIONAL DESCRIPTION: DOOR NORMALLY CLOSED AND LOCKED. VALID CARD READ ALLOWS ENTRY FROM PULL SIDE. VALID CARD READ FROM PUSH SIDE OF DOOR TEMPORARLY DISABLES CX DEVICE ALLOWING EXIT. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM. ALARM MUST RESET AT THE OPENING.

HARDWARE SET: EAC-07

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE
2	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	PANIC HARDWARE	HH-CD-9847-EO-SNB	630	VON
1	EA	PANIC HARDWARE	HH-CD-9847-NL-OP-110MD-SNB	626	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
1	EA	SURF. AUTO OPERATOR	9563 REG2 MS	ANCLR	LCN
1	EA	ACTUATOR, JAMB MOUNT	8310-818T	630	LCN
1	EA	ACTUATOR, WALL MOUNT	8310-853T	630	LCN

2	EA	BOLLARD	BPA-SM (6X6X45 ANGLE TOP, PREP FOR SPECIFIED ACTUA	630	WIK
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. PANICS MAY BE DOGGED (MADE PUSH/PULL) VIA KEY. DOOR WILL ONLY OPEN WHEN PANICS ARE DOGGED, CLUTCHING MECHANISM IN AUTO OPERATOR WILL PREVENT DAMAGE TO OPERATOR WHEN LATCHED. ALWAYS FREE EGRESS.

HARDWARE SET: EAC-08

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	IC MORT. CYLINDER	1080 CT6R (VERIFY TYPE AND QUANTITY REQUIRED)	630	C-R
	EA	NOTE	REMAINDER OF HARDWARE BY DOOR SUPPLIER		

HARDWARE SET: EAC-09

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7215 SET	626	IVE
2	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
1	EA	BLADE STOP SPACER	4040-61	689	LCN
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ALWAYS FREE FOR EGRESS FROM ROOF.

HARDWARE SET: EAM-01

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE

2	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	ELEC PANIC HARDWARE	LX-RX-HH-CD-9847-EO-SNB-CON	630	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-HH-CD-9847-NL-OP-110MD-SNB-CON	626	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
2	EA	BLADE STOP SPACER	4040-61	689	LCN
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

HARDWARE SET: EAM-02

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE
4	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
2	EA	PANIC HARDWARE	HH-CD-9847-EO-SNB	630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
2	EA	BLADE STOP SPACER	4040-61	689	LCN
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

HARDWARE SET: EAM-03

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE
4	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
2	EA	ELEC PANIC HARDWARE	LX-RX-HH-CD-9847-EO-SNB-CON	630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
2	EA	BLADE STOP SPACER	4040-61	689	LCN
2	EA	DOOR SWEEP	8198AA	AA	ZER

1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

HARDWARE SET: EAM-04

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7215 SET	626	IVE
1	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-HH-LD-98-NL-OP-110MD-SNB-CON	630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
1	EA	BLADE STOP SPACER	4040-61	689	LCN
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

HARDWARE SET: EAM-05

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7215 SET	626	IVE
1	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	PANIC HARDWARE	HH-LD-98-EO-SNB	630	VON
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
1	EA	BLADE STOP SPACER	4040-61	689	LCN
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	RAIN DRIP	142A	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

HARDWARE SET: EAM-06

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7215 SET	626	IVE
1	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	PANIC HARDWARE	HH-CD-98-NL-OP-110MD-SNB	630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
1	EA	BLADE STOP SPACER	4040-61	689	LCN
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

HARDWARE SET: EHC-01

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	KEYED FIRE RATED REMOVABLE MULLION	KR9954	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	LX-RX-HH-98-EO-F-SNB-CON	630	VON
1	EA	ELEC FIRE EXIT HARDWARE	LX-RX-QEL-HH-98-L-NL-F-03 SS-630-CON	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. ALWAYS FREE FOR EGRESS.

HARDWARE SET: EHC-01A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	KEYED REMOVABLE MULLION	KR4954	689	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-HH-98-EO-SNB-CON	630	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-HH-98-L-NL-03 SS-630-CON	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. ALWAYS FREE FOR EGRESS.

HARDWARE SET: EHC-01B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	PANIC HARDWARE	HH-9847-L-BE-03	630	VON
2	EA	SURFACE CLOSER	4040XP SHCUSH SRI	689	LCN
1	EA	GASKETING	429A	A	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER

1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	RAIN DRIP	142A	A	ZER

HARDWARE SET: EHC-02

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	KEYED FIRE RATED REMOVABLE MULLION	KR9954	689	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-HH-98-EO-SNB-CON	630	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-HH-98-L-NL-03 SS-630-CON	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: EHC-03

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	LX-RX-QEL-HH-98-L-NL-F-03 SS-630-CON	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH

1	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: EHC-03A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-HH-98-L-NL-03 SS-630-CON	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: EHC-04

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-HH-98-L-NL-03 SS-630-CON	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: EHC-05

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	KEYED REMOVABLE MULLION	KR4954	689	VON
1	EA	DELAYED PANIC HARDWARE	CX-HH-98-EO-SNB-CON	630	VON
1	EA	ELEC DELAYED PANIC HARDWARE	CX-HH-98-L-E996-03 SS-FSE-630-CON	630/630	VON
3	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: EHC-05A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	DELAYED PANIC HARDWARE	CX-HH-9847-EO-SNB-CON	630	VON

1	EA	ELEC DELAYED PANIC HARDWARE	CX-HH-9847-L-E996-03 SS-FSE-630-CON	630/630	VON
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
1	EA	POWER SUPPLY	PS904 900-4R-FA CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	LGR	VON

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: EHC-05B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	KEYED REMOVABLE MULLION	KR4954	689	VON
2	EA	DELAYED PANIC HARDWARE	CX-HH-98-EO-SNB-CON	630	VON
3	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		

			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, NO ENTRY. PUSH SIDE - ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: EHC-05C

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	KEYED FIRE RATED REMOVABLE MULLION	KR9954	689	VON
1	EA	ELEC DELAYED FIRE EXIT HARDWARE	CX-HH-9847-L-F-E996-03 SS-FSE-630-CON	630/630	VON
1	EA	DELAYED FIRE EXIT HARDWARE	CX-HH-98-EO-F-SNB-CON	630	VON
3	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: EHC-06

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON

1	EA	ELEC DELAYED PANIC HARDWARE	CX-HH-98-L-E996-03 SS-FSE-630-CON	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: EHC-06A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	DELAYED PANIC HARDWARE	CX-HH-98-EO-SNB-CON	630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, NO ENTRY. PUSH SIDE - ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: EHC-07

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	GASKETING	488S-BK (APPLY TO ASTRAGAL)	S-BK	ZER
1	EA	ASTRAGAL	BY DOOR MANUFACTURER	630	
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: EHC-07A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	485A	A	ZER
1	EA	ASTRAGAL	BY DOOR MANUFACTURER	630	
2	EA	DOOR BOTTOM	361AA6-Z49	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		

POWER SUPPLY BY ACCESS CONTROL PROVIDER

HARDWARE SET: EHC-08

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

CARD READER BY ACCESS CONTROL PROVIDER
POWER SUPPLY BY ACCESS CONTROL PROVIDER

HARDWARE SET: EHC-08A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	485A	A	ZER
1	EA	DOOR BOTTOM	360AA6-Z49	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

CARD READER BY ACCESS CONTROL PROVIDER
POWER SUPPLY BY ACCESS CONTROL PROVIDER

HARDWARE SET: EHC-09

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
2	EA	ELEC FIRE EXIT HARDWARE	RX-QEL-9847-L-F-03 SS-630-CON	630/630	VON
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURF. AUTO OPERATOR	9563 REG2 MS	ANCLR	LCN
1	EA	ACTUATOR, JAMB MOUNT	8310-818T	630	LCN
1	EA	ACTUATOR, WALL MOUNT	8310-853T	630	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: DOOR NORMALLY CLOSED AND ELECTRONICALLY DOGGED (MADE PUSH/PULL). PRESSING ACTUATORS OPENS CORRESPONDING DOOR. UPON FIRE ALARM OR LOSS OF POWER DOORS TO CLOSE AND LATCH. ALWAYS FREE FOR EGRESS.

HARDWARE SET: EHC-10

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
2	EA	ELEC FIRE EXIT HARDWARE	RX-QEL-9847-L-F-03 SS-630-CON	630/630	VON
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		

POWER SUPPLY BY ACCESS CONTROL PROVIDER

HARDWARE SET: EHC-10A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
2	EA	ELEC DELAYED FIRE EXIT HARDWARE	CX-HH-9847-L-F-E996-03 SS-FSE-630-CON	630/630	VON
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
1	EA	POWER SUPPLY	PS904 900-4R-FA	LGR	VON

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: EHC-10B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
2	EA	ELEC DELAYED PANIC HARDWARE	CX-HH-9847-L-E996-03 SS-FSE-630-CON	630/630	VON
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH

1	EA	POWER SUPPLY	PS904 900-4R-FA	LGR	VON

OPERATION: DOOR NORMALLY CLOSED AND ELECTRONICALLY DOGGED (MADE PUSH/PULL). UPON FIRE ALARM OR LOSS OF POWER DOORS TO CLOSE AND LATCH. ALWAYS FREE FOR EGRESS.

HARDWARE SET: EHC-11

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	LOCK GUARD	LG14	630	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	RAIN DRIP	142A	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: EHC-11A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR BOTTOM	361AA6	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	RAIN SHIELD	141AA	AA	ZER
1	EA	RAIN DRIP	142A	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		

			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: EHC-12

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	SURFACE CLOSER	4040XP	689	LCN
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	ASTRAGAL SET	555AA X 55AA	AA	ZER
2	EA	DOOR BOTTOM	361AA6	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	RAIN SHIELD	141AA	AA	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: EHC-13

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	WP-RX-HH-LD-9847-EO-CON	630	VON
1	EA	ELEC PANIC HARDWARE	WP-RX-HH-LD-9847-L-E996-06-FSE-CON	630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP CUSH SRI	689	LCN
1	EA	GASKETING	429A	A	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH

1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. PANICS MAY BE DOGGED (MADE PUSH/PULL) ELECTRONICALLY OR VIA KEYSWITCH. ALWAYS FREE FOR EGRESS.

HARDWARE SET: EHC-14

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	KEYED FIRE RATED REMOVABLE MULLION	KR9954	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	LX-RX-HH-98-EO-F-SNB-CON	630	VON
1	EA	ELEC FIRE EXIT HARDWARE	LX-RX-QEL-HH-98-L-NL-F-03 SS-630-CON	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	170AA	AA	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	MEETING STILE	555AA X 55AA	AA	ZER
2	EA	DOOR BOTTOM	361AA6	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	MOUNTING BRACKET	770SPB		ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. ALWAYS FREE FOR EGRESS.

HARDWARE SET: EHM-01

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	PANIC HARDWARE	CD-9849-L-DT-03 SS-630-249-LBL	630/630	VON
1	EA	PANIC HARDWARE	CD-9849-L-NL-03 SS-630-249-LBL	630/630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER

HARDWARE SET: EHM-02

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	KEYED REMOVABLE MULLION	KR4954	689	VON
2	EA	PANIC HARDWARE	HH-LD-98-L-03 SS-630	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: EHM-02A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	KEYED REMOVABLE MULLION	KR4954	689	VON
2	EA	PANIC HARDWARE	HH-LD-98-L-03 SS-630	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R

2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	170AA	AA	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	555AA X 55AA	AA	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR BOTTOM	361AA6	AA	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	MOUNTING BRACKET	770SPB		ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: EHM-02B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	KEYED FIRE RATED REMOVABLE MULLION	KR9954	689	VON
2	EA	FIRE EXIT HARDWARE	HH-98-L-F-03 SS-630	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	170AA	AA	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	555AA X 55AA	AA	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR BOTTOM	361AA6	AA	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	MOUNTING BRACKET	770SPB		ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: EHM-02C

EACH TO HAVE:

A.

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	FIRE EXIT HARDWARE	HH-98-L-F-03 SS-630	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	170AA	AA	ZER

1	EA	DOOR BOTTOM	361AA6	AA	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	MOUNTING BRACKET	770SPB		ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: EHM-03

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	KEYED FIRE RATED REMOVABLE MULLION	KR9954	689	VON
2	EA	FIRE EXIT HARDWARE	HH-98-EO-F-SNB	630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: EHM-04

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	KEYED REMOVABLE MULLION	KR4954	689	VON
2	EA	PANIC HARDWARE	HH-LD-98-EO-SNB	630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: EHM-04A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	KEYED REMOVABLE MULLION	KR4954	689	VON
2	EA	PANIC HARDWARE	HH-98-EO-SNB	630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	485A	A	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR BOTTOM	360AA6-Z49	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: EHM-05

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	FIRE EXIT HARDWARE	98-L-NL-F-03 SS-630	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER

HARDWARE SET: EHM-06

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	PANIC HARDWARE	HH-LD-98-EO-SNB	630	VON
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: EHM-06A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	FIRE EXIT HARDWARE	HH-98-EO-F-SNB	630	VON
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: EHM-07

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	FIRE EXIT HARDWARE	98-L-F-03 SS-630	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER

HARDWARE SET: EHM-07A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	PANIC HARDWARE	HH-98-L-03 SS-630	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH (WHEN REQUIRED ON TS DRAWINGS)	630	SEN

HARDWARE SET: EHM-08

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	GASKETING	488S-BK (APPLY TO ASTRAGAL)	S-BK	ZER
1	EA	ASTRAGAL	BY DOOR MANUFACTURER	630	
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER

HARDWARE SET: EHM-08A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	485A	A	ZER
1	EA	GASKETING	488S-BK (APPLY TO ASTRAGAL)	S-BK	ZER
1	EA	ASTRAGAL	BY DOOR MANUFACTURER	630	
2	EA	DOOR BOTTOM	361AA6-Z49	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER

HARDWARE SET: EHM-08B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE

1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	170AA	AA	ZER
1	EA	ASTRAGAL SET	555AA X 55AA	AA	ZER
2	EA	DOOR BOTTOM	361AA6-Z49	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	MOUNTING BRACKET	770SPB		ZER

HARDWARE SET: EHM-08C

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	OH STOP	100S	630	GLY
2	EA	SURFACE CLOSER	4040XP ST-1630	689	LCN
1	EA	GASKETING	429A	A	ZER
1	EA	GASKETING	488S-BK (APPLY TO ASTRAGAL)	S-BK	ZER
1	EA	ASTRAGAL	BY DOOR MANUFACTURER	630	
2	EA	DOOR BOTTOM	361AA6	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	RAIN SHIELD	141AA	AA	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH (WHEN REQUIRED ON TS DRAWINGS)	630	SEN

HARDWARE SET: EHM-08D

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R

1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	SURFACE CLOSER	4040XP	689	LCN
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	ASTRAGAL SET	555AA X 55AA	AA	ZER
2	EA	DOOR BOTTOM	361AA6	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	RAIN SHIELD	141AA	AA	ZER
1	EA	RAIN DRIP	142A	A	ZER

HARDWARE SET: EHM-09

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER

HARDWARE SET: EHM-09A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP	689	LCN
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR BOTTOM	361AA6	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	RAIN SHIELD	141AA	AA	ZER

HARDWARE SET: EHM-10

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10	689	VON

1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

NOTE: INSTALL LOCKSET TO ALLOW EGRESS FROM ROOFTOP.

HARDWARE SET: EHM-11

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	ASTRAGAL	BY DOOR MANUFACTURER	630	
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

NOTE: INSTALL LOCKSET TO ALLOW EGRESS FROM ROOFTOP.

HARDWARE SET: EHM-11A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R

1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	GASKETING	429A	A	ZER
2	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	RAIN DRIP	142A	A	ZER

NOTE: INSTALL LOCKSET TO ALLOW EGRESS FROM ROOFTOP.

HARDWARE SET: EHM-12

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	RAIN DRIP	142A	A	ZER

HARDWARE SET: EHM-13

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	FIRE EXIT HARDWARE	HH-9847-L-F-06	630	VON
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH SRI	689	LCN
1	EA	GASKETING	429A	A	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	RAIN DRIP	142A	A	ZER

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. ALWAYS FREE FOR EGRESS.

HARDWARE SET: EHM-14

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR

4	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	FIRE EXIT HARDWARE	HH-98-L-F-03 SS-630	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH SRI	689	LCN
1	EA	GASKETING	429A	A	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
2	EA	RAIN DRIP	142A	A	ZER

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. ALWAYS FREE FOR EGRESS.

HARDWARE SET: EHM-15

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	PRIVACY LOCK	ML2030 LWA X LWM M19V	630	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	RAIN DRIP	142A	A	ZER

HARDWARE SET: EHM-16

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	429A	A	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER

HARDWARE SET: IAC-01

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
10	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON

1	EA	ELEC PANIC HARDWARE	RX-QEL-9849-EO-249-LBL-CON	630	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9849-NL-OP-110MD-249-LBL-CON	630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
2	EA	BLADE STOP SPACER	4040-61	689	LCN
2	EA	WALL STOP	WS406/407CCV	630	IVE
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IAC-02

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-NL-OP-110MD-CON	630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	PA MOUNTING PLATE	4040-18PA	689	LCN
1	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
1	EA	BLADE STOP SPACER	4040-61	689	LCN
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID CARD READ. ALWAYS FREE FOR EGRESS.

HARDWARE SET: IAC-03

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE
2	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE

2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-3547A-EO-CON	626	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL-3547A-NL-OP-388-CON	626	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
2	EA	BLADE STOP SPACER	4040-61	689	LCN
1	SET	SEALS	350CSR	AL	PEM
2	EA	ASTRAGAL SEALS	29324CNB	AL	PEM
2	EA	DOOR BOTTOM	430CRL	AL	PEM
1	EA	MOUNTING BRACKET	870SPB		ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

NOTE: VERIFY SEALS ARE COMPATIBLE WITH DOOR/FRAME. DOOR/FRAME SUPPLIER TO PROVIDE SIMILAR SEAL IF SPECIFIED SEAL IS NOT COMPATIBLE.

HARDWARE SET: IAC-04

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE
2	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
2	EA	DUMMY PUSH BAR	350	630	VON
2	EA	MAGNETIC LOCK	M490P ATS/LED	628	SCE
2	EA	LONG DOOR PULL	9264F 36" 20" 0	630-316	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	PA MOUNTING PLATE	4040-18PA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
2	EA	BLADE STOP SPACER	4040-61	689	LCN
1	EA	PUSHBUTTON	621ALEX DA NS	629	SCE
1	EA	MOTION SENSOR	SCANII	WHT	SCE
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: ACCESS CONTROL EGRESS DOOR. DOOR NORMALLY CLOSED AND LOCKED. VALID CARD READ FROM PULL SIDE ALLOWS TEMPORARY ACCESS. PUSH SIDE ALWAYS FREE FOR EGRESS VIA MOTION SENSOR OR EMERGENCY PUSHBUTTON. DOOR TO UNLOCK UPON FIRE ALARM OR LOSS OF POWER.

HARDWARE SET: IAC-05

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	CX-98-L-E996-03 SS-FSE-630-CON	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IAC-06

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7215 SET	626	IVE
1	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	PA MOUNTING PLATE	4040-18PA	689	LCN
1	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
1	EA	BLADE STOP SPACER	4040-61	689	LCN
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED,

THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IAC-07

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE
2	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	DELAYED PANIC HARDWARE	CX-9847-L-LBR-03 SS-630-CON	630/630	VON
1	EA	DELAYED PANIC HARDWARE	CX-9847-EO-LBR-CON	630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	BLADE STOP SPACER	4040-61	689	LCN
2	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		
			CARD READER BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IAM-01

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7215 SET	626	IVE
1	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	PANIC HARDWARE	CD-9847-NL-OP-LBR-110MD	630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	PA MOUNTING PLATE	4040-18PA	689	LCN
1	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
1	EA	BLADE STOP SPACER	4040-61	689	LCN

HARDWARE SET: IAM-02

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE
2	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	PANIC HARDWARE	CD-9847-EO-LBR	630	VON
1	EA	PANIC HARDWARE	CD-9847-NL-OP-LBR-110MD	630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	90 DEG OFFSET PULL	8190HD 12" O	630	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	PA MOUNTING PLATE	4040-18PA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
2	EA	BLADE STOP SPACER	4040-61	689	LCN

HARDWARE SET: IAM-03

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7215 SET	626	IVE
1	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	EA	MORTISE DEADBOLT	8501 (VERIFY BACKSET)	626	ACC
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	MORTISE CYL TURN	09-905	626	SCH
1	SET	PUSH/PULL BAR	9190HD-12"-NO	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE

HARDWARE SET: IAM-04

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	PIVOT SET	7215 SET	626	IVE
1	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
1	SET	PUSH/PULL BAR	9190HD-12"-NO	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE

HARDWARE SET: IAM-05

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	MORTISE LOCK	8848 L X L W/ SCHLAGE 03 LEVER (VERIFY BACKSET)	630	ACC
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R

1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT PRACTICAL)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE

HARDWARE SET: IAM-06

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	NOTE	REMAINDER OF HARDWARE BY DOOR SUPPLIER		

HARDWARE SET: IHC-01

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	KEYED FIRE RATED REMOVABLE MULLION	KR9954	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-98-EO-F-CON	630	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-QEL-98-L-NL-F-03 SS-630-CON	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	MULLION SEAL	8780N	N	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER	630	SEN

			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-02

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	KEYED FIRE RATED REMOVABLE MULLION	KR9954	689	VON
1	EA	ELEC PANIC HARDWARE	RX-98-EO-CON	630	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-L-NL-03 SS-630-CON	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
2	EA	SILENCER	SR64	GRY	IVE
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-03

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-QEL-98-L-NL-F-03 SS-630-CON	630/630	VON
1	EA	OH STOP	90S (WHERE WALL STOP IS NOT PRACTICAL)	630	GLY
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH

1	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-03A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-QEL-98-L-NL-F-03 SS-630-CON	630/630	VON
1	EA	OH STOP	90S (WHERE WALL STOP IS NOT PRACTICAL)	630	GLY
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-03B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-L-NL-03 SS-630-CON	630/630	VON
1	EA	OH STOP	90S (WHERE WALL STOP IS NOT PRACTICAL)	630	GLY
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH

1	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-04

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-98-L-NL-03 SS-630-CON	630/630	VON
1	EA	OH STOP	90S (WHERE WALL STOP IS NOT PRACTICAL)	630	GLY
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-05

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	DELAYED FIRE EXIT HARDWARE	CX-9847-EO-F-LBR-CON	630	VON
1	EA	ELEC DELAYED FIRE EXIT HARDWARE	CX-9847-L-F-LBR-E996-03 SS-FSE-630-CON	630/630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER

4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-05A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	DELAYED FIRE EXIT HARDWARE	CX-9847-EO-F-LBR-CON	630	VON
1	EA	ELEC DELAYED FIRE EXIT HARDWARE	CX-9847-L-F-LBR-E996-03 SS-FSE-630-CON FAIL SAFE	630/630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-05B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	DELAYED PANIC HARDWARE	CX-9847-EO-LBR-CON	630	VON
1	EA	ELEC DELAYED PANIC HARDWARE	CX-9847-L-LBR-E996-03 SS-FSE-630-CON	630/630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	ASTRAGAL SET	8193AA	AA	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-05C

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	DELAYED FIRE EXIT HARDWARE	CX-9847-EO-F-LBR-CON	630	VON
1	EA	DELAYED FIRE EXIT HARDWARE	CX-9847-L-F-LBR-03 SS-630-CON	630/630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
		CARD READER BY ACCESS CONTROL PROVIDER (WHEN REQUIRED BY TS DRAWINGS)			

POWER SUPPLY BY ACCESS CONTROL PROVIDER
(WHEN REQUIRED BY TS DRAWINGS)

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-05D

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
2	EA	DELAYED FIRE EXIT HARDWARE	CX-9847-EO-F-LBR-CON	630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED, EXIT ONLY. ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-05E

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
2	EA	DELAYED FIRE EXIT HARDWARE	CX-9847-EO-F-LBR-CON	630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER

4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE – NO ACCESS. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-06

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	CX-9875-L-F-E996-03 SS-FSE-630-SS7500-CON	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
		CARD READER BY ACCESS CONTROL PROVIDER (WHEN REQUIRED BY TS DRAWINGS) POWER SUPPLY BY ACCESS CONTROL PROVIDER (WHEN REQUIRED BY TS DRAWINGS)			

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-06A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	CX-9875-L-F-E996-03 SS-FSE-630-SS7500-CON	630/630	VON

1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-06B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	CX-98-L-F-03 SS-630-CON	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
		CARD READER BY ACCESS CONTROL PROVIDER (WHEN REQUIRED BY TS DRAWINGS)			
		POWER SUPPLY BY ACCESS CONTROL PROVIDER (WHEN REQUIRED BY TS DRAWINGS)			

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, KEY ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-07

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	DELAYED PANIC HARDWARE	CX-9847-EO-LBR-CON	630	VON
1	EA	ELEC DELAYED PANIC HARDWARE	CX-9847-L-LBR-E996-03 SS-FSE-630-CON	630/630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
2	EA	SILENCER	SR64	GRY	IVE
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-07A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	DELAYED FIRE EXIT HARDWARE	CX-9847-EO-F-LBR-CON	630	VON
1	EA	ELEC DELAYED FIRE EXIT HARDWARE	CX-9847-L-F-LBR-E996-03 SS-FSE-630-CON	630/630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		

POWER SUPPLY BY ACCESS CONTROL PROVIDER

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-07B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
2	EA	TWO PT EU MORT LOCK	LM9295EUL 03A LBL	630	SCH
2	EA	SURFACE CLOSER	4040XP CUSH MC	MTLPC	LCN
2	EA	FIRE/LIFE HOLDER	4040SEH	689	LCN
2	EA	SILENCER	SR64	GRY	IVE
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY/EXIT. NOT AN EGRESS DOOR.

HARDWARE SET: IHC-07C

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	DELAYED FIRE EXIT HARDWARE	CX-9847-EO-F-LBR-CON	630	VON
1	EA	ELEC DELAYED FIRE EXIT HARDWARE	CX-9847-L-F-LBR-E996-03 SS-FSE-630-CON	630/630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	FIRE/LIFE HOLDER	4040SEH	689	LCN
1	EA	GASKETING	488S-BK	S-BK	ZER

2	EA	ASTRAGAL SET	8193AA	AA	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
2			CARD READER BY ACCESS CONTROL PROVIDER		
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM. HOLD OPEN TO INTERFACE WITH SECURITY AND FIRE SYSTEM.

HARDWARE SET: IHC-08

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	CX-9875-L-E996-03 SS-FSE-630-SS7500-CON	630/630	VON
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PULL SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PUSH SIDE - VALID CARD READ TEMPORARILY DISABLES CX DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-08A

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR

3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	DELAYED EGRESS MAG	M490DEP	628	SCE
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: PUSH SIDE - DOOR NORMALLY CLOSED AND LOCKED, VALID CARD READ ALLOWS ENTRY. PULL SIDE - VALID CARD READ TEMPORARILY DISABLES DELAYED EGRESS DEVICE ALLOWING EGRESS. WITHOUT VALID CARD READ ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-08B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
4	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	CX-98-EO-F-CON	630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED, EXIT ONLY. ALARM WILL SOUND WHEN PUSH PAD IS DEPRESSED, THE DEVICE WILL PREVENT EGRESS FOR 15 SECONDS OR LESS. DEVICE WILL DISARM IMMEDIATELY UPON FIRE ALARM.

HARDWARE SET: IHC-09

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	LX-RX-9847-EO-F-LBR-CON	630	VON
1	EA	ELEC FIRE EXIT HARDWARE	LX-RX-QEL+-9847-L-NL-F-03-249-LBR-CON	630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	MOUNTING BRACKET	MB	689	IVE
1	EA	OH STOP	90S (WHERE WALL STOP IS NOT FEASIBLE)	630	GLY
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	770AA	AA	ZER
1	EA	ASTRAGAL SET	555AA X 55AA	AA	ZER
2	EA	DOOR BOTTOM	360AA6	AA	ZER
4	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-09A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	LX-RX-9847-EO-F-LBR-CON	630	VON
1	EA	ELEC FIRE EXIT HARDWARE	LX-RX-QEL+-9847-L-NL-F-03-249-LBR-CON	630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	MOUNTING BRACKET	MB	689	IVE
1	EA	OH STOP	90S (WHERE WALL STOP IS NOT FEASIBLE)	630	GLY
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	555AA X 55AA	AA	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH

2	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-09AA

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	LX-RX-9847-EO-F-LBR-CON	630	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL+-9847-L-NL-03-249-LBR-CON	630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	MOUNTING BRACKET	MB	689	IVE
1	EA	OH STOP	90S (WHERE WALL STOP IS NOT FEASIBLE)	630	GLY
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	555AA X 55AA	AA	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-09B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	LX-RX-QEL+-9847-L-NL-F-03-249-LBR-CON	630	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-9849-EO-F-249-LBL-CON	630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	MOUNTING BRACKET	MB	689	IVE

1	EA	OH STOP	90S (WHERE WALL STOP IS NOT FEASIBLE)	630	GLY
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	555AA X 55AA	AA	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-10

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BY SOUND DOOR SUPPLIER		
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	RX-98-L-E996-03 SS-FSE-630-CON	630/630	VON
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
	EA	SOUND SEALS	BY DOOR/FRAME SUPPLIER		
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-11

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9847-EO-LBR-CON	630	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-9847-L-NL-LBR-03 SS-630-CON	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R

2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP/HOLDER	FS495	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
2	EA	SILENCER	SR64	GRY	IVE
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-11A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-QEL-9847-EO-F-LBR-CON	630	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-QEL-9847-L-NL-F-LBR-03 SS-630-CON	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP/HOLDER	FS495	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-12

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC PANIC HARDWARE	LX-RX-QEL+-9847-L-DT-03-LBR-CON	630	VON

1	EA	ELEC PANIC HARDWARE	LX-RX-QEL+-9847-L-NL-03-249-LBR-CON	630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	770AA	AA	ZER
1	EA	ASTRAGAL SET	555AA X 55AA	AA	ZER
2	EA	DOOR BOTTOM	360AA6	AA	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER		

NOTE: INSTALL SEALS PRIOR TO SOFFIT MOUNTED HARDWARE.

HARDWARE SET: IHC-13

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	ELEC FIRE EXIT HARDWARE	RX-98-L-BE-F-E996-03 SS-FS-630-CON	630/630	VON
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-14

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	FIRE EXIT HARDWARE	98-L-BE-F-03 SS-630	630/630	VON

1	EA	OH STOP	90S (WHERE DOOR DOESN'T RETURN TO WALL)	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR SWEEP	8198AA	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER

HARDWARE SET: IHC-14A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PANIC HARDWARE	98-L-BE-03 SS-630	630/630	VON
1	EA	OH STOP	90S (WHERE DOOR DOESN'T RETURN TO WALL)	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: IHC-14B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	FIRE EXIT HARDWARE	98-L-BE-F-03 SS-630	630/630	VON
1	EA	OH STOP	90S (WHERE DOOR DOESN'T RETURN TO WALL)	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: IHC-15

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
2	EA	POWER TRANSFER	EPT10 CON	689	VON
2	EA	ELEC FIRE EXIT HARDWARE	LX-RX-9849-L-BE-F-E996-03 SS-FS-630-249-LBL-CON	630/630	VON
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-16

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
2	EA	FIRE EXIT HARDWARE	9849-L-BE-F-03 SS-630-249-LBL	630/630	VON
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHC-16A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
2	EA	PANIC HARDWARE	9849-L-BE-03 SS-630-249-LBL	630/630	VON
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: IHC-16B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
2	EA	FIRE EXIT HARDWARE	9849-L-BE-F-03 SS-630-249-LBL	630/630	VON
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: IHC-17

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-17A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	485A	A	ZER
1	EA	DOOR BOTTOM	360AA6-Z49	AA	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-18

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-19

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-19A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-19AB

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT COMPATIBLE)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	485A	A	ZER
1	EA	DOOR BOTTOM	360AA6-Z49	AA	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-19B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BY SOUND DOOR SUPPLIER		
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	SOUND SEALS	BY DOOR/FRAME SUPPLIER		
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

NOTE: STC RATED DOOR ASSEMBLY. COORDINATE HARDWARE REQUIREMENTS WITH DOOR MANUFACTURER.

HARDWARE SET: IHC-19C

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT COMPATIBLE)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	485A	A	ZER
1	EA	DOOR BOTTOM	360AA6-Z49	AA	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-19D

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BY SOUND DOOR SUPPLIER		
1	EA	COMBINATION LOCK	LKM7000	630	LKM
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	SOUND SEALS	BY DOOR/FRAME SUPPLIER		
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

NOTE: STC/HIGH SECURITY DOOR RATED DOOR ASSEMBLY. COORDINATE HARDWARE REQUIREMENTS WITH DOOR MANUFACTURER.

HARDWARE SET: IHC-19E

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BY SOUND DOOR SUPPLIER		
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	COMBINATION LOCK	LKM7000	630	LKM
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
1			CARD READER BY ACCESS CONTROL PROVIDER		
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER		

NOTE: BALLISTIC RATED DOOR ASSEMBLY. COORDINATE HARDWARE REQUIREMENTS WITH DOOR MANUFACTURER.

HARDWARE SET: IHC-19F

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BY SOUND DOOR SUPPLIER		
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	EU MORTISE LOCK	L9095LEU 03A	626	SCH
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

1			CARD READER BY ACCESS CONTROL PROVIDER
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER
	EA	NOTE	WEATHERSTRIP/ASTRAGAL BY DOOR SUPPLIER

NOTE: STC RATED DOOR ASSEMBLY. COORDINATE HARDWARE REQUIREMENTS WITH DOOR MANUFACTURER.
OPERATION: DOOR NORMALLY CLOSED AND LOCKED FROM BOTH SIDES. VALID CARD READ ALLOWS ACCESS IN/OUT. LOCKING CONDITION SUBJECT TO AHJ APPROVAL.

HARDWARE SET: IHC-20

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR VIEWER	U698	626	IVE
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-21

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE

1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-22

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-23

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	SURFACE CLOSER	4040XP H	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT PRACTICAL)	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

2	EA	DOOR SWEEP	39A	A	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-23A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	SURFACE CLOSER	4040XP H	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT PRACTICAL)	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	DOOR SWEEP	39A	A	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-23B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE

2	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT PRACTICAL)	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-23C

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT PRACTICAL)	626	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	DOOR SWEEP	39A	A	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-23D

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R

1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT PRACTICAL)	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	485A	A	ZER
2	EA	DOOR BOTTOM	361AA6-Z49	AA	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-23E

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	SURFACE CLOSER	4040XP REG OR PA AS REQ	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT PRACTICAL)	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	429AA	AA	ZER
2	EA	DOOR BOTTOM	361AA6-Z49	AA	ZER
1	EA	ASTRAGAL SET	383A	AA	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-23F

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE

1	EA	POWER TRANSFER	EPT10	689	VON
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT PRACTICAL)	626	IVE
1	EA	GASKETING	429AA	AA	ZER
2	EA	DOOR BOTTOM	361AA6-Z49	AA	ZER
1	EA	ASTRAGAL SET	383A	AA	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-24

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
			CARD READER BY ACCESS CONTROL PROVIDER		
			POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-25

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR

6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
1	EA	OH STOP	90S (WHERE WALL STOP IS NOT PRACTICAL)	630	GLY
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL	BY DOOR MANUFACTURER	630	
2	EA	DOOR SWEEP	39A	A	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-26

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SECURE EL LOCK	ML20906 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	770AA	AA	ZER
1	EA	DOOR BOTTOM	360AA6	AA	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH CARD READER BY ACCESS CONTROL PROVIDER POWER SUPPLY BY ACCESS CONTROL PROVIDER	630	SEN

HARDWARE SET: IHC-27

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10 CON	689	VON
1	EA	EU MORTISE LOCK	L9492LEU 03A 09-666 L583-363DM	626	SCH
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	770AA	AA	ZER
1	EA	DOOR BOTTOM	361AA6	AA	ZER
2	EA	WIRE HARNESS	CON (VERIFY LENGTH AND QUANTITY REQUIRED)		SCH
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		

OPERATION: DOOR NORMALLY CLOSED AND LOCKED. ENTRY VIA VALID REMOTE RELEASE. DEADBOLT ALLOWS OCCUPANT TO LOCK FOR PRIVACY. MONITOR IN LOCK SENDS SIGNAL WHEN DEADBOLT IS THROWN. ALWAYS FREE FOR EGRESS

HARDWARE SET: IHC-28

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON
1	EA	FAIL SEC EL INSTITUTION LOCK	ML20932 LWM SEC M92 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP HW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
2			CARD READER BY ACCESS CONTROL PROVIDER		
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHC-29

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	POWER TRANSFER	EPT10	689	VON

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	EXIT LATCH	ML2010 LWM M92 (LESS OUTSIDE LEVER)	630	C-R
1	EA	SURFACE CLOSER	4040XP HW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
1			CARD READER BY ACCESS CONTROL PROVIDER		
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		

HARDWARE SET: IHM-01

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	FIRE EXIT HARDWARE	98-L-NL-F-03 SS-630	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: IHM-02

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PANIC HARDWARE	98-EO	630	VON
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: IHM-03

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR

3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	FIRE EXIT HARDWARE	98-L-F-03 SS-630	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-04

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	FIRE EXIT HARDWARE	9849-EO-F-249-LBL	630	VON
1	EA	FIRE EXIT HARDWARE	9849-L-NL-F-03 SS-630-249-LBL	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-04A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PANIC HARDWARE	9849-EO-249-LBL	630	VON
1	EA	PANIC HARDWARE	9849-L-NL-03 SS-630-249-LBL	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: IHM-05

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PANIC HARDWARE	CD-9849-L-DT-03 SS-630-249-LBL	630/630	VON
1	EA	PANIC HARDWARE	CD-9849-L-NL-03 SS-630-249-LBL	630/630	VON

2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP/HOLDER	FS495	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-06

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
2	EA	FIRE EXIT HARDWARE	9849-L-F-03 SS-630-249-LBL	630/630	VON
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
2	EA	FIRE/LIFE WALL MAG	SEM7850 (OMIT AT 1A6.01-A, 1A47.01-F, 1C25.09-A)	689	LCN
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

NOTE: HOLD OPEN TO RELEASE UPON FIRE ALARM OR LOSS OF POWER.

HARDWARE SET: IHM-07

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
2	EA	FIRE EXIT HARDWARE	9849-L-F-03 SS-630-249-LBL	630/630	VON
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

NOTE: HOLD OPEN TO RELEASE UPON FIRE ALARM OR LOSS OF POWER.

HARDWARE SET: IHM-08

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
2	EA	FIRE EXIT HARDWARE	9849-L-F-03 SS-630-249-LBL	630/630	VON
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-09

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	FIRE EXIT HARDWARE	9849-EO-F-249-LBL	630	VON
1	EA	FIRE EXIT HARDWARE	9849-L-F-03 SS-630-249-LBL	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-09A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
2	EA	FIRE EXIT HARDWARE	9849-EO-F-249-LBL	630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-10

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PANIC HARDWARE	CD-9849-L-DT-03 SS-630-249-LBL	630/630	VON

1	EA	PANIC HARDWARE	CD-9849-L-NL-03 SS-630-249-LBL	630/630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
2	EA	SURFACE CLOSER	4040XP HEDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-11

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	FIRE EXIT HARDWARE	98-L-F-03 SS-630	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-11A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PANIC HARDWARE	98-L-03 SS-630	630/630	VON
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-12

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PANIC HARDWARE	CD-98-L-03 SS-630	630/630	VON
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER

HARDWARE SET: IHM-13

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PANIC HARDWARE	98-L-BE-03 SS-630	630/630	VON
1	EA	SURFACE CLOSER	4040XP HEDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-15

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	BY SOUND DOOR SUPPLIER		
1	EA	PANIC HARDWARE	CD-9827-L-03 SS-630	630/630	VON
1	EA	PANIC HARDWARE	CD-9875-L-03 SS-630	630/630	VON
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
1	EA	CARRYBAR	CB1	626	IVE
2	EA	SURFACE CLOSER	4040XP HW/PA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
	EA	SOUND SEALS	BY DOOR/FRAME SUPPLIER		

NOTE: STC RATED DOOR/FRAME. VERIFY HARDWARE IS COMPATIBLE WITH STC DOOR MANUFACTURER. ADD/MODIFY HARDWARE AS REQUIRED TO MEET STC RATING.

HARDWARE SET: IHM-16

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	FIRE EXIT HARDWARE	98-L-NL-F-03 SS-630	630/630	VON
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER

HARDWARE SET: IHM-17

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK (AT RATED OPENINGS)	S-BK	ZER
3	EA	SILENCER	SR64 (AT NON-RATED OPENINGS)	GRY	IVE
1	EA	DOOR POSITION SWITCH	2757 SWITCH (WHEN REQUIRED ON TS DRAWINGS)	630	SEN

HARDWARE SET: IHM-18

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK (AT RATED OPENINGS)	S-BK	ZER
3	EA	SILENCER	SR64 (AT NON-RATED OPENINGS)	GRY	IVE
1	EA	DOOR POSITION SWITCH	2757 SWITCH (WHEN REQUIRED ON TS DRAWINGS)	630	SEN

HARDWARE SET: IHM-19

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE

1	EA	FLOOR STOP	FS438 (WHERE REQUIRED)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK (AT RATED OPENINGS)	S-BK	ZER
3	EA	SILENCER	SR64 (AT NON-RATED OPENINGS)	GRY	IVE

HARDWARE SET: IHM-19A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS438 (WHERE REQUIRED)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	485A	A	ZER
1	EA	DOOR BOTTOM	360AA6-Z49	AA	ZER

HARDWARE SET: IHM-20

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP H	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS438 (WHERE REQUIRED)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-20A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R

1	EA	OH STOP	90S (WHERE WALL STOP IS NOT COMPATIBLE)	630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-21

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER

HARDWARE SET: IHM-22

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	OH STOP	90S (WHERE WALL STOP IS NOT PRACTICAL)	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR SWEEP	39A	A	ZER

HARDWARE SET: IHM-23

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN

1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	770AA	AA	ZER
1	EA	DOOR BOTTOM	360AA6	AA	ZER

HARDWARE SET: IHM-23A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BY SOUND DOOR SUPPLIER		
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	SOUND SEALS	BY DOOR/FRAME SUPPLIER		

NOTE: STC RATED DOOR ASSEMBLY. COORDINATE HARDWARE REQUIREMENTS WITH DOOR MANUFACTURER.

HARDWARE SET: IHM-23C

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BY SOUND DOOR SUPPLIER (NRP AT OUTSWING)		
1	EA	SEC INSTITUTION LOCK	ML2092 LWM CT6R	630	C-R
2	EA	PERMANENT CORE	8000	626	C-R
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	SOUND SEALS	BY DOOR/FRAME SUPPLIER		

NOTE: STC RATED DOOR ASSEMBLY. COORDINATE HARDWARE REQUIREMENTS WITH DOOR MANUFACTURER.

HARDWARE SET: IHM-24

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R

2	EA	OH STOP & HOLDER	90H	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-25

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP H	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-25A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-26

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-27

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
2	EA	MANUAL FLUSH BOLT	FB457	626	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-27A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE

2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-28

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R LESS OUTSIDE LEVER	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	FLUSH PULL	955	626	IVE
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-29

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP SHCUSH	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR SWEEP	39A	A	ZER

HARDWARE SET: IHM-30

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE

1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-31

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP/HOLDER	FS495	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-32

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
2	EA	FIRE/LIFE WALL MAG	SEM7850	689	LCN
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-33

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
1	EA	OH STOP & HOLDER	90H (WHERE DOOR DOES NOT RETURN TO WALL)	630	GLY
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP/HOLDER	FS495	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-34

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	CLASSROOM LOCK	ML2055 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
1	EA	OH STOP & HOLDER	90H (WHERE DOOR DOES NOT RETURN TO WALL)	630	GLY
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP/HOLDER	FS495	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-35

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE

1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	FIRE/LIFE HOLDER	4040SEH (WHERE WALL MAG IS NOT PRACTICAL)	689	LCN
2	EA	FIRE/LIFE WALL MAG	SEM7850	689	LCN
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

NOTE: HOLD OPEN TO RELEASE UPON FIRE ALARM OR LOSS OF POWER.
NOTE: OMIT HOLD OPEN AT 1A1.03-A, 1A45.04-B

HARDWARE SET: IHM-36

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	CLASSROOM LOCK	ML2055 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP HEDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT PRACTICAL)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-37

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	CLASSROOM LOCK	ML2055 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	OH STOP	90S (WHERE WALL STOP IS NOT FEASIBLE)	630	GLY
1	EA	SURFACE CLOSER	4040XP H	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-38

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	CLASSROOM LOCK	ML2055 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-39

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	CLASSROOM LOCK	ML2055 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
	EA	SOUND SEALS	BY DOOR/FRAME SUPPLIER		

HARDWARE SET: IHM-39A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	CLASSROOM LOCK	ML2055 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
	EA	SOUND SEALS	BY DOOR/FRAME SUPPLIER		
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: IHM-40

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR

6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	STORE DOOR LOCK	ML2022 LWM CT6R	630	C-R
2	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP/HOLDER	FS495	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	770AA	AA	ZER
1	EA	ASTRAGAL SET	555AA X 55AA	AA	ZER
2	EA	DOOR BOTTOM	361AA6	AA	ZER
2	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN

HARDWARE SET: IHM-41

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STORE DOOR LOCK	ML2022 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP HW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	770AA	AA	ZER
1	EA	DOOR BOTTOM	360AA6	AA	ZER

HARDWARE SET: IHM-42

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	770AA	AA	ZER
1	EA	DOOR BOTTOM	360AA6	AA	ZER

HARDWARE SET: IHM-42A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED) (NRP AT OUTSWING DOORS)	652	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	770AA	AA	ZER
1	EA	DOOR BOTTOM	360AA6	AA	ZER

HARDWARE SET: IHM-42B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	BY SOUND DOOR SUPPLIER		
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	SOUND SEALS	BY DOOR/FRAME SUPPLIER		

NOTE: STC RATED DOOR ASSEMBLY. COORDINATE HARDWARE REQUIREMENTS WITH DOOR MANUFACTURER.

HARDWARE SET: IHM-43

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-44

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED) (4 EA ON DOORS OVER 7'6")	652	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	OH STOP	90S (WHERE DOOR DOESN'T RETURN TO WALL AT 90 DEGREES)	630	GLY
1	EA	SURFACE CLOSER	4040XP H	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-44A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED) (4 EA ON DOORS OVER 7'6")	652	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	OH STOP	90S (WHERE DOOR DOESN'T RETURN TO WALL AT 90 DEGREES)	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-45

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED) (4 EA ON DOORS OVER 7'6")	652	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488S-BK (AT RATED OPENINGS)	S-BK	ZER
3	EA	SILENCER	SR64 (AT NON-RATED OPENINGS)	GRY	IVE

HARDWARE SET: IHM-46

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED) (4 EA ON DOORS OVER 7'6")	652	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	OH STOP	90S	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-47

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STOREROOM LOCK LESS/LVR	ML2057 LWM CT6R M30	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	FLUSH PULL	955	626	IVE
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-48

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW NRP (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STOREROOM LOCK LESS/LVR	ML2057 LWM CT6R M30	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	FLUSH PULL	955	626	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-49

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	OH STOP & HOLDER	90H	630	GLY
2	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-49A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	OH STOP	90S	630	GLY
2	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-49B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	630	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	OH STOP	90S	630	GLY

2	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	485A	A	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER
2	EA	DOOR BOTTOM	361AA6-Z49	AA	ZER
1	EA	THRESHOLD	656A-MSLA-10	A	ZER
1	EA	RAIN DRIP	142A	A	ZER

HARDWARE SET: IHM-50

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-51

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP H	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	770AA	AA	ZER
1	EA	DOOR BOTTOM	360AA6	AA	ZER

HARDWARE SET: IHM-52

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR

3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	770AA	AA	ZER
1	EA	DOOR BOTTOM	360AA6	AA	ZER

HARDWARE SET: IHM-53

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	OH STOP & HOLDER	90H	630	GLY
2	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	770AA	AA	ZER
1	EA	ASTRAGAL SET	555AA X 55AA	AA	ZER
2	EA	DOOR BOTTOM	361AA6	AA	ZER

HARDWARE SET: IHM-54

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PRIVACY LOCK	ML2030 LWA X LWM M19V	630	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK (AT RATED DOORS)	S-BK	ZER
3	EA	SILENCER	SR64 (AT NON-RATED OPENINGS)	GRY	IVE

HARDWARE SET: IHM-55

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	SPRING HINGE	3SP1 (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
2	EA	HINGE	5BB1 (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PRIVACY LOCK	ML2030 LWA X LWM M19V	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	SINGLE HOOK	511BC	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-56

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PRIVACY LOCK	ML2030 LWA X LWM M19V	630	C-R
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-56A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PRIVACY LOCK	ML2030 LWA X LWM M19V	630	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-56B

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PRIVACY LOCK	ML2030 LWA X LWM M19V	630	C-R
1	EA	SURFACE CLOSER	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-57

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PASSAGE SET	ML2010 LWM	630	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK (AT RATED OPENINGS)	S-BK	ZER
3	EA	SILENCER	SR64 (AT NON-RATED OPENINGS)	GRY	IVE

HARDWARE SET: IHM-57A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	PASSAGE SET	ML2010 LWM	630	C-R
1	EA	COORDINATOR	COR X FL	628	IVE
2	EA	MOUNTING BRACKET	MB	689	IVE
2	EA	SURFACE CLOSER	4040XP	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	FLOOR STOP	FS438 (WHERE WALL STOP IS NOT FEASIBLE)	626	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
2	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-58

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PASSAGE SET	ML2010 LWM	630	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	FIRE/LIFE WALL MAG	SEM7850	689	LCN
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-58A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PASSAGE SET	ML2010 LWM	630	C-R
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER

HARDWARE SET: IHM-59

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PASSAGE SET	ML2010 LWM	630	C-R
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-60

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8305 10" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-61

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	CLASSRM DEADBOLT	DL4117 CT6R	626	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	PUSH PLATE	8200 4" X 16"	630	IVE
1	EA	PULL PLATE	8305 10" 4" X 16"	630	IVE
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE SET: IHM-62

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
8	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	DUTCH DOOR BOLT	054	626	IVE
1	SET	CONST LATCHING BOLT	FB51P	630	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	ENTRANCE LOCK	ML2053 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
2	EA	OH STOP & HOLDER	90H	630	GLY
1	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
2	EA	ARMOR PLATE	8402 34" X 2" LDW B-CS	630	IVE
2	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-63

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
	EA	NOTE	ALL HARDWARE BY DOOR SUPPLIER		

HARDWARE SET: IHM-64

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	DUST PROOF STRIKE	DP1/DP2	626	IVE
1	EA	TWO POINT DEADBOLT	MS1837	628	ADA
1	EA	IC RIM CYLINDER	3080 CT6R	630	C-R
1	EA	MORTISE CYL TURN	09-905	626	SCH
2	EA	PUSH PLATE	8200 4" X 16"	630	IVE
2	EA	PULL PLATE	8305 10" 4" X 16"	630	IVE
2	EA	OH STOP & HOLDER	90H	630	GLY
2	EA	SURFACE CLOSER	4040XP RW/PA	689	LCN
2	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	ASTRAGAL SET	8193AA	AA	ZER

HARDWARE SET: IHM-65

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	PIVOT SET	7215 SET	626	IVE
2	EA	INTERMEDIATE PIVOT	7215 INT	626	IVE
2	EA	DUMMY PUSH BAR	350	630	VON
2	EA	LONG DOOR PULL	9264F 36" 20" 0	630-316	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH	689	LCN
2	EA	PA MOUNTING PLATE	4040-18PA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040-30	689	LCN
2	EA	BLADE STOP SPACER	4040-61	689	LCN

HARDWARE SET: IHM-66

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	FASCIA	C-130 (VERIFY LENGTH REQUIRED)		KNC
2	EA	TRACK	C-104 (VERIFY LENGTH REQUIRED)		KNC
2	EA	DOOR LOCK	C-90L-CT (CYLINDER BY THUMTURN)	626	KNC
2	EA	GUIDE	C-913		KNC
2	EA	GUIDE CHANNEL	C-914 (VERIFY LENGTH REQUIRED) (INSTALL IN BOTTOM OF DOOR)		KNC
4	EA	HANGER	C-994		KNC
2	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	FLUSH PULL	955	626	IVE
2	EA	DOOR STOP	C-100-HD		KNC

HARDWARE SET: IHM-67

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	OH DOOR POSITION SWITCH	2707AD SWITCH (WHERE REQUIRED BY TS DRAWINGS)	628	
	EA	NOTE	REMAINDER OF HARDWARE BY DOOR SUPPLIER		

HARDWARE SET: IHM-67A

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R

HARDWARE SET: IHM-68

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
2	EA	OH DOOR POSITION SWI	2707AD SWITCH (WHERE REQUIRED BY TS DRAWINGS)	628	
1	EA	NOTE	REMAINDER OF HARDWARE BY DOOR SUPPLIER		

HARDWARE SET: IHM-69

EACH TO HAVE:

QTY	DESCRIPTION	CATALOG NUMBER	FINISH	MFR
		HARDWARE BY DOOR / FRAME MANUFACTURER		

HARDWARE SET: IHM-70

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	IC MORT. CYLINDER	1080 CT6R	630	C-R
1	EA	NOTE	REMAINDER OF HARDWARE BY DOOR SUPPLIER		

HARDWARE SET: IHM-71

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HW HINGE	5BB1HW (VERIFY TYPE AND QUANTITY REQUIRED)	652	IVE
1	EA	STOREROOM LOCK	ML2057 LWM CT6R	630	C-R
1	EA	PERMANENT CORE	8000	626	C-R
1	EA	SURFACE CLOSER	4040XP HW/PA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CCV	630	IVE
1	EA	GASKETING	488S-BK	S-BK	ZER
1	EA	DOOR POSITION SWITCH	2757 SWITCH	630	SEN
1			CARD READER BY ACCESS CONTROL PROVIDER		
1	EA		POWER SUPPLY BY ACCESS CONTROL PROVIDER		

END OF SECTION 08 71 00

SECTION 08 71 13 - AUTOMATIC DOOR OPERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Power door operators for swinging doors.
2. Guide rails.

B. Related Requirements:

1. Section 08 11 13 “Hollow Metal Doors and Frames” for entrances furnished separately.
2. Section 08 71 00 “Door Hardware” for hardware to the extent not specified in this Section.
3. Section 08 41 13 “Aluminum-Framed Entrances and Storefronts” for aluminum-framed entrances furnished separately.
4. Division 26 Sections for electrical connections including conduit and wiring for automatic door operators.

1.2 DEFINITIONS

A. AAADM: American Association of Automatic Door Manufacturers.

B. Activation Device: A control that, when actuated, sends an electrical signal to the door operator to open the door.

C. Safety Device: A control that, to avoid injury, prevents a door from opening or closing.

D. For automatic door terminology, see BHMA A156.10 and BHMA A156.19 for definitions of terms.

1.3 COORDINATION

A. Templates: Distribute for doors, frames, and other work specified to be factory prepared and reinforced for installing automatic door operators.

B. Coordinate hardware for doors with operators to ensure proper size, thickness, hand, function, and finish.

C. Electrical System Roughing-in: Coordinate layout and installation of automatic door operators with connections to power supplies and access-control system.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic door operators.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content

C. Shop Drawings: For automatic door operators.

1. Include plans, elevations, sections, hardware mounting heights, and attachment details.
2. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Indicate locations of activation and safety devices.
4. Include diagrams for power, signal, and control wiring.
5. Include plans, elevations, sections, and attachment details for guide rails.

D. Samples: For each exposed product and for each color and texture specified, manufacturer's standard size.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of automatic door operator.

C. Field quality-control reports.

D. Sample Warranties: For manufacturer's special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For automatic door operators, safety devices, and control systems, to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation and maintenance of units required for this Project.

1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

B. Certified Inspector Qualifications: Certified by AAADM.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of automatic door operators that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Faulty or sporadic operation of automatic door operator, including controls.
   b. Deterioration of metals, metal finishes, and other materials beyond normal weathering or use.
2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Besam Entrance Solutions; ASSA ABLOY.
2. DORMA USA, Inc.
3. LCN; an Allegion brand.
4. Stanley Access Technologies.

B. Source Limitations: Obtain automatic door operators, including activation and safety devices, from single source from single manufacturer.

2.2 AUTOMATIC DOOR OPERATORS, GENERAL

A. General: Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated; and according to UL 325. Coordinate operator mechanisms with door operation, hinges, and activation and safety devices.

B. Electromechanical Operating System: Self-contained unit powered by permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor, connections for power and activation- and safety-device wiring, and manual operation including spring closing when power is off.

C. Hinges: See Section 08 71 00 "Door Hardware" for hinge type for each door that door operator shall accommodate.

D. Cover for Surface-Mounted Operators: Fabricated from 0.125-inch-thick, extruded or formed aluminum; manufacturer's standard width; continuous over full width of operator-controlled door opening; with enclosed end caps, provision for maintenance access, and fasteners concealed when door is in closed position.

E. Brackets and Reinforcements: Fabricated from aluminum with nonstaining, nonferrous shims for aligning system components.

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 POWER DOOR OPERATORS

A. Standard: BHMA A156.10.

B. Performance Requirements:

1. Opening Force:
   a. Power-Operated Swinging Doors: Not more than 30 lbf required to manually open door if power fails.
2. Entrapment-Prevention Force: Not more than 40 lbf required to prevent stopped door in the last 10 degrees of opening from moving in the direction of opening; not more than 30 lbf required to prevent stopped door from moving in direction of closing.

C. Configuration: Operator to control single swinging door.

1. Traffic Pattern: Two way.
2. Operator Mounting: Surface.

D. Operation: Power opening and spring closing. Provide time delay for door to remain open before initiating closing cycle as required by BHMA A156.10.

E. Operating System: Electromechanical.

F. Microprocessor Control Unit: Solid-state controller.

G. Features:

1. Adjustable opening and closing speed.
2. Adjustable opening and closing force.
3. Adjustable backcheck.
4. Adjustable hold-open time from zero to 30 seconds.
5. Adjustable time delay.
6. Adjustable acceleration.
7. Adjustable limit switch.
8. Obstruction recycle.
9. Automatic door re-open if stopped while closing.
10. On-off/hold-open switch to control electric power to operator; key operated.

H. Controls: Activation and safety devices according to BHMA standards.

1. Activation Device: Push-plate switch on each side of door to activate door operator.
2. Safety Device: Presence sensor mounted on door header to detect pedestrians in presence zone and to prevent door from closing.

I. Exposed Finish: Baked-enamel or powder-coat finish matching door and frame.

2.4 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Extrusions: ASTM B 221.
2. Sheet: ASTM B 209.

B. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.5 CONTROLS

A. General: Provide controls, including activation and safety devices, according to BHMA standards; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated. Coordinate activation and safety devices with door operation and door operator mechanisms.

B. Motion Sensors: Self-contained, K-band-frequency, microwave-scanner units; fully enclosed in plastic housing; adjustable to provide detection field sizes and functions required by BHMA A156.10.

1. Provide capability for switching between bidirectional and unidirectional detection.
2. For one-way traffic, sensor on egress side shall not be active when doors are fully closed.

C. Presence Sensors: Self-contained, active-infrared scanner units; adjustable to provide detection field sizes and functions required by BHMA A156.10. Sensors shall remain active at all times.

D. Photoelectric Beams: Pulsed infrared, sender-receiver assembly for recessed mounting. Beams shall not be active when doors are fully closed.

E. Push-Plate Switch: Momentary-contact door control switch with flat push-plate actuator with contrasting-colored, engraved message.

1. Configuration: Square push plate with 4-by-4-inch junction box.
   a. Mounting: As indicated on Drawings.
2. Configuration: Rectangular push plate with 2-by-4-inch junction box.
   a. Mounting: As indicated on Drawings.
3. Push-Plate Material: Stainless steel as selected by Architect from manufacturer's full range.
4. Message: International symbol of accessibility and "Push to Open."

F. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.6 FABRICATION

A. Factory fabricate automatic door operators to comply with indicated standards.

B. Form aluminum shapes before finishing.

C. Fabricate exterior components to drain condensation and water passing joints within operator enclosure to the exterior.

D. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match operator.

E. Provide metal cladding, completely covering visible surfaces before shipment to Project site. Fabricate cladding with concealed fasteners and connection devices, with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion, and with allowance for thermal expansion at exterior doors.

2.7 ACCESSORIES

A. Signage: As required by cited BHMA standard for type of door and its operation.

1. Application Process: Operator manufacturer's standard process.
2. Provide sign materials with instructions for field application when operators are installed.

2.8 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

B. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

2.9 ALUMINUM FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, door and frame preparation and reinforcements, and other conditions affecting performance of automatic door operators.

B. Examine roughing-in for electrical systems to verify actual locations of power connections before automatic door operator installation.

C. Examine roughing-in for compressed-air piping systems to verify actual locations of piping connections before automatic door operator installation.

D. Verify that full-height finger guards are installed at each door with pivot hinges where door has a clearance at hinge side greater than 1/4 inch and less than 3/4 inch with door in any position.

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

3.2 INSTALLATION

A. General: Install automatic door operators according to manufacturer's written instructions and cited BHMA standard for type of door operation and direction of pedestrian travel, including signage, controls, wiring, remote power units if any, and connection to building's power supply.

1. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion.
2. Install operators true in alignment with established lines and door geometry without warp or rack. Anchor securely in place.

B. Controls: Install activation and safety devices according to manufacturer's written instructions and cited BHMA standard for operator type and direction of pedestrian travel. ~~Connect control wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."~~

C. Access-Control System: Connect operators to access-control system as specified in Division 28.

D. Signage: Apply on both sides of each door as required by cited BHMA standard for type of door operator and direction of pedestrian travel.

3.3 FIELD QUALITY CONTROL

A. Certified Inspector: Owner will engage a Certified Inspector to test and inspect components, assemblies, and installations, including connections.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:

1. Test and inspect each automatic door operator installation, using AAADM inspection forms, to determine compliance of installed systems with applicable BHMA standards.

C. Automatic door operators will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust automatic door operators to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.

1. Adjust operators on exterior doors for weathertight closure.

B. After completing installation of automatic door operators, inspect exposed finishes on doors and operators. Repair damaged finish to match original finish.

C. Readjust automatic door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).

D. Occupancy Adjustment: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic door operators.

END OF SECTION 08 71 13

SECTION 08 71 63 - DETENTION DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes detention door hardware for the following:

1. Swinging detention doors.
2. Sliding detention doors.

B. Related Requirements:

1. Section 08 34 63 “Detention Doors and Frames”.

1.3 COORDINATION

A. Templates: Obtain and distribute, to the parties involved, templates for detention doors, frames, and other work specified to be factory prepared for installing detention door hardware.

1.4 PREINSTALLATION MEETINGS

A. Detention Keying Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." In addition to Owner, Contractor, and Architect, conference participants shall also include Installer. Incorporate detention keying conference decisions into Project's final Detention Keying Schedule after reviewing detention door hardware keying system including, but not limited to, the following:

1. Preliminary key system schematic diagram.
2. Requirements for key-control system.
3. Requirements for access control.
4. Address for delivery of keys.

B. Preinstallation Conference: Conduct conference at Project site.

1. Inspect and discuss power and control system roughing-in and other preparatory work performed by other trades.
2. Review sequence of operation for each type of detention door hardware.
3. Review and finalize a construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Certifying procedures.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of detention door hardware.

B. Shop Drawings: For each type of detention door hardware.

1. Include plans, elevations, sections, and attachment details.

C. Detention Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware as well as installation procedures and wiring diagrams. Coordinate the Detention Door Hardware Schedule with detention doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of detention door hardware.

1. Integrate detention door hardware indicated in "Detention Door Hardware Schedule" Article into Project's final Detention Door Hardware Schedule and indicate complete designations of every item required for each detention door and opening.
2. Keying Schedule: Coordinate detention keying with other door hardware in Project's final Keying Schedule.
3. Indicate each detention lock and type of key cylinder using the following prefixes: "P" for paracentric, "M" for mogul, "HS" for high security, and "C" for commercial.
4. Indicate security level of each item.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified supplier.

B. Product Certificates: For each type of detention door hardware.

1. Certify that detention door hardware complies with listed fire door assemblies.

C. Product Test Reports: For each type of detention lock and latch, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Examination reports documenting inspections of substrates, areas, and conditions.

E. Anchor inspection reports documenting inspections of built-in and cast-in anchors.

F. Field quality-control reports documenting inspections of installed products.

1. Field quality-control certification signed by Contractor.

G. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For detention door hardware to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:
   a. Normal local security operation.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of detention door hardware.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer and an authorized representative of detention door hardware manufacturer for installation and maintenance of units required for this Project.

B. Supplier Qualifications: Detention door hardware supplier with warehousing facilities in Project's vicinity who is, or employs, a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Architect, and Owner about detention door hardware and keying.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Inventory detention door hardware on receipt and provide secure lockup for detention door hardware delivered to Project site.

B. Tag each item or package separately with identification related to the Detention Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver detention door keys to Owner by registered mail or overnight package service.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of detention door hardware that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Structural failures including excessive deflection, cracking, or breakage.
   b. Faulty operation of operators and detention door hardware.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering or detention use.

2. Warranty Period: Three years from date of Substantial Completion.
3. Warranty Period for Continuous-Pin Detention Hinges: 10 years from date of Substantial Completion.
4. Warranty Period for Security Door Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Swinging Detention Door Assemblies: Provide detention door hardware as part of a detention door assembly that complies with security grade indicated, when tested according to ASTM F 1450, based on testing manufacturer's standard units in assemblies similar to those indicated for this Project.

2.2 DETENTION DOOR HARDWARE, GENERAL

A. Provide detention door hardware for each door as scheduled in "Detention Door Hardware Schedule" Article to comply with requirements in this Section.

1. Detention Door Hardware Sets: Provide quantity, item, size, finish, or color indicated.

B. Source Limitations: Obtain mechanical detention door hardware from same manufacturer as that of electrically powered or pneumatic detention door hardware.

C. Regulatory Requirements:

1. Fire-Rated Detention Door Assemblies: Provide detention door hardware for assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
2. Where indicated to comply with accessibility requirements, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.

2.3 DETENTION HINGES

A. Full Mortise Detention Hinges: Cast steel or stainless steel, ball bearing, with pins made non-removable by a concealed hardened roll pin.

1. Leaves: Drilled for countersunk security fasteners.
2. Size: Minimum 4-1/2 by 4-1/2 by 0.188 inch.
3. Security Grade: 4 according to ASTM F 1758.
4. Finish: BHMA 600.

B. Basis of Design Manufacturer: Provide Products by Southern Folger or approved manufacturer meeting all requirements.

2.4 MECHANICAL DETENTION LOCKS AND LATCHES

A. Lock Mountings:

1. Hollow-Metal Detention Doors: Mount detention lock to back of 0.179-inch nominal-thickness steel cover plate for installation in lock pocket fabricated into detention door. Attach cover plate to hollow-metal detention door with security fasteners.

B. Mechanical Deadlocks, Paracentric Cylinder:

1. Function: Deadlocked in both locked and unlocked position; latchbolt retracted and extended by five-tumbler paracentric cylinder; keyed one side.
2. Latchbolt: 2-inch-high by 3/4-inch-thick steel, with two case-hardened-steel insert pins; 3/4-inch throw; 1/2-inch bolt projection when retracted.
3. Security Grade: 4 according to ASTM F 1577.

C. Basis of Design Manufacturer: Provide Products by Southern Folger or approved manufacturer meeting all requirements.

2.5 DETENTION LOCK TRIM

A. Levers: Solid stainless steel.

B. Knobs: Stainless steel.

C. Escutcheons for Paracentric Locks: 0.125-inch-thick, 3-inch-diameter stainless steel with BHMA 630 finish. Attach with security fasteners.

1. Style: Single or double wing as required by lock function.

D. Basis of Design Manufacturer: Provide Products by Southern Folger or approved manufacturer meeting all requirements.

1. Style: Single or double wing as required by lock function.

2.6 DETENTION CYLINDERS AND KEYING

A. Source Limitations: Subject to compliance with requirements, provide cylinders and keying for paracentric and mogul cylinders by same manufacturer as for detention locks and latches.

B. Paracentric Cylinders: Manufacturer's standard lever-tumbler type, constructed from one-piece spring-tempered brass; with tumblers activated by phosphor bronze springs; five tumblers per lock.

C. Keying System: Provide a factory-registered keying system complying with the following requirements:

1. Paracentric cylinders operated by change keys only.

D. Keys: Provide cast silicon-bronze copper alloy keys complying with the following:

1. Stamping: Permanently inscribe each key with a visual key-control number and include the following notation:

a. "DO NOT DUPLICATE."

2. Quantity: In addition to one extra blank key for each lock, provide the following:

a. Cylinder Change Keys: Three.

2.7 SECURITY DOOR CLOSERS

A. Standard: BHMA A156.4, Grade 1.

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

B. Surface-Mounted Security Door Closers:
1. Arms: Minimum 3/8-inch- (9.5-mm-) thick by 1-1/8-inch- (29-mm-) wide, rectangular steel main arm; 5/16-inch- (8-mm-) thick by 1-inch- (25-mm-) wide, rectangular steel secondary arm; full rack-and-pinion type; fabricated with orbital-riveted, pinned, or welded elbow and arm shoe/soffit plate joints designed to prevent disassembly with ordinary hand tools.
2. Cover: Heavy-duty metal, attached with four security fasteners.
3. Mounting: Attach security door closer with security fasteners.

C. Unit Size: Comply with manufacturer's written recommendations for size of security door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to comply with field conditions and requirements for opening force.

D. Basis of Design Manufacturer: Provide Products by LCN or approved manufacturer meeting all requirements.

2.8 DETENTION DOOR STOPS

~~A. Detention Floor Stops: 3-1/2-inch-high by 2-inch-diameter, rubber bumper mounted on steel lag bolt; BHMA A156.16; install in floor with nonshrink grout; for detention doors unless wall or other type stops are indicated. Do not mount floor stops where they can impede traffic.~~

~~B.~~A. Silencers for Detention Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum 1/2-inch diameter; fabricated for drilled-in application to detention door frame. Attach with security fasteners.

2.9 MAGNETIC HOLD-OPENS

A. Standard: BHMA 156.15

B. Basis of Design Manufacturer: Provide Products by LCN or approved manufacturer meeting all requirements.

~~2.9~~2.10 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise approved by Architect.

B. Base Metals: Produce detention door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified detention door hardware units and BHMA A156.18 finishes.

C. Fasteners: Provide flat-head security fasteners with finished heads to match surface of detention door hardware.

1. Security Fasteners: Fabricate detention door hardware using security fasteners with head style appropriate for fabrication requirements, strength, and finish of adjacent materials. Provide stainless-steel security fasteners in stainless-steel materials.
2. Concealed Fasteners: For detention door hardware units that are exposed when detention door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching detention door hardware. Where using through bolts on hollow-metal detention door and frame construction, provide sleeves for each through bolt.
3. Steel Machine Screws: For the following fire-rated applications:

    a. Mortise detention hinges to detention doors.
    b. Strike plates to detention frames.
    c. Security door closers to detention doors and frames.

4. Spacers Bolts: For through bolting of hollow-metal detention doors.

D. Detention Lock Construction: Fabricate detention lock case and cover plate from steel plate. Fabricate bolts from solid sections; laminated construction is unacceptable.

~~2.10~~2.11 HARDWARE FINISHES

A. Standard: Comply with BHMA A156.18.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

~~2.11~~2.12 SECURITY FASTENERS

A. Operable only by tools produced by fastener manufacturer or other licensed fabricator for use on specific fastener type. Provide drive-system type, head style, material, and protective coating as required for assembly, installation, and strength, and as follows:

1. Drive-System Type: Pinned Torx.

2. Fastener Strength: 120,000 psi.
3. Socket Button Head Fasteners:

    a. Heat-treated alloy steel, ASTM F 835.
    b. Stainless steel, ASTM F 879, Group 1 CW.

4. Socket Flat Countersunk Head Fasteners:

    a. Heat-treated alloy steel, ASTM F 835.
    b. Stainless steel, ASTM F 879, Group 1 CW.

5. Socket Head Cap Fasteners:

    a. Heat-treated alloy steel, ASTM A 574.
    b. Stainless steel, ASTM F 837, Group 1 CW.

6. Protective Coatings for Heat-Treated Alloy Steel:

    a. Zinc and clear trivalent chromium where indicated.
    b. Zinc phosphate with oil, ASTM F 1137, Grade I, or black oxide unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine detention doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations of detention door hardware connections before detention door hardware installation.

C. Inspect built-in and cast-in anchor installations, before installing detention door hardware, to verify that anchor installations comply with requirements. Prepare inspection reports.

1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
2. Perform additional inspections to determine compliance of replaced or additional work.

D. Verify locations of detention door hardware with those indicated on Shop Drawings.

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

3.2 PREPARATION

A. Steel Detention Doors and Frames: Comply with BHMA A156.115 Series.

1. Surface-Applied Detention Door Hardware: Drill and tap detention doors and frames according to SDI A250.6.

3.3 INSTALLATION

A. Mounting Heights: Mount detention door hardware units at heights indicated in DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."

B. Install each detention door hardware item to comply with Shop Drawings and manufacturer's written instructions. Where cutting and fitting are required to install detention door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinge Installation:

1. Welding: Where indicated, weld hinges to detention doors and frames with continuous fillet weld around three sides of hinge perimeter.
2. Security Fasteners: Provide socket flat countersunk head machine screws; finish screw heads to match surface of detention hinges. Install into drilled and tapped holes.

D. Security Fasteners: Install detention door hardware using security fasteners with head style appropriate for installation requirements, strength, and finish of adjacent materials.

3.4 FIELD QUALITY CONTROL

A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

B. Perform the following tests and inspections:

1. Verify that lock bolts engage strikes with required bolt projection.
2. Verify that detention door hardware is installed, connected, and adjusted according to the Contract Documents.

C. Detention work will be considered defective if it does not pass tests and inspections.

D. Perform additional inspections to determine compliance of replaced or additional work.

E. Prepare field quality-control certification that states installed products comply with requirements in the Contract Documents.

F. Prepare test and inspection reports.

3.5 ADJUSTING

A. Adjust and check each operating item of detention door hardware and each detention door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust detention door-control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

3.6 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by detention door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that detention door hardware is without damage or deterioration at time of Substantial Completion.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain detention door hardware and detention door hardware finishes.

3.8 DETENTION DOOR HARDWARE SCHEDULE

A. General: Provide detention door hardware for each detention door to comply with requirements in this Section and with detention door hardware sets indicated below.

HARDWARE SET: DT-01

EACH TO HAVE:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	204FMSS	US32D	SOUTHERN FOLGER
1	EA	LOCK	1070AK.a-1	US32D	SOUTHERN FOLGER
1	EA	CYLINDER	PARACENTRIC	---	SOUTHERN FOLGER
1	EA	CLOSER	~~4210~~4510T	AL	LCN
3	EA	SILENCERS	SR64	---	IVES
~~1~~	~~EA~~	~~FLOOR STOP~~	~~420~~	~~---~~	~~SOUTHERN FOLGER~~
1	EA	MAGNET	SEM7850	AL	LCN

END OF SECTION 08 71 63

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Glass for doors, interior borrowed lites, storefront framing, bullet resistant assembies.
2. Glazing sealants and accessories.

B. Section does not include:

1. Glass specified in Section 05 73 13 “Glazed Decorative Metal Railings”
2. Glass specified in Section 08 41 20 “Structural Glass Fin Wall”
3. Glass specified in Section 08 41 26 “All-Glass Interior Storefronts”
4. Glass specified in Section 08 44 13 “Glazed Curtain Walls and Skylights”

C. Related Requirements:

1. Section 08 42 29.23 “Sliding Automatic Entrances” for glass sliding entrances.
2. Section 08 56 67 “Bullet-Resistant Transaction Windows” for glazing as part of bullet resistant assemblies.
3. Section 08 81 13 "Decorative Glass Glazing"

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. FBC: Florida Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Adhesives and Sealants
3. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)
   b. Corporate Sustainability Reporting (CSR’s)
   c. Health Product Declarations (HPD’s)

C. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

D. Glazing Accessory Samples: For sealants, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

E. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

F. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For glass.

C. Product Test Reports: For coated glass, insulating glass, and glazing sealants, for tests performed by a qualified testing agency.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Sample Warranties: For special warranties.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Refer to Section 01 43 39 “Visual Mock-Up Requirements” for additional requirements.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.
2. Use ASTM C 1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.11 FIELD CONDITIONS

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

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.12 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

1. Guardian Glass; SunGuard.
2. Oldcastle Building Envelope™.
3. Pilkington North America.
4. Viracon, Inc.

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 45 00 "Quality Control," to design glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the FBC and ASTM E 1300.

1. Design Wind Pressures: As indicated on Drawings.
2. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
   a. Wind Design Data: As indicated on Drawings.
3. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
4. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

1. Minimum Glass Thickness for Exterior Lites: 6 mm.

D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

1. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard

B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

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

C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

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

D. Ceramic-Coated Vision Glass: Refer to Section 08 44 13 “Glazed Curtain Walls and Skylights” for frit pattern requirements.

E. Ceramic-Coated Spandrel Glass: Refer to Section 08 44 13 “Glazed Curtain Walls and Skylights” for spandrel glass requirements.

F. Ultraclear Float Glass: ASTM C 1036, Type I, Class I (clear), Quality-Q3; and with visible light transmission of not less than 91 percent.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide PPG Starphire 6mm (minimum) or comparable approved product meeting all requirements including sustainability requirements.
      a. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

G. Bullet Resistant Glazing: UL Standard 752, Level 3 all glass unit consisting of multiple layers of glass and polyvinyl butyral (PVB).
   1. Basis-of-Design Product: Subject to compliance with requirements, provide Global Security Glazing, Armor-Gard or comparable approved product meeting all requirements.
      a. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

2.5 LAMINATED GLASS

A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
   1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
   2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
   3. Interlayer Color: Clear unless otherwise indicated.

B. Laminated One-Way Vision Glass: Transparent (One Way) Mirror Glass.
   1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
   2. Basis-of-Design Product: Subject to compliance with requirements, provide Pilkington, Mirropane or comparable approved product meeting all requirements.
      a. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

2.6 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
   1. Sealing System: Dual seal, with polyisobutylene and polysulfide primary and secondary sealants.
   2. Perimeter Spacer: Polypropylene-covered stainless steel in color selected by Architect.

3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.7 BACKLIT GLASS

A. Ultraclear float glass with polyester, translucent, acrylic pressure sensitive film attached to back face.

1. Film Manufacturer: provide 3M FASARA Glass Finishes – Milky Milky (San Marino) 60 in. x 98.4 ft. film.

2.8 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Low Emitting Adhesives and Sealants
   a. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
   b. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

B. Sealants: Listed products are acceptable subject to tests. Provide colors as selected by Architect.

1. Sealants required for non-structural exposed outdoor seals at perimeters of metal panels and stone panels, and acceptable for other non-structural seals.
   a. Dow Corning 756 SMS.
2. Sealants acceptable for non-structural seals at locations other than perimeters of metal panels and stone panels.
   a. Dow Corning 790, 791, 795.
   b. Tremco Spectrem 1 and Spectrem 2.
3. Sealants acceptable for shop-applied structural seals.
   a. Tremco Proglaze II.
4. Sealants acceptable for shop-applied and field-applied structural seals.
   a. Dow Corning 795, 995.
5. Data sheets for and samples of other sealants may be submitted for approval. Oil base sealants are not acceptable.
6. Sealant back-up materials shall be polyethylene foam, urethane foam or extruded silicone as recommended by sealant manufacturer. Back-up shall not absorb water, and shall not emit gas, even if punctured.
7. Coordinate with other sections to assure compatibility of intersecting sealants.

2.9 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces;

with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.
2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.10 MISCELLANEOUS GLAZING MATERIALS

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

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.11 FABRICATION OF GLAZING UNITS

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

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
   a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

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

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

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

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

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

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

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

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

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

F. Apply heel bead of elastomeric sealant where indicated.

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

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

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 GLASS SCHEDULE

A. MONOLITHIC GLASS

1. Float Glass Type: Clear annealed float glass.
   a. Minimum Thickness: 6 mm.
2. Safety Glass Type: Clear fully tempered float glass.
   a. Minimum Thickness: 6 mm.
   b. Safety glazing required.

B. Refer to Glass Schedule paragraph in Section 08 44 13 “Glazed Curtain Walls and Skylights” for all other glass types.

END OF SECTION 08 80 00

SECTION 08 81 13 - DECORATIVE GLASS GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Patterned glass.
2. Coated glass.
3. Acid-etched glass.
4. Sandblasted glass.
5. Laminated glass.
6. Glass with decorative film overlay.
7. Glass with finished edges.

B. Related Requirements:

1. Section 08 84 00 "Plastic Glazing" for acrylic and polycarbonate glazing.

1.2 DEFINITION

A. Glass Thickness: Indicated by thickness designations in millimeters according to ASTM C 1036.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For decorative glass. Show fabrication and installation details. Include the following:

1. Size and location of penetrations.
2. Glazing method.
3. Mounting method.
4. Attachments to other work.
5. Full-size details of edge-finished profiles.

C. Glass Samples: For the following products, 12 inches square:

1. Each type of decorative glass.

D. Glazing Accessory Samples: For sealants, in 12-inch lengths. Install sealant Samples between two strips of material representative of the glazed system.

E. Decorative Glazing Schedule: List decorative glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of decorative glass.

C. Preconstruction adhesion and compatibility test report.

D. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of decorative glass to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under NGA's Certified Glass Installer Program.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Refer to Section 01 43 39 “Visual Mock-up Requirements” for additional requirements.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect decorative glass and glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Retain packaging and sequencing numbers for decorative-glass units.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install decorative glass until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of openings and construction contiguous with decorative glass by field measurements before fabrication.

1.11 WARRANTY

A. Special Warranty on Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide products specified in Section 09 00 01 “Finish Key”.

B. Source Limitations for Glass: Obtain each type of decorative glass from single source from single manufacturer.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer, for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and "GANA's "Glazing Manual" unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

B. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C 1036, Type I, Class 1 (clear), Quality-Q3.

B. Ultraclear Float Glass: ASTM C 1036, Type I, Class I, Quality-Q3, and with visible light transmission not less than 91 percent.

C. Tinted Annealed Float Glass: ASTM C 1036, Type I, Class 2 (tinted), Quality-Q3.

D. Fully Tempered Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

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

E. Heat-Strengthened Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

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

F. Patterned Glass: ASTM C 1036, Type II, Class 1 (clear) or Class 2 (tinted) as indicated, Form 3; finish, pattern, and quality as indicated.

G. Tempered Patterned Glass: ASTM C 1048, Kind FT (fully tempered), Type II, Class 1 (clear) or Class 2 (tinted) as indicated, Form 3; finish, pattern, and quality as indicated.

H. Patterned Ultraclear Glass: ASTM C 1036, Type II, Class 1 (clear), Form 3, with visible light transmission not less than 91 percent; finish, pattern, and quality as indicated.

I. Tempered Patterned Ultraclear Glass: ASTM C 1048, Kind FT (fully tempered), Type II, Class 1 (clear), Form 3, with visible light transmission not less than 91 percent; finish, pattern, and quality as indicated.

J. Ceramic-Coated Glass: ASTM C 1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in GANA's "Engineering Standards Manual."

K. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.

L. Decorative Film Overlay: Translucent, dimensionally stable, cast PVC film, 2-mil-minimum thickness, with pressure-sensitive, clear adhesive back for adhering to glass and releasable protective backing.

2.5 GLAZING MATERIALS

A. Glazing Sealants, Tapes, and Miscellaneous Glazing Materials: As specified in Section 08 80 00 "Glazing."

1. Colors: As selected by Architect from manufacturer's full range.

2.6 HARDWARE FOR GLASS INSTALLATION

A. Hardware: As indicated.

B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

C. Gaskets: Manufacturer's standard, compatible with decorative glass type indicated.

D. Anchors and Inserts: Provide devices as required for hardware installation. Provide metal expansion-bolt devices for drilled-in-place anchors. Provide anchors and inserts for applications on inside face of exterior walls and where indicated.

2.7 DECORATIVE-GLASS FABRICATION

A. Fabricate decorative glass and provide other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with product manufacturer's written instructions and with referenced glazing standard.

B. Edge Finishing: Finish edges smooth and polished, without chips, scratches, or warps.

1. Finished Edge: Flat polished.

C. Decorative Film Overlay: Apply squarely aligned to glass edges, uniformly smooth, and free from tears, air bubbles, wrinkles, and rough edges, with graphic image as indicated on Drawings to the back face of clean glass, according to manufacturer's written instructions, including surface preparation and application temperature limitations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine decorative-glass framing members, with Installer present, for compliance with the following:

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

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

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate orientation of outer surfaces. Label or mark units as needed so that surface orientation is readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 INSTALLATION

A. Set decorative-glass units in each series true in line with uniform orientation, pattern, draw, bow, and similar characteristics.

B. Set glass lites with proper orientation so that each outer surface faces the direction indicated on Drawings.

C. Set decorative glass in locations indicated on Drawings. Install glass with hardware and accessories according to hardware manufacturer's written instructions. Attach hardware securely to mounting surfaces.

3.4 GLAZING, GENERAL

A. Decorative Glass: Install glazing as specified in Section 08 80 00 "Glazing."

B. Comply with combined written instructions of manufacturers of glass, gaskets, sealants, tapes, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is more than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances, and to comply with system performance requirements.
2. Provide 1/8-inch-minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

3.5 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

E. Refer to Section 01 74 23 “Final Cleaning” for additional cleaning requirements.

END OF SECTION 08 81 13

SECTION 08 84 00 - PLASTIC GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Monolithic acrylic glazing and support system.

1.2 PERFORMANCE REQUIREMENTS

A. Provide plastic glazing sheets and glazing materials capable of withstanding normal temperature changes without failure, including loss or breakage of plastic sheets.

1.3 ACTION SUBMITTALS

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

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)
   b. Corporate Sustainability Reporting (CSR’s)

C. Plastic Glazing Samples: For each color and finish of plastic glazing indicated, 12 inches square and of same thickness indicated for final Work.

D. Plastic Glazing Schedule: List plastic glazing types and thicknesses for each location. Use same designations indicated on Drawings. Indicate coordinated dimensions of plastic glazing and construction that receives plastic glazing, including clearances and glazing channel dimensions.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers.

B. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For plastic glazing to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution. Refer to Section 01 43 39 “Visual Mock-Up Requirements” for additional requirements.

1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect plastic glazing materials according to manufacturer's written instructions. Prevent damage to plastic glazing and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Maintain protective coverings on plastic glazing to avoid exposures to abrasive substances, excessive heat, and other sources of possible deterioration.

1.8 PROJECT CONDITIONS

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

1.9 COORDINATION

A. Coordinate dimensions of plastic glazing with dimensions of construction that receives plastic glazing to ensure that glazing channels provide adequate face and edge clearance, bite, and allowance for expansion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Recycled Content of plastic glazing: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

B. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:

1. Product specific declarations in accordance with ISO 1404
2. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
3. Industry Wide Product Specific Type III EPD Third Party Certification

2.2 PLASTIC GLAZING, GENERAL

A. Sizes: Fabricate plastic glazing to sizes indicated.

B. Fire-Test-Response Characteristics of Plastic Glazing: As determined by testing plastic glazing by a qualified testing agency acceptable to authorities having jurisdiction.

1. Self-ignition temperature of 700 deg F or higher when tested according to ASTM D 1929 on plastic sheets in thicknesses indicated for the Work.

2. Smoke-developed index of 450 or less when tested according to ASTM E 84, or smoke density of 75 or less when tested according to ASTM D 2843 on plastic sheets in thicknesses indicated for the Work.
3. Burning extent of 1 inch or less when tested according to ASTM D 635 at a nominal thickness of 0.060 inch or thickness indicated for the Work, where Class CC1 is indicated.
4. Flame-spread index not less than that indicated when tested according to ASTM E 84.

2.3 RESIN COMPOSITE PANELS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Resin Composite Panels as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean framing members immediately before glazing. Remove coatings not firmly bonded to substrates.

3.2 PROTECTING AND CLEANING

A. Protect plastic glazing from contact with contaminating substances from construction operations. If, despite such protection, contaminating substances do come into contact with plastic glazing, remove immediately and wash plastic glazing according to plastic glazing manufacturer's written instructions.

B. Remove and replace plastic glazing that is broken, chipped, cracked, abraded, or damaged in other ways during construction period, including natural causes, accidents, and vandalism.

C. Wash plastic glazing on both faces before date scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Wash plastic glazing according to plastic glazing manufacturer's written instructions.

1. Refer to Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 08 84 00

SECTION 08 88 00 - SPECIAL FUNCTION GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Electrochromic insulating glass units for dynamic light and heat control.

B. Related Requirements:

1. Section 08 80 00 "Glazing"
2. Division 26 Sections for control for electrical systems.

1.3 DEFINITIONS

A. Fenestration: Openings in building's envelope including windows, doors, and skylights.

B. Framing System: Basic rigid supporting structure of window.

C. Glazing System: Soft material used in framing system.

D. Bite: Dimension by which edge of glass product is engaged into glazing channel.

E. IGU: Insulating Glass Unit.

F. IGU Pigtail: Wire that extends from individual insulated glass units.

G. Frame Cable: Wire that runs through framing system and connects IGU pigtail to low-voltage wiring on interior of building.

H. 2-ply Laminated Glass: 2-sheets of monolithic glass bonded together with plastic interlayer by heat and pressure.

I. Inboard Lite: Pane of IGU that faces interior of building.

J. Outboard Lite: Pane of IGU that faces exterior of building.

K. Performance Characteristics:

1. Center-of-Glass Characteristics: Performance values that take only center portion of IGU into account and not framing members.
2. Fenestration Performance: Performance based on total fenestration (glass and framing members). Values that can be validated and certified by National Fenestration Rating Council (NFRC).

L. Sealing Insulating Glass Unit Surfaces and Coating Orientation:

1. Surface 1: Exterior surface of outer laminated glass ply.
2. Surface 2: Interior surface of outer laminated glass ply (surface facing the laminating material).
3. Surface 3: Exterior surface of inner laminated glass ply (surface facing the laminating material).
4. Surface 4: Interior surface of inner laminated glass ply which is coated with the electrochromic layers.
5. Surface 5: Exterior surface of inner pane.
6. Surface 6: Room side surface of inner pane.

M. Tinted: On state, with lowest visible light transmission.

N. Clear: Off state, with highest visible light transmission.

O. Variable Tint: Intermediate tint levels between fully tinted and clear.

P. Gradient Tint: Seamless transition from clear to fully tinted across a single unit

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.

B. Conduct pre-installation meeting with the following parties in attendance:

1. Architect, contractor, glazing contractor, framing manufacturer, electrochromic IGU and controls manufacturer, electrical contractor, and other parties related to work of this section, to review procedures, schedules, safety, and coordination with other elements of Project.

1.5 SYSTEM DESCRIPTION

A. Design Requirements:

1. Electrochromic glass units shall be operated by a control system approved by the electrochromic glass manufacturer and as specified in Section 26 09 00.

B. System must be capable of providing up to 3 independently tintable zones in each pane to provide adequate light quality in the space. Refer to project drawings for zoning specifics.

1. Framing and Glazing Systems:
   a. Designed to accommodate IGU components below:
   b. Edge clearance: 1/4 inch (6 mm)
   c. Bite clearance: 5/8 inch (16 mm)
   d. Face clearance: 3/16 inch (5 mm)
   e. Accommodate controls wiring.

f. Has glazing materials that are compatible with materials of electrochromic IGU.
g. Provide glazing and framing systems capable of withstanding normal thermal movements, wind loads, and impact loads, without failure, including loss due to defective manufacture, fabrication, and installation, deterioration of glazing materials, and other defects in construction.
1) Normal Thermal Movement: Resulting from ambient temperature range of 120 degrees F (67 degrees C) and from consequent temperature range within glass and glass framing members of 180 degrees F (100 degrees C).

2. Provide glass products in thicknesses and strengths (annealed or heat-treated) required to meet or exceed the following criteria based on Project loads and in-service conditions per the methodology described in ASTM E1300.
a. Select minimum thickness of annealed or heat-treated glass products to ensure probability of failure does not exceed the following:
1) 8 breaks per 1000 for glass installed vertically or not over 15 degrees or more from vertical plan and under wind action.
2) 1 break per 1000 for glass installed 15 degrees or more from vertical plane and under action of wind, snow, or both.

1.6 SUBMITTALS

A. Product Data: Manufacturer's Product Data sheets including installation instructions.

B. Documentation indicating compliance with ASTM E2141-14 and 2953-14, Standard Specification for Evaluating Accelerated Aging Performance of Electrochromic Devices in Sealed Insulating Glass Units as verified by third party test laboratory such as National Renewable Energy Laboratory (NREL).

C. Test Report: ASTM E2190 Specification for IGU Seal Durability. Provide certificate or test report stating that IGUs that passed the testing requirement contained the electrochromic system (EC coatings, bus bars, wires etc.) as in the product specified herein. If triple glazing is specified herein, a test report for triple glazing is required.

D. IG Certification: IGCC/IGMA certification for insulating glass units containing electrochromic system. Provide certificate stating that IGUs that passed the testing requirement contained the electrochromic system (EC coatings, bus bars, wires etc.) as in the product specified herein. If triple glazing is specified, certification covering triple glazing is required. If capillary tubes are required for altitude applications, certification covering units with capillary tubes is also required.

E. Shop Drawings: Indicate framing system and accommodations for wiring paths, connectors, routing, and exit from framing system.

1.7 QUALITY ASSURANCE

A. Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer

to these publications for glazing terms not otherwise defined in this section or referenced standards.

1. GANA Publications.
2. AAMA Publications.
3. IGMA Publications.

B. Safety glass products in the US are to comply with CPSC 16 CFR Part 1201 for Category II materials and ANZI Z97.1 2009.

C. Glass thermal and optical performance properties shall be based on calculations from the current LBNL WINDOW 6.3 computer program.

D. Provide glass that is heat-treated by horizontal (roller hearth) process with inherent roller wave distortion parallel to the base dimension, unless otherwise specified.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's instruction for receiving, handling, storing, and protecting materials.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Store materials in original packaging, protected from exposure to harmful environmental conditions, including static electricity, and at temperature and humidity conditions recommended by manufacturer.

D. Exercise care to prevent edge damage to glass, wire, and coatings on glass.

E. Where insulating glass units will be exposed to substantial altitude changes, avoid seal ruptures by complying with manufacturer’s recommendations for venting and sealing.

1.9 PROJECT / SITE CONDITIONS

A. Verify frame channel dimensions are adequate for wire runs as designed.

B. Environmental Requirements:

1. Ensure that substrate surface and ambient air temperature are minimum of 40 degrees F (5 degrees C) and rising at application time and remain above 40 degrees F (5 degrees C) for at least 24 hours after application of sealants.

1.10 WARRANTY

A. Manufacturer’s Special Warranty for Electrochromic IGU Seals: Manufacturer agrees to replace electrochromic IGU’s with defects in material or workmanship causing material obstruction of vision as a result of fogging or film formation of the internal glass as a result of failure of the seal.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Electrochromic IGU Tint: Manufacturer agrees to replace electrochromic IGU's with defects in material or workmanship, resulting in failure to tint.

1. Warranty Period: Five years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Electrochromic IGU Lamination: Manufacturer agrees to replace electrochromic IGU's with lamination defects, such as edge separation or delamination, that materially obstruct vision through the glass.

1. Warranty Period: Five years from date of Substantial Completion.

D. Manufacturer's Special Warranty for Electrochromic Controls: Manufacturer agrees to replace electrochromic controls with defects in material or workmanship.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ELECTROCHROMIC INSULATED GLASS UNITS, GENERAL

A. Basis of Design: Subject to compliance with the requirements, provide SAGE Electrochromics, Inc.; SageGlass or a comparable product by another manufacturer meeting all requirements.

2.2 MATERIALS

A. Electrochromic Laminated Sealed Insulating Glass Units (IGUs) on clear glass, Air Filled:

1. Laminated Outdoor Lite:
   a. Outer Ply:
      1) Glass Type: Float glass.
      2) Glass Tint: Clear.
      3) Nominal Thickness: 0.16 inch (3.9 mm).
      4) Type FT.
   b. Interlayer:
      1) Interlayer Type: Ionoplast interlayer.
      2) Interlayer Tint: Clear.
      3) Nominal Thickness: 0.90mm.
   c. Inner Ply:
      1) Glass Type: Electrochromics coated clear float glass.
      2) Glass Tint: Electronically variable tintable.
      3) Nominal Thickness: 2.2 mm.
      4) Type: Annealed.
      5) Coating Orientation: Surface No. 4.
2. Cavity:
   a. Spacer Material: Austenitic standard stainless steel, black finish.
   b. Nominal Thickness: 11.5 mm +/- 0.5mm.
   c. Cavity: 12mm.
   d. Wall Thickness: >/= 0.178 mm.
   e. Gas Fill: Air.
   f. Desiccant: Four legs filled with blend of 3A molecular sieve and silica gel desiccant.

3. Laminated Indoor Lite:
   a. Inner Ply:
      1) Glass Type: Float glass.
      2) Glass Tint: Clear.
      3) Nominal Thickness: 3.9 mm.
      4) Type: FT.
   b. Interlayer:
      1) Interlayer Type: Polyvinyl butyral.
      2) Interlayer Tint: Clear.
      3) Nominal Thickness: 1.52 mm.
   c. Outer Ply:
      1) Glass Type: Float glass.
      2) Glass Tint: Clear.
      3) Nominal Thickness: 3.9 mm.
      4) Type: FT.
4. Pigtail:
   a. Multi-conductor sheathed cable.
   b. 2, 3 or 4 pin weather tight connector.
5. Clear Performance Characteristics (Center of Glass):
   a. Visible Transmittance: 63 percent.
   b. Exterior Reflectance: No greater than 12 percent.
   c. Interior Reflectance: No greater than 13 percent.
   d. Summer U-factor (U-value): 0.32.
   e. Winter U-factor (U-value): 0.32.
   f. Solar Heat Gain Coefficient (SHGC): 0.44.
   g. Shading Coefficient: 0.50.
6. Tinted Performance Characteristics (Center of Glass):
   a. Visible Transmittance: 1 percent.
   b. Exterior Reflectance: No greater than 6 percent.
   c. Interior Reflectance: No greater than 10.5 percent.
   d. Summer U-factor (U-value): 0.32.
   e. Winter U-factor (U-value): 0.32.
   f. Solar Heat Gain Coefficient (SHGC): 0.10.
   g. Shading Coefficient: 0.12.
7. In-Pane Zoning
   a. Gradual transition between tinted and clear areas within a single pane.
      1) The entire pane can be controlled to contain a gradual transition from one Visible Light Transmittance level to another Visible Light Transmittance level within the pane at a specific point in time.

B. Frame Cable (one per IGU):
   1. Multi-conductor plenum rated sheathed cable type CMP/CL2P.
   2. 2, 3 or 4 pin weathertight connector.
   3. Connector shall be thin at <0.2” in height and installed in the glazing pocket or other easy to access space in the framing system for ease of maintenance.

C. Off state: Clear.

D. Operating Voltage: 5 volts DC or less applied to the EC insulating glass. Class 2 (low voltage, low current) electrical system.

E. Control Functionality: Automated control for daylight and glare shall be provided. Manual over-ride must be provided in designated locations via wall mounted switch(es) or a software application. When a manual command is given via the wall switch or software application, it must over-ride the automated system immediately and initiate the requested change in state of the glass. Subsequent manual commands via the manual over-ride system must over-ride the previous command and be acted on by the control system immediately to initiate the requested change in state. This must occur no matter how soon the subsequent manual command(s) follow the previous manual command.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Site Verification and Conditions

1. Verify that site conditions are acceptable for glass installation.
2. Verify openings for glazing are correctly sized and within tolerance.
3. Verify that functioning weep system is present.
4. Verify that minimum required face and edge clearances are being met.
5. Verify that glazing channels and recesses are clear and free of obstructions, weeps are clear, and channels and recesses are ready for glazing.
6. Verify that framing system is appropriately sized for IGU thickness and that precautions are taken to not over compress the edge seals of the IGU when the glass is installed.

B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation:

1. Clean and prepare glazing channels and other framing members to receive glass and wire.
2. Remove coatings and other harmful materials that will prevent glass and glazing installation required to comply with performance criteria specified.
3. Install grommets at all locations where Frame Cable will penetrate metal framing or structure.

3.3 INSTALLATION

A. Install products using recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in the "GANA Glazing Manual".

B. Verify that IGU secondary seal is compatible with glazing sealants.

C. Install glass in prepared glazing channels and other framing members.

D. Install glass per framing manufacturer’s wiring diagram showing IGU orientation and wire exit point into building. Comply with glass manufacturer’s labels and instructions for glass orientation.

E. Protect IGU pigtail and Frame Cable from any damage during installation. Use grommets during installation to protect wire when routing through frame. If Frame Cable or the connector is damaged during installation the Frame Cable must be replaced. If the IGU pigtail connector is damaged during installation electrochromic glass manufacturer must be notified and the connector must be repaired with the manufacturer's approved method.

F. PVC jacketed plenum shall be conditioned for 24 hours at room temperature prior to installation and never installed below 0°C (32° F) ambient temperature. Once installed these wires must not be exposed to sunlight even through glass. If they are installed in an exposed location, they must be covered or painted (latex / water-based paint only).

G. Verify glazing pocket where IGU Pigtail and Frame Cable connection is made is a dry location.

H. Install silicone setting blocks in rabbets as recommended by referenced glazing standards in GANA Glazing Manual and IGMA Glazing Guidelines and manufacturer's Glazing Guidelines.

I. Use silicone edge blocks for all installed panes to prevent glass from walking post installation.

J. Provide bite on glass, minimum edge and face clearances, and glazing material tolerances recommended by GANA Glazing Manual and as approved by glass manufacturer.

K. Provide weep system as recommended by GANA Glazing Manual.

L. Distribute weight of glass unit along edge rather than at corners.

M. Comply with framing manufacturer's and referenced industry recommendations on expansion joints and anchors, accommodating thermal movement, glass openings, use of setting and edge blocks, use of glass spacers, edge blocks, and installation of weep systems. Setting and edge blocks must be made from silicone. Electrochromic glass manufacturer does not recommend the use of setting blocks made from other materials, as they been known to alter the chemical makeup of plastics and rubbers they come in contact with, resulting in seal failure.

N. Protect glass from edge damage during handling and installation.

O. Install per IGMA North American Glazing Guidelines for Sealed Insulated Glass Units, for Commercial and Residential Use TM-3000-90(04) states "For dry glazed systems, an adequate seal should consist of a minimum of 0.70 N/mm (4 lb/in) and not exceeding 1.75 N/mm (10 lb/in) applied to the edges of the insulated glass unit by gaskets or other fastening systems."

P. Prevent glass from contact with contaminating substances that result from construction operations, such as weld spatter, fireproofing, or plaster.

Q. Remove labels within 30 days of exposure to sunlight or other UV light sources.

3.4 ADJUSTING

A. Remove glass that is broken, chipped, cracked, or damaged in any way, and replace with new materials. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

3.5 CLEANING AND TESTING

A. Clean glass inside and outside, immediately after installation and sealants have cured, per electrochromic glass manufacturer's written recommendations.

B. Remove labels and markings from glass.

C. Clean glass per:

1. GANA Glass Informational Bulletin GANA 01-0300 - Proper Procedures for Cleaning Architectural Glass Products.
2. GANA Glass Information Bulletin GANA TD-02-0402 – Heat-Treated Glass Surfaces Are Different.

D. Do not use scrapers or other metal tools to clean glass.

E. Do not use 'high voltage spark' gas analyzers such as on electrochromic insulating glass units.

END OF SECTION 08 88 00

SECTION 08 91 19 - FIXED LOUVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fixed, extruded-aluminum louvers.

1.2 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades (i.e., the axes of the blades are horizontal).

C. Vertical Louver: Louver with vertical blades (i.e., the axes of the blades are vertical).

D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

E. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content

C. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

D. Samples: For each type of metal finish required.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

1.5 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

1.6 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following 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. Wind pressures shall be considered to act normal to the face of the building.

1. Wind Loads: Determine loads based on pressures as indicated on Drawings.

B. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal, Wind-Driven-Rain-Resistant Louver:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Ruskin Company; EME520MD or a comparable product by one of the following:
   a. Air Flow Company, Inc.
   b. Airolite Company, LLC (The).
   c. Construction Specialties, Inc.
   d. Nystrom, Inc.
   e. Reliable Products, Inc.
2. Louver Depth: 5 inches.
3. Frame and Blade Nominal Thickness: Not less than 0.080 inch.
4. Louver Performance Ratings:
   a. Free Area: Refer to Mechanical Drawings.
   b. Air Performance: Refer to Mechanical Drawings.
   c. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 8 inches per hour and a wind speed of 50 mph at a core-area intake velocity of 400 fpm.
5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Insect screening.

B. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Metal: Same type and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
2. Finish: Same finish as louver frames to which louver screens are attached.
3. Type: Non-rewirable, U-shaped frames.

D. Louver Screening for Aluminum Louvers:

1. Insect Screening: Aluminum: 18-16 mesh, mill finish, .011 inch (0.3 mm) wire.

2.5 BLANK-OFF PANELS

A. Uninsulated, Blank-Off Panels: Metal sheet attached to back of louver.

1. Aluminum sheet for aluminum louvers, not less than 0.050-inch nominal thickness.
2. Panel Finish: Same finish type applied to louvers, but black color.
3. Attach blank-off panels with clips.

2.6 MATERIALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209, Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Recycled Content of Aluminum Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

D. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use tamper-resistant screws for exposed fasteners unless otherwise indicated.
2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
3. For color-finished louvers, use fasteners with heads that match color of louvers.

E. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed for masonry, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

F. Shop Applied Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.7 FABRICATION

A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.

1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern.

C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

1. Frame Type: Channel unless otherwise indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

F. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.

1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.

G. Provide subsills made of same material as louvers for recessed louvers.

H. Join frame members to each other and to fixed louver blades with fillet welds concealed from view, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.8 ALUMINUM FINISHES

A. Finish louvers after assembly.

B. High-Performance Organic Finish: Three-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: Match Architect's sample.

2.9 STAINLESS-STEEL SHEET FINISHES

A. Repair sheet finish by grinding and polishing irregularities, weld spatter, scratches, and forming marks to match surrounding finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 07 92 00 "Joint Sealants" for sealants applied during louver installation.

3.4 FIELD QUALITY CONTROL

A. Installer shall provide field quality control by staff having adequate prior experience and shall provide the following reports and checklists.

1. BECxA shall provide initial BECx checklists. Contractor shall provide weekly updates verifying all locations have been inspected and are free of installation defects and damage.
    a. BECx Checklists shall include specific locations of the work and specific location and description of any repairs.
    b. BECx checklist shall be completed in its entirety and shall be provided weekly to the Construction Manager, Architect, and Owner.
2. Provide field inspection reports within 5 working days of inspection.

3.5 ADJUSTING AND CLEANING

A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 08 91 19

SECTION 09 21 16.23 - GYPSUM BOARD SHAFT WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes gypsum board shaft wall assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each component of gypsum board shaft wall assembly.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)
   b. Corporate Sustainability Reporting (CSR’s)
   c. Health Product Declarations (HPD’s)

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and support them on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Comply with gypsum-shaftliner-board manufacturer's written instructions.

B. Do not install finish panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, or mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: Provide materials and construction identical to those of assemblies tested according to ASTM E 90 and classified according to ASTM E 413 by a testing and inspecting agency.

C. Recycled Content of Steel Products: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C” for recycled content requirements.

2.2 GYPSUM BOARD SHAFT WALL ASSEMBLIES

A. Fire-Resistance Rating: As indicated.

B. STC Rating: As indicated.

C. Gypsum Shaftliner Board:

1. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard
2. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:
   a. Product specific declarations in accordance with ISO 1404
   b. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
   c. Industry Wide Product Specific Type III EPD Third Party Certification
3. Corporate Sustainability Report: Provide third-party verified Corporate Sustainability Report (CPD) including impacts of extraction operations and activities associated with the manufacturer’s product and product’s supply chain conforming the following:
   a. Global Reporting Initiative (GRI) Sustainability report
   b. Organization for Economic Co-operation and Development (OOECD) Guidelines for Multinational Enterprises.
   c. U.N. Global Compact: Communication of Progress
   d. ISO 26000: 2010 Guidance on Social Responsibility
   e. USGBC Approved Program: Other approved programs meeting the CSR criteria.
4. Type X: ASTM C 1396/C 1396M; manufacturer's proprietary fire-resistive liner panels with paper faces, 1-inch-thick, with double beveled long edges. Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. CertainTeed Corporation.
   b. National Gypsum Company.
   c. United States Gypsum Company.

D. Non-Load-Bearing Steel Framing, General: Complying with ASTM C 645 requirements for metal unless otherwise indicated and complying with requirements for fire-resistance-rated assembly indicated.

1. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

a. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

E. Studs: Manufacturer's standard profile for repetitive, corner, and end members as follows:

1. Depth: As indicated.
2. Minimum Base-Metal Thickness: As indicated 0.030 inch.

F. Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches long and matching studs in depth.

1. Minimum Base-Metal Thickness: Matching steel studs.

G. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

H. Elevator-Hoistway-Entrance Struts: Manufacturer's standard J-profile jamb strut with long-leg length of 3 inches, matching studs in depth, and not less than 0.033 inch thick.

I. Finish Panels: Gypsum board as specified in Section 09 29 00 "Gypsum Board.".

J. Sound Attenuation Blankets: As specified in 07 2100 “Thermal Insulation”

2.3 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with shaft wall manufacturer's written instructions.

B. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in Section 09 29 00 "Gypsum Board" that comply with gypsum board shaft wall assembly manufacturer's written instructions for application indicated.

C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

D. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.

1. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E 488/E 488M conducted by a qualified testing agency.
2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

E. Reinforcing: Galvanized-steel reinforcing strips with 0.033-inch minimum thickness of base metal (uncoated).

F. Acoustical Sealant: Section 07 92 19 "Acoustical Joint Sealants."

G. Gypsum Board Cants:

1. Gypsum Board Panels: As specified in Section 09 29 00 "Gypsum Board," Type X, 1/2- or 5/8-inch panels.
2. Adhesive: Laminating adhesive as specified in Section 09 29 00 "Gypsum Board."
3. Non-Load-Bearing Steel Framing: As specified in Section 09 22 16 "Non-Structural Metal Framing."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.

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

3.2 PREPARATION

A. Sprayed Fire-Resistive Materials: Coordinate with gypsum board shaft wall assemblies so both elements of Work remain complete and undamaged. Patch or replace sprayed fire-resistive materials removed or damaged during installation of shaft wall assemblies to comply with requirements specified in Section 07 81 00 "Applied Fireproofing."

B. After sprayed fire-resistive materials are applied, remove only to extent necessary for installation of gypsum board shaft wall assemblies and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLATION

A. General: Install gypsum board shaft wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated and manufacturer's written installation instructions.

B. Refer to Section 01 35 46 ~~“Indoor Air Quality”~~ ”Indoor Air Quality Management” for air quality standards.

C. Do not bridge building expansion joints with shaft wall assemblies; frame both sides of expansion joints with furring and other support.

D. Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.

1. Elevator Hoistway: At elevator hoistway-entrance door frames, provide jamb struts on each side of door frame.
2. Reinforcing: Provide where items attach directly to shaft wall assembly as indicated on Drawings; accurately position and secure behind at least one layer of face panel.

E. Penetrations: At penetrations in shaft wall, maintain fire-resistance rating of shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons and floor indicators, and similar items.

F. Isolate perimeter of gypsum panels from building structure to prevent cracking of panels while maintaining continuity of fire-rated construction.

G. Firestop Tracks: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

H. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect while maintaining fire-resistance rating of gypsum board shaft wall assemblies.

I. Sound-Rated Shaft Wall Assemblies: Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly.

J. Gypsum Board Cants: At projections into shaft exceeding 4 inches, install gypsum board cants covering tops of projections.

1. Slope cant panels at least 75 degrees from horizontal. Set base edge of panels in adhesive and secure top edges to shaft walls at 24 inches o.c. with screws fastened to shaft wall framing.
2. Where non-load-bearing steel framing is required to support gypsum board cants, install framing at 24 inches o.c. and extend studs from the projection to shaft wall framing.

K. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.4 PROTECTION AND CLEANING

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, or mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

C. Remove all debris and particulate from framing assemblies using vacuum or other device capable of fine particulate removal. Channel spaces shall be dry and free from dirt prior to installation of insulation and finish materials.

1. Refer to Section 01 35 46 ”Indoor Air Quality Management”~~“Indoor Air Quality”~~ and Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 09 21 16.23

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.

B. Related Requirements:

1. Section 05 40 00 "Cold-Formed Metal Framing" for exterior and interior load-bearing and exterior non-load-bearing wall studs; floor joists; roof rafters and ceiling joists; and roof trusses.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)

1.3 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of code-compliance certification for studs and tracks.

B. Evaluation Reports: For firestop tracks, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

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

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

C. Horizontal Deflection: For wall assemblies, limited to 1/240 of the wall height based on horizontal loading of 5 lbf/sq. ft..

2.2 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.

B. Sustainability Requirements

1. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:
   a. Product specific declarations in accordance with ISO 1404
   b. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
   c. Industry Wide Product Specific Type III EPD Third Party Certification
2. Recycled Content of Steel Products: Provide products with a post and pre-consumer recycled content of no less than 35% combined. Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C” for recycled content requirements.

C. Studs and Tracks: ASTM C 645.

1. Steel Studs and Tracks:
   a. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection and acoustical performance.
   b. Depth: As indicated on Drawings.

D. Slip-Type Head Joints: Where indicated, provide the following:

1. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

E. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

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

G. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.0329 inch.
2. Depth: As indicated on Drawings.

H. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

I. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

J. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:

1. Product specific declarations in accordance with ISO 1404
2. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
3. Industry Wide Product Specific Type III EPD Third Party Certification

K. Corporate Sustainability Report: Provide third-party verified Corporate Sustainability Report (CPD) including impacts of extraction operations and activities associated with the manufacturer’s product and product’s supply chain conforming the following:

1. Global Reporting Initiative (GRI) Sustainability report
2. Organization for Economic Co-operation and Development (OOECD) Guidelines for Multinational Enterprises.
3. U.N. Global Compact: Communication of Progress
4. ISO 26000: 2010 Guidance on Social Responsibility
5. USGBC Approved Program: Other approved programs meeting the CSR criteria.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch-diameter wire, or double strand of 0.048-inch-diameter wire.

B. Hanger Attachments to Concrete:

1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 as appropriate for the substrate.
   a. Uses: Securing hangers to structure.
   b. Type: Torque-controlled, expansion anchor.
   c. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
   d. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
   e. Recycled Content of Steel Products: Provide products with a post and pre-consumer recycled content of no less than 35% combined. Refer to

section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C” for recycled content requirements.

2. Power-Actuated Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

D. Fiberglass Pad Wire-Tie Hanger: The ceiling isolation hanger shall consist of a one-inch (1”) thick, pre-compressed, molded fiberglass isolator. The fiberglass isolator shall be encased in an anti-short-circuit, reinforced steel bracket which will accommodate up to #8 suspension wire or a ¼” bolt or screw. The hanger bracket shall be zinc-plated, reinforced steel and shall carry a five (5) times maximum rated load overload without failure.

1. Basis-of-Design: Provide Kinetics Noise Control, Inc., Kinetics AF or comparable approved product by the following manufacturers.
   a. Mason Industries, Inc.
   b. PAC International, Inc.

E. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.0538 inch and minimum 1/2-inch-wide flanges.

1. Depth: 2-1/2 inches.

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

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Armstrong World Industries, Inc; Drywall Grid Systems.
   b. United States Gypsum Company; Drywall Suspension System.
   c. Approved Substitution.

G. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

H. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:

1. Product specific declarations in accordance with ISO 1404
2. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
3. Industry Wide Product Specific Type III EPD Third Party Certification

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D 226/D 226M, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

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

3.2 PREPARATION

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

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

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

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

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

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

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

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
   1. Single-Layer Application: As required by horizontal deflection performance requirements unless otherwise indicated.
   2. Multilayer Application: As required by horizontal deflection performance requirements unless otherwise indicated.
   3. Tile Backing Panels: As required by horizontal deflection performance requirements unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

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

D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
   1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
   2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
      a. Install two studs at each jamb unless otherwise indicated.
      b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
      c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
   3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
   4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
      a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
   5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
   6. Curved Partitions:
      a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.

b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.

E. Direct Furring:

1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

F. Z-Shaped Furring Members:

1. Erect insulation, specified in Section 07 21 00 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING CEILING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Hangers: 48 inches o.c.
2. Carrying Channels (Main Runners): 48 inches o.c.
3. Furring Channels (Furring Members): 16 inches o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
   a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
   a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

E. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

3.6 CLEANING AND PROTECTION

A. Remove all debris and particulate from framing assemblies using vacuum or other device capable of fine particulate removal. Channel spaces shall be dry and free from dirt prior to installation of insulation and finish materials.

END OF SECTION 09 22 16

SECTION 09 24 00 - CEMENT PLASTERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Exterior vertical plasterwork (stucco).
2. Exterior horizontal and nonvertical plasterwork (stucco).
3. Interior vertical plasterwork.
4. Interior horizontal and nonvertical plasterwork.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)
   b. Corporate Sustainability Reporting (CSR’s)

C. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.

D. Samples: For each type of factory-prepared finish coat and for each color and texture specified.

E. Samples for Initial Selection: For each type of factory-prepared finish coat and for each color and texture specified.

F. Samples for Verification: For each type of factory-prepared finish coat and for each color and texture specified, 12 by 12 inches, and prepared on rigid backing.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockups for each substrate and finish texture indicated for cement plastering, including accessories.
2. Refer to Section 01 43 39 “Visual Mock-Up Requirements” for additional requirements.
3. For interior plasterwork, simulate finished lighting conditions for review of mockups.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.7 FIELD CONDITIONS

A. Comply with ASTM C 926 requirements.

B. Exterior Plasterwork:

1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
2. Apply plaster when ambient temperature is greater than 40 deg F.
3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

C. Interior Plasterwork: Maintain room temperatures at greater than 40 deg F for at least 48 hours before plaster application, and continuously during and after application.

1. Avoid conditions that result in plaster drying out during curing period. Distribute heat evenly; prevent concentrated or uneven heat on plaster.
2. Ventilate building spaces as required to remove water in excess of that required for hydrating plaster in a manner that prevents drafts of air from contacting surfaces during plaster application and until plaster is dry.

D. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Where indicated, provide cement plaster assemblies identical to those of assemblies tested for fire resistance according to ASTM E 119 by a qualified testing agency.

2.2 METAL LATH

A. Expanded-Metal Lath: ASTM C 847, cold-rolled carbon-steel sheet with ASTM A 653/A 653M, G60, hot-dip galvanized-zinc coating.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. Alabama Metal Industries Company; a Gibraltar Industries company.
   b. CEMCO; California Expanded Metal Products Co.
   c. ClarkDietrich Building Systems.
   d. MarinoWARE.
   e. Phillips Manufacturing Co.
2. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
   a. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.
3. Diamond-Mesh Lath: V-Groove Self-furring, 2.5 lb/sq. yd.

B. Wire-Fabric Lath:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Structa Wire Corp.; Mega Lath or a comparable product by one of the following:
   a. Davis Wire; a Heico Wire Group company.
   b. K-Lath; a Tree Island Steel Ltd. company.
2. Welded-Wire Lath: ASTM C933; self-furring, 1.95 lb/sq. yd. with ASTM A 641/A 641M, hot-dip galvanized-zinc coating

~~B.~~C. Paper Backing: FS UU-B-790a, Type I, Grade D, Style 2 vapor-permeable paper.

2.3 ACCESSORIES

A. General: Comply with ASTM C 1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. ~~Metal~~ Accessories:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. Alabama Metal Industries Company; a Gibraltar Industries company.
   b. CEMCO; California Expanded Metal Products Co.
   c. ClarkDietrich Building Systems.

d. MarinoWARE.
e. Phillips Manufacturing Co.

2. Foundation Weep Screed: Fabricated from hot-dip galvanized-steel sheet, ASTM A 653/A 653M, G60 zinc coating or rigid PVC, ASTM D 1784 / D 4216.
3. Cornerite: Fabricated from metal lath ~~with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating~~.
4. External- (Outside-) Corner Reinforcement: Fabricated from metal lath ~~with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating~~.
5. Corner Beads: Fabricated from zinc.
   a. Smallnose cornerbead with expanded flanges; use unless otherwise indicated.
   b. Smallnose cornerbead with perforated flanges; use on curved corners.
   c. Smallnose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing unit masonry corners.
   d. Bullnose cornerbead, radius 3/4 inch minimum, with expanded flanges; use at locations indicated on Drawings.
6. Casing Beads: Fabricated from zinc or PVC; square-edged style; with expanded flanges.
7. Control Joints: Fabricated from zinc or PVC; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
8. Expansion Joints: Fabricated from zinc or PVC; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
9. Two-Piece Expansion Joints: Fabricated from zinc or PVC; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8-inch-wide; with perforated flanges.

2.4 MISCELLANEOUS MATERIALS

A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in cement plaster.

C. Fasteners for Attaching Metal Lath to Substrates: ASTM C 1063.
   1. Stub Nails are not permitted.

D. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch diameter unless otherwise indicated.

2.5 PLASTER MATERIALS

~~A. Portland Cement: ASTM C 150/C 150M, Type I.~~

~~1. Color for Finish Coats: White.~~

A. Cement: Use on of the following:

1. Portland Cement: ASTM C 150/C 150M, Type I.
   a. Color for Finish Coats: White.

2. Stucco Cement: ASTM C 1328 Plastic Cement or ASTM C 91 Masonry Cement.
   a. Color for Finish Coats: White.

B. Colorants for Job-Mixed Finish Coats: Colorfast mineral pigments that produce finish plaster color to match Architect's sample.

C. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.

D. Sand Aggregate: ASTM C 897.

1. Color for Job-Mixed Finish Coats: White.

E. Bonding Agent Admixture: ~~Sika Latex R.~~Use one of the following:

1. Sika Corporation; SikaLatex R.
2. Lambert Corporation; 932 Link.

F. Acrylic-Based Finish Coatings: Factory-mixed acrylic-emulsion coating systems formulated with colorfast mineral pigments and fine aggregates; for use over cement plaster base coats. Include manufacturer's recommended primers and sealing topcoats for acrylic-based finishes.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. El Rey Stucco Solutions; a Parex USA, Inc. brand.
   b. Finestone, BASF Corp.
   c. Omega Products International, Inc.
   d. SonoWall, BASF Corp.
   e. Sto Corp.
2. Color: Match Architect's sample.

G. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

2.6 PLASTER MIXES

A. General: Comply with ASTM C 926 for applications indicated.

1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. of cementitious materials.

B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:

1. Portland Cement Mixes:
   a. Scratch Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.

b. Brown Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.

2. Stucco Cement Mixes:
   a. Scratch Coat: For cementitious material, mix 1 part stucco cement with 2-1/2 to 4 parts aggregate.
   b. Brown Coat: For cementitious material, mix 1 part stucco cement with 3 to 5 parts aggregate, but not less than volume of aggregate used in scratch coat.

C. Factory-Prepared Finish-Coat Mixes: For ready-mixed finish-coat plasters, comply with manufacturer's written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

B. Prepare smooth, solid substrates for plaster according to ASTM C 926.

3.3 INSTALLING METAL LATH

A. Metal Lath: Install according to ASTM C 1063.

~~1. Partition Framing and Vertical Furring: Install flat-diamond-mesh lath.~~
~~2. On Solid Surfaces, Not Otherwise Furred: Install self-furring, diamond-mesh lath.~~

3.4 INSTALLING ACCESSORIES

A. Install according to ASTM C 1063 and at locations indicated on Drawings or as required to accommodate field as-built conditions or structural considerations.

B. Reinforcement for External (Outside) Corners:

1. Install lath-type, external-corner reinforcement at exterior locations.
2. Install cornerbead at interior locations.

C. Control Joints: Locate as approved by Architect for visual effect and as follows:

1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
   a. Vertical Surfaces: 144 sq. ft.
   b. Horizontal and Other Nonvertical Surfaces: 100 sq. ft.

2. At distances between control joints of not greater than 18 feet o.c.
3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
4. Where control joints occur in surface of construction directly behind plaster.
5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.5 PLASTER APPLICATION

A. General: Comply with ASTM C 926.

1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces when measured by a 10-foot straightedge placed on surface.
2. Finish plaster flush with ~~metal~~ frames and other built-in ~~metal~~ items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.

~~B. Walls; Base-Coat Mixes for Use over Metal Lath: For scratch and brown coats, for three-coat plasterwork with 3/4-inch total thickness, as follows:~~

~~1. Portland cement mixes.~~

B. Walls; Base-Coat Mixes:

1. Portland Cement Mixes for Use over Expanded Metal Lath: For scratch and brown coats, for three-coat plasterwork with 3/4-inch total thickness.
2. Stucco Cement Mixes for Use over Wire Fabric Lath: For scratch and brown coats, for three-coat plasterwork with 7/8-inch total thickness.

C. Plaster Finish Coats: Apply to provide float finish to match Architect's sample.

3.6 PLASTER REPAIRS

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.7 FIELD QUALITY CONTROL

A. Installer shall provide field quality control by certified staff and shall provide the following reports and checklists.

1. BECxA shall provide initial BECx checklists. Contractor shall provide weekly updates verifying all locations have been inspected and are free of installation defects and damage.
   a. BECx Checklists shall include specific locations of the work and specific location and description of any repairs.
   b. BECx checklist shall be completed in its entirety and shall be provided weekly to the Construction Manager, Architect, and Owner.

2. Provide field inspection reports within 5 working days of inspection.

3.8 CLEANING AND PROTECTION

A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

B. Refer to Section 01 35 46 “Indoor Air Quality Management” and Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 09 24 00

SECTION 09 24 50 - CEMENT PLASTERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Exterior vertical plasterwork (stucco).
2. Exterior horizontal and nonvertical plasterwork (stucco).
3. Interior vertical plasterwork.
4. Interior horizontal and nonvertical plasterwork.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)
   b. Corporate Sustainability Reporting (CSR’s)

C. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.

D. Samples: For each type of factory-prepared finish coat and for each color and texture specified.

E. Samples for Initial Selection: For each type of factory-prepared finish coat and for each color and texture specified.

F. Samples for Verification: For each type of factory-prepared finish coat and for each color and texture specified, 12 by 12 inches, and prepared on rigid backing.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and

execution.

1. Build mockups for each substrate and finish texture indicated for cement plastering, including accessories.
2. Refer to Section 01 43 39 “Visual Mock-Up Requirements” for additional requirements.
3. For interior plasterwork, simulate finished lighting conditions for review of mockups.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.7 FIELD CONDITIONS

A. Comply with ASTM C 926 requirements.

B. Exterior Plasterwork:

1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
2. Apply plaster when ambient temperature is greater than 40 deg F.
3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

C. Interior Plasterwork: Maintain room temperatures at greater than 40 deg F for at least 48 hours before plaster application, and continuously during and after application.

1. Avoid conditions that result in plaster drying out during curing period. Distribute heat evenly; prevent concentrated or uneven heat on plaster.
2. Ventilate building spaces as required to remove water in excess of that required for hydrating plaster in a manner that prevents drafts of air from contacting surfaces during plaster application and until plaster is dry.

D. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: Where indicated, provide cement plaster assemblies identical to those of assemblies tested for fire resistance according to ASTM E 119 by a qualified testing agency.

2.2 METAL LATH

A. Expanded-Metal Lath: ASTM C 847, cold-rolled carbon-steel sheet with ASTM A 653/A 653M, G60, hot-dip galvanized-zinc coating.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. Alabama Metal Industries Company; a Gibraltar Industries company.
   b. CEMCO; California Expanded Metal Products Co.
   c. ClarkDietrich Building Systems.
   d. MarinoWARE.
   e. Phillips Manufacturing Co.
2. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
   a. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.
3. Diamond-Mesh Lath: V-Groove Self-furring, 2.5 lb/sq. yd.

B. Paper Backing: FS UU-B-790a, Type I, Grade D, Style 2 vapor-permeable paper.

2.3 ACCESSORIES

A. General: Comply with ASTM C 1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Metal Accessories:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. Alabama Metal Industries Company; a Gibraltar Industries company.
   b. CEMCO; California Expanded Metal Products Co.
   c. ClarkDietrich Building Systems.
   d. MarinoWARE.
   e. Phillips Manufacturing Co.
2. Foundation Weep Screed: Fabricated from hot-dip galvanized-steel sheet, ASTM A 653/A 653M, G60 zinc coating.
3. Cornerite: Fabricated from metal lath with ASTM A 653/A 653M, G60, hot-dip galvanized-zinc coating.
4. External- (Outside-) Corner Reinforcement: Fabricated from metal lath with ASTM A 653/A 653M, G60, hot-dip galvanized-zinc coating.
5. Corner Beads: Fabricated from zinc.
   a. Smallnose cornerbead with expanded flanges; use unless otherwise indicated.
   b. Smallnose cornerbead with perforated flanges; use on curved corners.
   c. Smallnose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing unit masonry corners.
   d. Bullnose cornerbead, radius 3/4 inch minimum, with expanded flanges; use at locations indicated on Drawings.
6. Casing Beads: Fabricated from zinc; square-edged style; with expanded flanges.

7. Control Joints: Fabricated from zinc; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
8. Expansion Joints: Fabricated from zinc; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
9. Two-Piece Expansion Joints: Fabricated from zinc; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8-inch-wide; with perforated flanges.

2.4 MISCELLANEOUS MATERIALS

A. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.

B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch long, free of contaminants, manufactured for use in cement plaster.

C. Fasteners for Attaching Metal Lath to Substrates: ASTM C 1063.

1. Stub Nails are not permitted.

D. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch diameter unless otherwise indicated.

2.5 LIMESTONE PLASTER MATERIALS

A. Limestone High Performance Cladding:
1. Type: Limestone high performance cladding based on natural hydraulic lime.
2. Characteristics:
   a. Granulometry: 0.8 to 4.0 mm according to ASTM C 136.
   b. Air Permeance: 0.001 at 75 Pa according to ASTM E 2178.
   c. Water Retention: 94 percent plus or minus 2 percent according to ASTM C 1506 on paste.
   d. Water Vapor Transmission Rate: 46 PERMS according to ASTM E 96, Wet Cup Method.
   e. Wind Driven Rain Resistance: Passed according to ASTM D 6904 (84 percent better than the standard for weight gain).
   f. Salt Fog Exposure: No significant change after 300 hours according to ASTM B 117.
   g. Accelerated Weathering: According to ASTM G 154:
      1) Visual Color Change: None after 2000 hours.
      2) 60 degree Gloss Change: 3 gloss units after 2000 hours.
      3) Blistering: None after 2000 hours.
      4) Chalking: None after 2000 hours.
      5) Checking: None after 2000 hours.
      6) Cracking: None after 2000 hours.
   h. Modulus of Elasticity: 7584 MPa according to ASTM C 469.

2.6 LIMESTONE PLASTER MIXES

A. Mix materials in accordance with manufacturer’s instructions using mechanical mixing

equipment.

B. Add water to premixed bagged material at rate of 1-1/4 to 1-1/2 gallons per bag until desired consistency is achieved. Use same amount of water per bag for subsequent batches.

C. Add coloring admixture in accordance with manufacturer's instructions; color to match approved samples.

D. Continue mixing for 6 to 7 minutes total.

E. Clean mixer thoroughly at end of each work day, when work is suspended for an extended period, and when changing colors.

F. Discard mixes not used within 60 minutes after mixing.

G. Source Quality Control:
   a. Perform slump and weight density test on first batch daily and whenever equipment is not in use for more than 30 minutes using materials discharged directly from mixer before application on wall.
   b. Record results of each batch using form provided by manufacturer.
   c. Record location of each batch number on copy of exterior building elevations.
   d. Ensure consistent compliance with manufacturer's slump and weight density requirements.
   e. Discard batches not complying with slump and density weight requirements and adjust subsequent mixes as required.
   f. If batches fail to meet required slump and weight requirements, remove applied finishes back to last verifiable point at no additional cost to Owner.
   g. Owner may request additional testing at any time during mixing.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

B. Prepare smooth, solid substrates for plaster according to ASTM C 926.

3.3 INSTALLING METAL LATH

A. Metal Lath: Install according to ASTM C 1063.

1. Partition Framing and Vertical Furring: Install flat-diamond-mesh lath.
2. On Solid Surfaces, Not Otherwise Furred: Install self-furring, diamond-mesh lath.

3.4 INSTALLING ACCESSORIES

A. Install according to ASTM C 1063 and at locations indicated on Drawings.

B. Reinforcement for External (Outside) Corners:

1. Install lath-type, external-corner reinforcement at exterior locations.
2. Install cornerbead at interior locations.

C. Control Joints: Locate as approved by Architect for visual effect and as follows:

1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
   a. Vertical Surfaces: 144 sq. ft.
   b. Horizontal and Other Nonvertical Surfaces: 100 sq. ft.
2. At distances between control joints of not greater than 18 feet o.c. or As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
3. Where control joints occur in surface of construction directly behind plaster.
4. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.

3.5 PLASTER APPLICATION

A. General: Comply with ASTM C 926.

1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces when measured by a 10-foot straightedge placed on surface.
2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.

B. Walls; Base-Coat Mixes for Use over Metal Lath: For scratch and brown coats, for three-coat plasterwork with 3/4-inch total thickness, as follows:

1. Portland cement mixes.

C. Plaster Finish Coats: Apply to provide float finish to match Architect's sample.

3.6 PLASTER REPAIRS

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

3.7 FIELD QUALITY CONTROL

A. Installer shall provide field quality control by certified staff and shall provide the

following reports and checklists.

1. BECxA shall provide initial BECx checklists. Contractor shall provide weekly updates verifying all locations have been inspected and are free of installation defects and damage.
   a. BECx Checklists shall include specific locations of the work and specific location and description of any repairs.
   b. BECx checklist shall be completed in its entirety and shall be provided weekly to the Construction Manager, Architect, and Owner.
2. Provide field inspection reports within 5 working days of inspection.

3.8 CLEANING AND PROTECTION

A. Remove temporary protection and enclosure of other work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

B. Refer to Section 01 35 46 “Indoor Air Quality Management” and Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 09 24 50

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.

B. Related Requirements:

1. Section 06 16 00 "Sheathing" for gypsum sheathing for exterior walls.
2. Section 09 21 16.23 "Gypsum Board Shaft Wall Assemblies" for metal shaft-wall framing, gypsum shaft liners, and other components of shaft-wall assemblies.
3. Section 09 22 16 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
4. Section 09 30 13 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: For Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Adhesives and Sealants
3. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)
   b. Corporate Sustainability Reporting (CSR’s)
   c. Health Product Declarations (HPD’s)

1.4 QUALITY ASSURANCE

A. Mockups: Build mockups demonstrate aesthetic effects and to set quality standards for materials and execution. Refer to Section 01 43 39 “Visual Mock-Up Requirements” for additional requirements.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential

causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned. In installation areas protected from weather but not yet conditioned, paper-faced panels may be replaced with mold resistant gypsum panels.

C. Do not install panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. *STC-Rated Assemblies: For STC-rated assemblies, provide materials and* construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

B. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard

C. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:

1. Product specific declarations in accordance with ISO 1404
2. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
3. Industry Wide Product Specific Type III EPD Third Party Certification

D. Corporate Sustainability Report: Provide third-party verified Corporate Sustainability Report (CPD) including impacts of extraction operations and activities associated

with the manufacturer's product and product's supply chain conforming the following:

1. Global Reporting Initiative (GRI) Sustainability report
2. Organization for Economic Co-operation and Development (OOECD) Guidelines for Multinational Enterprises.
3. U.N. Global Compact: Communication of Progress
4. ISO 26000: 2010 Guidance on Social Responsibility
5. USGBC Approved Program: Other approved programs meeting the CSR criteria.

E. Low Emitting ceilings and walls

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 "Sustainable Design Requirements - LEED v4 BD+C" for additional requirements.

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

2.3 INTERIOR GYPSUM BOARD

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

1. CertainTeed Corporation.
2. National Gypsum Company.
3. United States Gypsum Company.

B. Gypsum Wallboard: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

C. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

D. Flexible Gypsum Board: ASTM C 1396/C 1396M. Manufactured to bend to fit radii and to be more flexible than standard regular-type gypsum board of same thickness.

1. Thickness: 1/4 inch.
2. Long Edges: Tapered.

E. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

F. Abuse-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.

1. Core: 5/8 inch, Type X.
2. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.

3. Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
4. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 3 requirements.
5. Long Edges: Tapered.
6. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

G. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Core: 5/8-inch, Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 SPECIALTY GYPSUM BOARD

A. Acoustically Enhanced Gypsum Board: ASTM C 1396/C 1396M. Multilayer products constructed of two layers of gypsum boards sandwiching a viscoelastic sound-absorbing polymer core.

1. Basis of Design: National Gypsum Company, Gold Bond SoundBreak XP Gypsum Board.
2. Core: As indicated.
3. Long Edges: Tapered.

B. Sound Attenuating, Type X Gypsum Board: Laminated noise-reducing gypsum board consisting of two layers of dense gypsum board encased in smooth, moisture and mold resistant paper facings laminated together with a viscoelastic polymer compound. Meeting ASTM C1766 and ASTM C1396.

1. Basis of Design: CertainTeed SilentFX® QuickCut Gypsum Board
2. Type and Thickness: Type X, 5/8 inch (15.9 mm) thick where indicated and as otherwise required to meet fire rating for specific element
3. Size: 48 by not less than 96 inches (1220 by not less than 2440 mm) ~~[longest length possible to minimize joints]~~.
4. Surface Paper: 100% recycled moisture and mold resistant paper on face, back and long edges.
5. Mold Resistance Rating: Score of 10 (best possible) tested in accordance with ASTM D3273
6. Abuse-Resistance per ASTM C1629: Surface Abrasion – Level 2, Soft Body Impact – Level 1

2.5 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. CertainTeed Corporation.
   b. National Gypsum Company.
   c. United States Gypsum Company.

2. Thickness: 5/8 inch.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Zinc Alloy.
2. Shapes:
   a. Cornerbead.
   b. Bullnose bead.
   c. LC-Bead: J-shaped; exposed long flange receives joint compound.
   d. L-Bead: L-shaped; exposed long flange receives joint compound.
   e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
   f. Expansion (control) joint.
   g. Curved-Edge Cornerbead: With notched or flexible flanges.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, including Environmental Product Disclosures, and Leadership Extraction Practices. Recycled material content shall be not less than 25% found in Section 01 81 13.14, provide products by one of the following:
   a. Fry Reglet Corporation.
   b. Gordon, Inc.
   c. Pittcon Industries.
2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials specified.

2.7 JOINT TREATMENT MATERIALS

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

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Low Emitting ceilings and walls
   a. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
   b. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

D. Joint Compound for Tile Backing Panels:

1. Cementitious Backer Units: As recommended by backer unit manufacturer.
2. Low Emitting ceilings and walls

a. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
b. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

2.8 AUXILIARY MATERIALS

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

B. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

C. Sound Attenuation Batts: Refer to Section 07 21 00 “Thermal Insulation”

D. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Acoustical joint sealant shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers" and additional low emitting requirements in Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C”.
2. Products: Subject to compliance with requirements, including VOC and CDPH requirements found in Section 01 81 13.14, provide one of the following:
   a. Pecora Corporation; AC-20 FTR.
   b. USG Corporation; SHEETROCK Acoustical Sealant.
   c. Approved Substitution.

E. High-strength expanded metal mesh security barrier

1. Material: Type II, Class 1 – carbon steel mesh complying with ASTM F1267 and ASTM A1011, 10 gauge, 3/4-inch diamond.
2. Sheet Size: 48-inch x 96-inch
3. Basis-of-Design Product: Subject to compliance with requirements, provide ClarkDietrich Building Systems, (BM75) Barrier Mesh or comparable product meeting all requirements including sustainability requirements by one of the following manufacturers.
   a. Alabama Metal Industries Corporation
   b. Metalex, a Jason Company
   c. Niles Fence & Security Products, LLC,

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

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

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch-wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: As indicated on Drawings.
2. Type X: As indicated on Drawings or where required for fire-resistance-rated assembly.
3. Flexible Type: As indicated on Drawings.
4. Ceiling Type: Ceiling surfaces.
5. Abuse-Resistant Type: As indicated on Drawings.
6. Mold-Resistant Type: As indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
   a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
   b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. On furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. Fastening Methods: Fasten base layers and face layers separately to supports with screws or as indicated by UL design.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Curved Surfaces:

1. Install panels horizontally (perpendicular to supports) and unbroken, to extent possible, across curved surface plus 12-inch-long straight sections at ends of curves and tangent to them.
2. For double-layer construction, fasten base layer to studs with screws 16 inches o.c. Center gypsum board face layer over joints in base layer, and fasten to studs with screws spaced 12 inches o.c.

3.4 APPLYING TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners unless otherwise indicated.
2. U-Bead: Use at exposed panel edges.
3. Curved-Edge Cornerbead: Use at curved openings.

D. Aluminum Trim: Install in locations indicated on Drawings.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.

2. Level 4: All exposed surfaces unless indicated otherwise.

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 CLEANING AND PROTECTION

A. Remove all debris and particulate from wall assemblies using vacuum or other device capable of fine particulate removal. Refer to Section 01 35 46 “Indoor Air Quality Management” for additional requirements.

B. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

C. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

D. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

SECTION 09 30 13 - CERAMIC TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Porcelain tile.
2. Waterproof membrane.
3. Metal edge strips.

B. Related Requirements:

1. Section 07 92 00 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Section 09 00 01 “Finish Key” for finish selections.
3. Section 09 29 00 "Gypsum Board" for cementitious backer units.
4. Section 09 30 23 "Glass Tiling."

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Paints and Coatings
   b. Low Emitting Materials for Adhesives and Sealants
   c. Low Emitting Materials for Flooring
2. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD's)

C. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

D. Samples for Initial Selection: For tile, grout, and accessories involving color selection.

E. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.
2. Full-size units of each type of trim and accessory.
3. Metal edge strips in 6-inch lengths.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

C. Product Certificates: For each type of product.

D. Product Test Reports: For tile-setting and -grouting products.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 10 percent of amount installed for each type, composition, color, pattern, and size indicated.
2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.8 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.
2. For large-format tile, installer shall be certified by tile manufacturer.

B. Mockups: Build mockups as indicated in Section 01 43 39 "Visual Mock-up Requirements".

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.10 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:

1. Waterproof membrane.
2. Crack isolation membrane.
3. Metal edge strips.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.3 TILE PRODUCTS

A. Basis-of-Design Product – Porcelain Tile: Subject to compliance with requirements, provide Porcelain Tile types as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

B. Basis-of-Design Product – Rectified Porcelain Tile: Subject to compliance with requirements, provide Rectified Porcelain Tile types as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

C. Basis-of-Design Product – Large Format Porcelain Tile: Subject to compliance with requirements, provide Large Format Porcelain Tile types as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

D. Basis-of-Design Product – Ceramic Tile: Subject to compliance with requirements, provide Ceramic Tile types as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

E. Basis-of-Design Product – Quarry Tile: Subject to compliance with requirements, provide Quarry Tile types as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

2.4 WATERPROOF MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.

1. Products: Subject to compliance with requirements, provide one of the following or comparable approved product meeting all requirements including sustainability requirements.
   a. LATICRETE International, Inc.; Laticrete Hydro Ban.
   b. MAPEI Corporation; Mapelastic AquaDefense.

C. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard

D. Low Emitting Paints & Coatings

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

2.5 SETTING MATERIALS

A. Modified Dry-Set Mortar (Thinset): ANSI A118.4.

1. Products: Subject to compliance with requirements, provide one of the following or comparable approved product meeting all requirements including sustainability requirements.
   a. LATICRETE International, Inc.; 253 Gold
   b. MAPEI Corporation; Ultralite Mortar
2. Provide prepackaged, dry-mortar mix combined with liquid-latex additive at Project site.
3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

B. Medium-Bed, Modified Dry-Set Mortar: Comply with requirements in ANSI A118.4. Provide product that is approved by manufacturer for application thickness of 5/8 inch (16 mm).

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or comparable approved product meeting all requirements including sustainability requirements.
   a. LATICRETE International, Inc.
   b. MAPEI Corporation

C. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard

D. Low Emitting Flooring

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

2.6 GROUT MATERIALS

A. Water-Cleanable Epoxy Grout: ANSI A118.3.

1. Products: Subject to compliance with requirements, provide one of the following or comparable approved product meeting all requirements including sustainability requirements.
   a. LATICRETE International, Inc.; SPECTRALOCK PRO Premium Grout
   b. MAPEI Corporation; Kerapoxy

B. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard

C. Low Emitting Flooring

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

2.7 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

1. Basis of Design: Provide Schluter Systems, Schluter-JOLLY or approved substitution
   a. Material and Finish: ACGB - Brushed Chrome Anodized Aluminum
   b. Provide radius profile where installed on radiused wall.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

D. Low Emitting Flooring

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

2.8 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

B. Manufacturer shall provide written approval of substrate condition prior to installation.

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

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 CERAMIC TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
   a. Exterior tile floors.
   b. Tile floors in wet areas.
   c. Tile floors consisting of tiles 8 by 8 inches or larger.
   d. Tile floors consisting of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Ceramic Mosaic Tile: 1/8 inch.

H. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.

I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
2. Refer to Section 07 92 00 “Joint Sealants” for sealant requirements.

J. Metal Edge Strips: Install at locations indicated.

3.4 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.5 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Refer to Section 01 35 46 “Indoor Air Quality Management” and Section 01 74 23 “Final Cleaning” for additional requirements.

3.6 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. Ceramic Tile Installation: TCNA F131; water-cleanable, tile-setting epoxy; epoxy grout.

B. Interior Wall Installations, Wood or Metal Studs or Furring:

1. Ceramic Tile Installation: TCNA W244C or TCNA W244F; thinset mortar on cementitious backer units or fiber-cement backer board.

END OF SECTION 09 30 13

SECTION 09 30 23 - GLASS TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Glass tile.
2. Waterproof membrane.
3. Metal Edge Strips.

B. Related Requirements:

1. Section 07 92 00 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
2. Section 09 00 01 “Finish Key” for finish selections.
3. Section 09 29 00 "Gypsum Board" for cementitious backer units.
4. Section 09 30 13 “Ceramic Tiling”

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.2 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Paints and Coatings
   b. Low Emitting Materials for Adhesives and Sealants
2. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD's)

C. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

D. Samples for Initial Selection: For tile, grout, and accessories involving color selection.

E. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required. For glass mosaic tile in color blend patterns, provide full sheets of each color blend.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

C. Product Certificates: For each type of product.

D. Product Test Reports: For tile-setting and -grouting products.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile Units: Furnish quantity of full-size units equal to 10 percent of amount installed for each type, composition, color, pattern, and size indicated.
2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.8 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer employs Ceramic Tile Education Foundation Certified Installers or installers recognized by the U.S. Department of Labor as Journeyman Tile Layers.

B. Mockups: Build mockups as indicated in Section 01 43 39 "Visual Mock-up Requirements".

1. Build mockup of glass tile installation.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.2 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.10 FIELD CONDITIONS

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.

1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:

1. Waterproof membrane.
2. Joint sealants.

2.2 PRODUCTS, GENERAL

A. ANSI Glass Tile Standard: Provide glass tile that complies with ANSI A137.2 for types and other characteristics indicated.

1. Provide tile complying with Standard grade requirements unless otherwise indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards

referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

2.3 TILE PRODUCTS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Mosaic Glass Tile as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

2.4 WATERPROOF MEMBRANE

A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fluid-Applied Membrane: Liquid-latex rubber or elastomeric polymer.

1. Products: Subject to compliance with requirements, provide one of the following or comparable approved product meeting all requirements including sustainability requirements.
   a. LATICRETE International, Inc.; Laticrete Hydro Ban.
   b. MAPEI Corporation; Mapelastic AquaDefense.

C. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard

D. Low Emitting Paints & Coatings

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

2.5 SETTING MATERIALS

A. Modified Dry-Set Mortar (Thinset): ANSI A118.4.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. C-Cure.
   b. LATICRETE SUPERCAP, LLC.
   c. MAPEI Corporation.
2. Provide prepackaged, dry-mortar mix combined with liquid-latex additive at Project site.
3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

2.6 GROUT MATERIALS

A. Water-Cleanable Epoxy Grout: ANSI A118.3, with a VOC content as indicated in Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C”.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
   a. C-Cure.
   b. LATICRETE SUPERCAP, LLC.
   c. MAPEI Corporation.

2.7 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.8 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

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

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

3.2 PREPARATION

A. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot toward drains.

B. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 GLASS TILE INSTALLATION

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

E. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Mosaic Glass Tile: 1/16 inch.

G. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.

H. Metal Edge Strips: Install at locations indicated.

I. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.

B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

3.5 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples

of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

D. Refer to Section 01 35 46 “Indoor Air Quality Management” and Section 01 74 23 “Final Cleaning” for additional requirements

3.6 INTERIOR GLASS TILE INSTALLATION SCHEDULE

A. Interior Wall Installations, Wood or Metal Studs or Furring:

1. Glass Tile Installation: TCNA W221 and ANSI A108.14; cement mortar bed (thickset) on solid backing.

END OF SECTION 09 30 23

SECTION 09 51 13 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section includes acoustical panels and exposed suspension systems for interior ceilings.

B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
    a. Extended Producer Responsibility
    b. Leadership Extraction Practices for Recycled Content
2. Product Certificates: Provide the following:
    a. Environmental Product Declarations (EPD’s)
    b. Corporate Sustainability Reporting (CSR’s)

C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

1. Acoustical Panels: Set of 6-inch-square samples of each type, color, pattern, and texture.
2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch-long Samples of each type, finish, and color.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Ceiling suspension-system members.
2. Structural members to which suspension systems will be attached.
3. Method of attaching hangers to building structure.
    a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
5. Size and location of initial access modules for acoustical panels.
6. Items penetrating finished ceiling and ceiling-mounted items including the following:
    a. Lighting fixtures.
    b. Diffusers.
    c. Grilles.
    d. Speakers.
    e. Sprinklers.
    f. Access panels.
    g. Perimeter moldings.
7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
8. Minimum Drawing Scale: 1/8 inch = 1 foot.

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical panel ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.

E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
3. Hold-Down Clips: Equal to 2 percent of quantity installed.

1.8 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals. Refer to Section 01 43 39 “Visual Mock-up Requirements” for requirements.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class B according to ASTM E 1264.
2. Smoke-Developed Index: 450 or less.

B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL or from the listings of another qualified testing agency.

C. Sustainability Requirements:

1. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 50 percent.
   a. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.
2. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:
   a. Product specific declarations in accordance with ISO 1404
   b. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930

c. Industry Wide Product Specific Type III EPD Third Party Certification

2.3 ACOUSTICAL PANELS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Acoustical Panel Ceiling types as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

B. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E 1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

2.4 METAL SUSPENSION SYSTEM

A. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C 635/C 635M and designated by type, structural classification, and finish indicated.

1. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" according to ASTM C 635/C 635M.

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch-diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.

F. Hold-Down Clips: Manufacturer's standard hold-down.

2.6 ACOUSTICAL SEALANT

A. Acoustical Sealant: As specified in Section 07 92 19 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

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

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

A. Install acoustical panel ceilings according to ASTM C 636/C 636M and manufacturer's written instructions.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
3. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
4. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a

manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

5. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
6. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
7. Do not attach hangers to steel deck tabs.
8. Do not attach hangers to steel roof deck. Attach hangers to structural members.
9. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
10. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. Arrange directionally patterned acoustical panels as follows:
   a. As indicated on reflected ceiling plans.
2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
6. Install hold-down clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Construction Manager will engage a qualified special inspector to perform the following special inspections:

1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no panels have been installed. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.

1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

D. Acoustical panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.6 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

1. Refer to Section 01 74 23 “Final Cleaning” for additional cleaning requirements.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 13

SECTION 09 51 23 - ACOUSTICAL TILE CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Acoustical tiles for interior ceilings.
2. Direct attachment of tiles to substrates with adhesive.

B. Related Requirements:

1. Section 09 51 13 "Acoustical Panel Ceilings" for ceilings consisting of mineral-base and glass-fiber-base acoustical panels and exposed suspension systems.
2. Section 09 51 33 "Acoustical Metal Pan Ceilings" for ceilings consisting of metal-pan units with exposed and concealed suspension systems.

C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Extended Producer Responsibility
   b. Leadership Extraction Practices for Recycled Content
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Adhesives and Sealants
3. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)
   b. Corporate Sustainability Reporting (CSR’s)

C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

D. Samples for Initial Selection: For components with factory-applied finishes.

E. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

1. Acoustical Tiles: Set of full-size Samples of each type, color, pattern, and texture.
2. Exposed Moldings and Trim: Set of 6-inch- long Samples of each type and color.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Items penetrating finished ceiling and ceiling-mounted items including the following:

a. Lighting fixtures.
b. Diffusers.
c. Grilles.
d. Speakers.
e. Sprinklers.
f. Access panels.
g. Perimeter moldings.

2. Minimum Drawing Scale: 1/8 inch = 1 foot.

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical tile ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Evaluation Reports: For each acoustical tile ceiling suspension system, from ICC-ES.

E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size tiles equal to 2 percent of quantity installed.

1.8 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals. Refer to Section 01 43 39 “Visual Mock-up Requirements” for requirements.

1. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical tiles, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical tiles, permit them to reach room temperature and a stabilized moisture content.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical tile ceiling installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations:

1. Suspended Acoustical Tile Ceilings: Obtain each type of acoustical ceiling tile and its suspension system from single source from single manufacturer.
2. Directly Attached Acoustical Tile Ceilings: Obtain each type of acoustical ceiling tile from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

B. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:

1. Product specific declarations in accordance with ISO 1404
2. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
3. Industry Wide Product Specific Type III EPD Third Party Certification

C. Corporate Sustainability Report: Provide third-party verified Corporate Sustainability Report (CPD) including impacts of extraction operations and activities associated with the manufacturer's product and product's supply chain conforming the following:

1. Global Reporting Initiative (GRI) Sustainability report
2. Organization for Economic Co-operation and Development (OOECD) Guidelines for Multinational Enterprises.
3. U.N. Global Compact: Communication of Progress
4. ISO 26000: 2010 Guidance on Social Responsibility
5. USGBC Approved Program: Other approved programs meeting the CSR criteria.

D. Low Emitting Adhesives and Sealants

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 "Sustainable Design Requirements - LEED v4 BD+C" for additional requirements.

E. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class B according to ASTM E 1264.
2. Smoke-Developed Index: 450 or less.

2.3 ACOUSTICAL TILES

A. Basis-of-Design Product: Subject to compliance with requirements, provide Acoustical Tile Ceiling types as indicated in Section 09 00 01 "Finish Key" or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 "Substitution Procedures" and 01 6000 "Product Requirements" for comparable product requirements.

B. Acoustical Tile Standard: Provide manufacturer's standard tiles of configuration indicated that comply with ASTM E 1264 classifications as designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

C. Color: As indicated by manufacturer's designation.

D. Light Reflectance (LR): Not less than As indicated by manufacturer's designation.

E. Ceiling Attenuation Class (CAC): Not less than As indicated by manufacturer's designation.

F. Noise Reduction Coefficient (NRC): Not less than As indicated by manufacturer's designation.

G. Articulation Class (AC): Not less than As indicated by manufacturer's designation.

2.4 METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations complying with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for of suspension-system runners.

1. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
2. Finish: Painted in color as selected from manufacturer's full range.

2.5 ACOUSTICAL SEALANT

A. Acoustical Sealant: As specified in Section 07 92 19 "Acoustical Joint Sealants."

2.6 MISCELLANEOUS MATERIALS

A. Acoustical Tile Adhesive: Type recommended in writing by acoustical tile manufacturer, bearing UL label for Class 0-25 flame spread.

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing and substrates to which acoustical tile ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine acoustical tiles before installation. Reject acoustical tiles that are wet, moisture damaged, or mold damaged.

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

3.2 PREPARATION

A. Testing Substrates: Before adhesively bonding tiles to wet-placed substrates such as cast-in-place concrete or plaster, test and verify that moisture level is below tile manufacturer's recommended limits.

B. Measure each ceiling area and establish layout of acoustical tiles to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width tiles at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

C. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF DIRECTLY ATTACHED ACOUSTICAL TILE CEILINGS

A. Adhesive Installation: Install acoustical tile by bonding to substrate, using acoustical tile adhesive and procedure recommended in writing by tile manufacturer and as follows:

1. Wipe and prime ceiling.
2. Remove loose dust from backs of tiles by brushing.
3. Install splines in joints between tiles and maintain bottom surface to a uniform level. Shim tile or correct substrate as required to maintain levelness.
4. Maintain tight butt joints, aligned in both directions and coordinated with ceiling fixtures.

B. Install edge moldings and trim of type indicated at perimeter of acoustical tile ceiling area and where necessary to conceal edges of acoustical units.

C. Arrange directionally patterned acoustical tiles as indicated on Drawings.

3.4 ERECTION TOLERANCES

A. Directly Attached Ceilings: Install bottom surface of tiles to a tolerance of 1/8 inch in 12 feet and not exceeding 1/4 inch cumulatively.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Periodic inspection during the installation of suspended ceiling grids according to ASCE/SEI 7.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

3.6 ADJUSTING

A. Clean exposed surfaces of acoustical tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

1. Refer to Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning” for additional requirements.

B. Remove and replace tiles and other ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09 51 23

SECTION 09 51 33 - ACOUSTICAL METAL PAN CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section includes acoustical metal pans and associated suspension system for interior ceilings.

B. Related Requirements:

1. Section 09 51 13 "Acoustical Panel Ceilings" for ceilings consisting of mineral-base and glass-fiber-base acoustical panels and exposed suspension systems.

C. Products furnished, but not installed, under this Section include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)

C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

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

E. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below:

1. Metal Pans: Set of 6-inch-square Samples of each type, finish, color, pattern, and texture. Show pan edge profile.
2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch-long Samples of each type, finish, and color.
3. Sound Absorber: Sample of each type matching size of Sample metal pan.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Suspended ceiling components.
2. Structural members to which suspension systems will be attached.
3. Size and location of access modules for acoustical panels.
4. Items penetrating finished ceiling including the following:
    a. Lighting fixtures.
    b. Air outlets and inlets.
    c. Speakers.
    d. Sprinklers.
    e. Access panels.
5. Perimeter moldings.

B. Qualification Data: For testing agency.

C. Product Test Reports: For each acoustical metal pan ceiling, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Evaluation Reports: For each acoustical metal pan ceiling suspension system.

E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Metal Pans: Full-size units equal to 2 percent of quantity installed.
2. Suspension-System Components: Quantity of each grid, exposed molding, and trim equal to 2 percent of quantity installed.
3. Hold-Down Clips: Equal to 2 percent of quantity installed.

1.8 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to NVLAP for testing indicated.

B. Mockups: Build mockups to comply with Section 01 43 39 (Visual Mock-Up Requirements”.

1. Build mockup of typical ceiling area as shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical metal pans, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they are protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Handle acoustical metal pans, suspension-system components, and accessories carefully to avoid damaging units and finishes in any way.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Comply with ASTM E 1264 for Class A materials.
2. Smoke-Developed Index: 50 or less.

2.2 ACOUSTICAL METAL PANS, GENERAL

A. Source Limitations: Obtain each type of acoustical metal ceiling pan and supporting suspension system from single source from single manufacturer.

B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 50 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

C. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:

1. Product specific declarations in accordance with ISO 1404
2. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
3. Industry Wide Product Specific Type III EPD Third Party Certification

D. Acoustical Panel Standard: Provide manufacturer's standard pans of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface according to ASTM E 795.

E. Sheet Metal Characteristics: For metal components exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, roughness, stains, or discolorations.

1. Aluminum Sheet: Rolled aluminum sheet, complying with ASTM B 209; alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

F. Sound-Absorbent Pads: Provide width and length to completely fill concealed surface of pan, with surface-burning characteristics for flame-spread index of 25 or less and smoke-developed index of 50 or less, as determined by testing according to ASTM E 84, and to comply with the following requirements:

1. Unwrapped, Glass-Fiber Insulation: Black coated, unfaced, complying with ASTM C 553, Type I, Type II, or Type III; not less than 1-lb/cu. ft. (16-kg/cu. m) density; treated to be nondusting; 1 inch (25 mm) thick.
2. Spacer Grids: Provide manufacturer's standard aluminum grid units that provide an air cushion between metal pans and insulation pads and that act to improve sound absorption.

2.3 ALUMINUM PANS FOR ACOUSTICAL METAL PAN CEILING

A. Basis-of-Design Product: Subject to compliance with requirements, provide Acoustical Metal Pan Ceiling types as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

B. Classification: Units complying with ASTM E 1264 for types described as perforated aluminum facing (pan) units with sound-absorbent fabric backing.

1. Pattern: Specified by product designation.

C. Pan Fabrication: Manufacturer's standard units of size, profile, and edge treatment indicated, formed from metal indicated and finished to comply with requirements indicated.

1. Lay-in Pans: Formed to set in exposed suspension grid.
2. Torsion-Spring-Hinged Pans: Designed to be securely retained in preslotted, exposed suspension grid by torsion springs provided by manufacturer.

D. Pan Thickness: Not less than 0.040 inch.

E. Pan Edge Detail: Manufacturer's standard edge detail.

F. Pan Joint Detail: Butt.

G. Pan Size: As indicated in Section 09 00 01 “Finish Key”.

H. Pan Face Finish: As indicated in Section 09 00 01 “Finish Key”..

I. LR: Not less than 0.77.

J. NRC: Not less than 0.70.

2.4 METAL SUSPENSION SYSTEMS, GENERAL

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

B. Metal Suspension System Standard: Provide manufacturer's standard metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635/C 635M requirements.

C. Suspension Systems: Provide systems complete with carriers, runners, splice sections, connector clips, alignment clips, leveling clips, hangers, molding, trim, retention clips, load-resisting struts, and other suspension components required to support ceiling units and other ceiling-supported construction.

D. Attachment Devices: Size for 5 times the design load indicated in ASTM C 635/C 635M, Table 1, Direct Hung, unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 5 times that imposed by ceiling construction, as determined by testing according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
   a. Type: Postinstalled expansion anchors.
   b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.
   c. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Group 1 Alloy 304 or 316 for bolts; Alloy 304 or 316 for anchor.
2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190, conducted by a qualified testing and inspecting agency.

E. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Stainless-Steel Wire: ASTM A 580/A 580M, Type 304, nonmagnetic.
2. Size: Select wire diameter so its stress at 3 times the hanger design load indicated in ASTM C 635/C 635M, Table 1, Direct Hung, is less than yield stress of wire, but provide not less than 0.106-inch-diameter wire.

F. Angle Hangers: Angles with legs not less than 7/8-inch-wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A 653/A 653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.

G. Exposed Metal Edge Moldings and Trim: Provide exposed members as indicated, to conceal edges of and penetrations through ceiling, to conceal edges of pans and runners, for fixture trim and adapters, for fasciae at changes in ceiling height, and for other conditions; of metal and finish matching acoustical metal pan ceiling units unless otherwise indicated.

1. For Circular Penetrations of Ceiling: Fabricate edge moldings to diameter required to fit penetration exactly.

H. Fiberglass Pad Wire-Tie Hanger: The ceiling isolation hanger shall consist of a one-inch (1") thick, pre-compressed, molded fiberglass isolator. The fiberglass isolator shall be encased in an anti-short-circuit, reinforced steel bracket which will accommodate up to #8 suspension wire or a ¼" bolt or screw. The hanger bracket shall be zinc-plated, reinforced steel and shall carry a five (5) times maximum rated load overload without failure.

1. Basis-of-Design: Provide Kinetics Noise Control, Inc., Kinetics AF or comparable approved product by the following manufacturers.
   a. Mason Industries, Inc.
   b. PAC International, Inc.

2.5 DIRECT-HUNG, STANDARD-GRID, METAL SUSPENSION SYSTEM FOR ACOUSTICAL METAL PAN CEILING

A. Basis-of-Design Product: Subject to compliance with requirements, provide Acoustical Metal Pan Ceiling ACL1 as indicated in Section 09 00 01 "Finish Key" or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 "Substitution Procedures" and 01 6000 "Product Requirements" for comparable product requirements.

B. Suspension System for Torsion-Spring-Hinged Metal Pans: Provide runners with factory-cut slots fabricated to accept torsion-spring-hinged attachment.

2.6 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.

2.7 ALUMINUM FINISHES

A. Color-Coated Finish: Manufacturer's standard baked paint complying with coating manufacturer's written instructions for surface preparation, pretreatment, application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical metal pan ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical metal pan ceilings.

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

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical metal pans to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width pans at borders, and comply with layout shown on reflected ceiling plans and coordination drawings.

3.3 INSTALLATION

A. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that do not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and hanger type involved. Install hangers in a manner that does not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.

6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

B. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

C. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical metal pans.

1. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Cut acoustical metal pan units for accurate fit at borders and at interruptions and penetrations by other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.

F. Install acoustical metal pans in coordination with suspension system and exposed moldings and trim. Comply with installation tolerances according to CISCA's "Metal Ceilings Technical Guidelines."

1. For torsion-spring-hinged pans, position pans according to manufacturer's written instructions.
2. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions unless otherwise indicated.
3. Fit adjoining units to form flush, tight joints.
4. Install directionally patterned or textured metal pans in directions indicated.
5. Install sound-absorbent fabric layers in, and bond to, perforated metal pans.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform the following tests and inspections of completed installations of acoustical metal panel ceiling hangers, anchors, and fasteners in successive stages. Do not proceed with installations of acoustical metal panel ceiling hangers for the next area until test results for previously completed installations show compliance with requirements.

1. Extent of Each Test Area: When installation of ceiling suspension systems on each floor has reached 20 percent completion but no panels have been installed.
   a. Within each test area, testing agency selects one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and tests them for 200 lbs. of tension; it also selects one of every two postinstalled anchors used to attach bracing wires to concrete and tests them for 440 lbs. of tension.
   b. When tested fasteners and anchors do not comply with requirements, testing agency tests those fasteners and anchors not previously tested until 20 pass consecutively and then resumes initial testing frequency.

C. Acoustical metal panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

3.5 CLEANING

A. Clean exposed surfaces of acoustical metal pan ceilings, including trim and edge moldings, after removing strippable, temporary protective covering, if any. Comply with manufacturer's written instructions for stripping of temporary protective covering, cleaning, and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

1. Refer to Section 01 74 23 “Final Cleaning” for additional cleaning requirements.

END OF SECTION 09 51 33

SECTION 09 54 33 - SPECIALTY METAL CEILIINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes Metal Baffle Ceiling System.

1.3 COORDINATION

A. Coordinate layout and installation metal baffle ceiling system with other construction that penetrates ceilings, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Initial Selection: For components with factory-applied color and other decorative finishes.

C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below:
   1. Metal Baffle: 12-inch-long Samples of each type and color.
   2. Suspension System Members: 12-inch-long Sample of each type.

D. Sustainable Design Documentation Submittals: Refer to section 01 8113.14 “Sustainable Design Requirements – LEED V4 BD+C”.
   1. Product Data: Documentation for Leadership Extraction Practices in the following:
      a. Leadership Extraction Practices for Recycled Content
   2. Product Certificates: Provide the following:
      a. Environmental Product Declarations (EPD’s)

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Linear pattern.
   2. Ceiling suspension members.
   3. Method of attaching hangers to building structure.
      a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

4. Minimum Drawing Scale: 1/8 inch = 1 foot.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum three years documented experience.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship. Refer to Section 01 4339 “Visual Mock-up Requirements” for additional requirements.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver metal baffles, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they are protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Handle metal baffles, suspension system components, and accessories carefully to avoid damaging units and finishes in any way.

1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not install metal baffle ceilings until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 METAL BAFFLE CEILINGS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Metal Baffle Ceiling Type CL1 and Type CL21as indicated in Section 09 0001 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.
   1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

B. Suspension System: Provide system compatible with metal baffle ceiling as indicated in Section 09 0001 “Finish Key”.

C. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
   1. Refer to Section 01 8113.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

D. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:

1. Product specific declarations in accordance with ISO 1404
2. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
3. Industry Wide Product Specific Type III EPD Third Party Certification

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing and substrates to which linear metal ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of linear metal ceilings.

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

3.2 PREPARATION

A. Measure each ceiling area and establish layout of linear metal pans to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width pans at borders, and comply with layout shown on reflected ceiling plans and on Coordination Drawings.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install suspension system in accordance with ASTM C 636 and as supplemented in this section.

C. Measure each ceiling area and establish layout of panels to balance border widths at opposite edges of each ceiling.

D. Suspend ceiling hangers from building's structural members, plumb and free from contact with insulation or other objects within ceiling plenum. Splay hangers only where required and to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

E. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers, use trapezes or equivalent devices. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.

F. Do not support ceilings directly from permanent metal forms or floor deck; anchor into concrete slabs.

G. Do not attach hangers to steel deck tabs.

H. Install edge moldings and trim of type specified at perimeter of open cell ceiling area and where necessary to conceal edges of panels. Miter corners accurately and connect securely.

I. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

3.4 ERECTION TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

3.5 PROTECTION AND CLEANING

A. Protect installed products until completion of project.

B. Clean adjacent surfaces and remove unused materials and debris from site.

C. Clean panels by vacuuming, brushing, or washing with water. Allow panels to dry after washing, before replacing.

D. Remove and reinstall improperly installed material.

E. Remove damaged ceiling panels, replace with undamaged ceiling panels.

F. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 09 54 33

SECTION 09 54 36 - SUSPENDED DECORATIVE GRIDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section includes rigid, open-frame, suspended grids and suspension systems for ceilings.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)

C. Samples: For each exposed product and for each color and texture specified, 6 inches in size.

D. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:

1. Cell Grids: Set of full-size module Samples of each type, finish, and color.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Lighting fixtures.
2. Air outlets and inlets.
3. Speakers.
4. Sprinklers.

B. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Suspended Decorative Grids: Quantity of each suspended decorative grid component, exposed molding, and trim equal to 2 percent of quantity installed.

1.8 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution. Refer to Section 01 43 39 “Visual Mock-ups” for additional information.

1. Build mockup of typical ceiling area as shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver suspended decorative grid components to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they are protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Handle suspended decorative grids and accessories to avoid damaging units and finishes.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

2.2 SUSPENDED DECORATIVE GRIDS, GENERAL

A. Recycled Content of Steel Products: Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for recycled content requirements.

B. Sheet Metal: Selected for surface flatness, smoothness, and freedom from surface blemishes where exposed to view in finished unit. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, variations in flatness exceeding those permitted by referenced standards for stretcher-leveled metal sheet, stains, discolorations, or other imperfections.

C. Grid Fabrication: Components are formed from metal indicated. Manufacturer's standard units of size, shape, and profile indicated; finished to comply with requirements indicated.

D. Cover Profiles and Trim: Provide manufacturer's standard cover profiles and trim for exposed members, and as indicated or required, for edges of grids, at changes in ceiling height, and for other conditions, of same metal and finish as suspended decorative grids.

E. Metal Suspension-System Standard: Provide ceiling manufacturer's standard metal suspension systems of types and finishes indicated that comply with applicable ASTM C 635/C 635M requirements. Provide systems complete with runners or beams, splice sections, connector clips, alignment clips, leveling clips, hangers, molding, trim, web covers, load-resisting struts, fixture filler pans, clips and adapters, and other suspension components required to support ceiling units and other ceiling-supported construction.

F. Attachment Devices: Size for 5 times the design load indicated in ASTM C 635/C 635M, Table 1, Direct Hung, unless otherwise indicated.

1. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318, greater than or equal to the design load, as determined by testing per ASTM E 488/E 488M conducted by a qualified testing agency.
2. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E 1190 conducted by a qualified testing agency.

G. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at 3 times hanger design load indicated in ASTM C 635/C 635M, Table 1, Direct Hung, is less than yield stress of wire, but provide not less than 0.106-inch-diameter wire.

2.3 ALUMINUM GRID UNITS AND STEEL GRID UNITS FOR SUSPENDED DECORATIVE GRIDS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Suspended Decorative Grid Type CL2 as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

B. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

C. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:

1. Product specific declarations in accordance with ISO 1404
2. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
3. Industry Wide Product Specific Type III EPD Third Party Certification

2.4 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for conditions affecting performance of the Work.

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

3.2 PREPARATION

A. Measure each installation area and establish layout of suspended decorative grids to balance border widths at opposite edges of each space. Comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. Install suspended decorative grids to comply with ASTM C 636/C 636M and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within plenum that are not part of supporting structure or of grid suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within plenum produces hanger spacings that interfere with location of hangers at spacings required to support

standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.

4. Secure hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for structure to which hangers are attached and for hanger type involved.
5. Do not support grids directly from permanent metal forms or floor deck. Fasten hangers to expansion anchors or power-actuated anchors that extend through forms into concrete.
6. Do not attach hangers to steel deck tabs.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of three tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with expansion anchors.

D. Install suspended decorative grids in coordination with suspension system and exposed moldings and trim. Comply with installation tolerances according to CISCA's "Metal Ceilings Technical Guidelines."

1. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions unless otherwise indicated.
2. Fit adjoining units to form flush, tight joints.
3. Where grid edges are visible, install cover profiles unless other trim is indicated.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform the following tests and inspections on each floor when installation of the suspended decorative grid on each floor is 20 percent complete. Do not proceed with installing the remainder of the grid on each floor until results in the test area for the floor show compliance with requirements.

1. Hanger-Wire Attachment: Within each test area, testing agency selects one of every 10 power-actuated anchors and expansion anchors used to attach hangers to concrete and tests them for 100 lbf of tension.
2. Bracing-Wire Attachment: Within each test area, testing agency selects one of every two expansion anchors used to attach bracing wires to concrete and tests them for 100 lbf of tension.
3. When tested anchors do not comply with requirements, testing agency tests those anchors not previously tested until 20 pass consecutively and then resumes initial testing frequency.

C. Suspended decorative grid anchors will be considered defective if they do not pass tests and inspections.

D. Prepare tests and inspection reports.

3.5 CLEANING

A. Clean exposed surfaces of suspended decorative grids, including trim and edge moldings, after removing strippable, temporary protective covering if any. Comply with manufacturer's written instructions for stripping of temporary protective covering, cleaning, and touchup of minor finish damage. Remove and replace grid components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and deformed grids.

B. Refer to Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 09 54 36

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Resilient base.
2. Resilient molding accessories.

B. Related Sections:

1. Division 09 Section “Finish Key” for finish selections.
2. Division 09 Section "Resilient Tile Flooring" for resilient floor tile.
3. Division 09 Section "Static-Control Resilient Flooring" for resilient floor coverings designed to control electrostatic discharge.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

C. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Adhesives and Sealants
   b. Low Emitting Materials for Flooring
2. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)

D. Samples for Initial Selection: For each type of product indicated.

E. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.

F. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to comply with Section 01 43 39 “Visual Mock-Up Requirements”.

1. Coordinate mockups in this Section with mockups specified in other Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers" and additional low emitting requirements in Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C”.

2.2 THERMOPLASTIC-RUBBER BASE

A. Basis-of-Design Product: Subject to compliance with requirements, provide Resilient Base types as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).

1. Group: I (solid, homogeneous).
2. Style and Location:
   a. Style A, Straight: Provide in areas with carpet.

b. Style B, Cove: Provide in areas with resilient flooring.

C. Thickness: 0.125 inch.

D. Height: As indicated on Drawings or in Section 09 00 01 “Finish Key.”

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Preformed.

G. Inside Corners: Preformed.

H. Colors: As indicated by manufacturer's designations.

2.3 RUBBER MOLDING ACCESSORY

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

1. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
2. Johnsonite.
3. Roppe Corporation, USA.
4. Tarkett Group

B. Description: Rubber Carpet edge for glue-down applications, nosing for carpet, nosing for resilient floor covering, reducer strip for resilient floor covering, joiner for tile and carpet, and transition strips.

C. Profile and Dimensions: As indicated.

D. Locations: Provide rubber molding accessories in areas indicated.

E. Colors and Patterns: As selected by Architect from full range of industry colors.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.

2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

C. Metal Edge Strips: Extruded aluminum with mill finish of width shown, of height required to protect exposed edges of flooring, and in maximum available lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

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

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

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

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum horizontal surfaces thoroughly.
3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before applying liquid floor polish.

1. Apply three coat(s).

E. Cover resilient products subject to wear and foot traffic until Substantial Completion.

F. Refer to Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 09 65 13

SECTION 09 65 19 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Solid vinyl floor tile.
2. Rubber floor tile.
3. Vinyl composition floor tile.
4. Resilient terrazzo floor tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Extended Producer Responsibility
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Adhesives and Sealants
   b. Low Emitting Materials for Flooring

C. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

1. Show details of special patterns.

D. Samples: Full-size units of each color and pattern of floor tile required.

1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

E. Samples for Verification: Full-size units of each color and pattern of floor tile required.

1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

F. Welded-Seam Samples: For seamless-installation technique indicated and for each flooring product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.

G. Product Schedule: For floor tile. Use same designations indicated on Drawings and in Section 09 00 01 “Finish Key”.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish five boxes for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

B. Mockups: Build mockups to comply with Section 01 43 39 “Visual Mock-Up Requirements”.

1. Build mockups at locations and in sizes shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
2. During installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Low Emitting Flooring

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

2.2 RESILIENT FLOOR TILE

A. Basis-of-Design Product: Subject to compliance with requirements, provide Resilient Tile Flooring types as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

C. Seamless-Installation Accessories:

1. Chemical-Bonding Compound: Manufacturer's product for chemically bonding seams.
2. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
    a. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

D. Floor Polish: Provide protective, liquid floor-polish products recommended by resilient stair-tread manufacturer and complying with Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning”.

E. Sealers and Finish Coats for Resilient Terrazzo Floor Tile: Products recommended by floor tile manufacturer for resilient terrazzo floor tile and complying with Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning”.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

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

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
    a. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.

b. Perform test so that each area does not exceed 200 sq. ft.

C. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.

D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. Do not install floor tiles until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

F. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles in pattern of colors and sizes indicated.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Seamless Installation:

1. Chemically Bonded Seams: Bond seams with chemical-bonding compound to permanently fuse sections into a seamless flooring. Prepare seams and apply compound to produce tightly fitted seams without gaps, overlays, or excess bonding compound on flooring surfaces.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Floor Polish: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor polish.

1. Apply three coat(s).

E. Joint Sealant: Apply sealant to resilient floor tile perimeter and around columns, at door frames, and at other joints and penetrations. Refer to Section 07 92 00 “Joint Sealants”.

F. Cover floor tile until Substantial Completion.

G. Refer to Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 09 65 19

SECTION 09 65 36 - STATIC-CONTROL RESILIENT FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Static-dissipative, solid vinyl floor tile.

B. Related Sections:

1. Division 09 Section “Finish Key” for finish selections.
2. Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with static-control resilient floor coverings.

1.3 PERFORMANCE REQUIREMENTS

A. Static-Dissipative Properties: Provide floor coverings with static-control properties indicated as determined by testing identical products per test method indicated by an independent testing and inspecting agency.

1. Electrical Resistance: Test per ASTM F 150, NFPA 00 2-6.3.8, UL 779, and ANSI/ESD S7.1 with 100-V applied voltage.
   a. Average greater than 1 megohm and less than or equal to 1000 megohms when test specimens are tested surface to ground.
   b. Average no less than 1 megohm and less than or equal to 1000 megohms when installed floor coverings are tested surface to ground.
2. Static Generation: Less than 300 V when tested per AATCC-134 at 20 percent relative humidity with conductive footwear.
3. Static Decay: 5000 to 0 V in less than 0.25 seconds when tested per FED-STD-101C/4046.1.

1.4 SUBMITTALS

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

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Flooring
3. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)

C. Shop Drawings: For each type of floor covering. Include floor covering layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

1. Show details of special patterns.
2. Submit grounding diagram showing location of grounding strips and connections.

D. Samples for Initial Selection: For each type of floor covering indicated.

E. Samples for Verification: For each type of floor covering indicated and of size indicated below:

1. Floor Tile: Full-size units.

F. Seam Samples: For seamless-installation technique indicated and for each floor covering product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.

G. Product Schedule: For floor covering. Use same designations indicated on Drawings.

H. Qualification Data: For qualified Installer.

I. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for floor coverings.

J. Maintenance Data: For each type of floor covering to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor covering installation and seaming method indicated.

1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.

B. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

C. Mockups: Build mockups to comply with Section 01 43 39 “Visual Mock-Up Requirements”.

1. Build mockups for floor coverings including integral-flash-cove base and accessories.

D. Preinstallation Conference: Conduct conference at project site.

1. Review methods and procedures related to static-control resilient floor coverings including, but not limited to, the following:
   a. Examination and preparation of substrates to receive floor covering.

b. Installation.
c. Field quality-control testing.

1.6 DELIVERY, STORAGE, AND HANDLING

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

1. Floor Tile: Store on flat surfaces.
2. Sheet Floor Covering: Store rolls upright.

1.7 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 85 deg F, in spaces to receive floor coverings during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor covering installation.

D. Close spaces to traffic for 48 hours after floor covering installation.

E. Install floor coverings after other finishing operations, including painting, have been completed.

1.8 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.9 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

B. Warranty: Manufacturer’s standard 5-year warranty.

PART 2 - PRODUCTS

2.1 STATIC-DISSIPATIVE RESILIENT FLOOR COVERINGS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Static Control Tile Flooring types as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

2.2 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

B. Static-Control Adhesive: Provided or approved by manufacturer; type that maintains electrical continuity of floor covering system to ground connection.

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

C. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

D. Grounding Strips: Provided or approved by manufacturer; type and size that maintains electrical continuity of floor covering system to ground connection.

E. Maintenance Floor Tiles: Special floor tiles inscribed "Conductive Floor. Do Not Wax."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Construction Manager, Installer and manufacturer's representative present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion or static-control characteristics of floor coverings.

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

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions and with oversight by manufacturer's representative to ensure adhesion of floor coverings and electrical continuity of floor covering systems.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with floor covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
    a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor coverings until they are same temperature as space where they are to be installed.

1. Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

3.3 INSTALLATION, GENERAL

A. Install static-control resilient floor covering according to manufacturer's written instructions and with oversight by manufacturer's representative.

B. Embed grounding strips in static-control adhesive. Extend grounding strips beyond perimeter of static-control resilient floor covering surfaces to ground connections.

C. Scribe, cut, and fit floor coverings to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

D. Extend floor coverings into toe spaces, door reveals, closets, and similar openings. Extend floor covering to center of door openings.

E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent, nonstaining marking device.

F. Install floor coverings on covers for telephone and electrical ducts, and similar items in installation areas. Maintain overall continuity of color and pattern with pieces of floor coverings installed on covers. Tightly adhere floor covering edges to substrates that abut covers and to cover perimeters.

G. Adhere floor coverings to substrates using a full spread of static-control adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so floor tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half floor tile at perimeter.

1. Lay floor tiles in pattern indicated.

C. Match floor tiles for color and pattern by selecting floor tiles from cartons in same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed floor tiles.

1. Lay static-dissipative, vinyl composition floor tiles in pattern of colors and sizes indicated.

3.5 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified testing agency to test electrical resistance of static-control resilient floor covering systems for compliance with requirements.

1. Arrange for testing after installation static-control adhesives have fully cured and floor covering systems have stabilized to ambient conditions and after ground connections are completed.

B. Static-control resilient floor coverings will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.6 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of floor coverings.

B. Perform the following operations immediately after completing floor covering installation:

1. Remove static-control adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

1. Do not wax static-control resilient floor coverings.

D. Cover floor coverings until Substantial Completion.

E. Refer to Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 09 65 36

SECTION 09 66 23 - RESINOUS MATRIX TERRAZZO FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Thin-set epoxy-resin terrazzo flooring and coved base.
2. Precast terrazzo stair tread and riser units.
3. Cast-in-place epoxy-resin terrazzo stair landings.

B. Related Section:

1. Section 05 71 00 “Decorative Metal Stairs” for precast terrazzo treads and risers and poured-in-place landings.
2. Section 07 92 00 "Joint Sealants" for sealants installed with terrazzo.

1.3 Allowances are sometimes used for special terrazzo patterns. If allowances apply to Work of this Section, insert brief paragraph here to alert Contractor and reference appropriate Division 01 Section for specific details.

1.4 SUBMITTALS

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

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Flooring
3. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)

C. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details, and attachments to other work. Show layout on drawings at a minimum scale of 1/8” = 1’-0” of the following:

1. Divider strips, base and border strips.
2. Control-joint strips.
3. Accessory strips.
4. Abrasive strips.
5. Stair treads, risers, and landings.
6. Precast terrazzo jointing and edge configurations.
7. Terrazzo patterns.

8. Preparation and repair of substrate.

D. Samples for Verification: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo sample to identify manufacturer's matrix color, all aggregate types, sizes, marble fill and proportions of each material. Prepare samples of same thickness and from same material to be used for the Work in size indicated below:

1. Terrazzo: 12-inch square Samples.
2. Precast Terrazzo: 12-inch square Samples.
3. Full-profile, 12” wide samples of combination tread/riser with cast-in nosing.
4. Accessories: 12-inch long Samples of each exposed strip item required.

E. Installer Certificates: Signed by manufacturer’s certifying that installers comply with requirements.

F. Qualification Data for Terrazzo Contractor Experience: Furnish list of at least three (3) resinous matrix terrazzo flooring projects using material being submitted for this project or similar that contractor has installed during the last five years of the same scope, complexity and phasing and at least 20% of the square footage of this project, including the following:

1. Project name and description.
2. Photos of project-minimum of 3 each @ 8.5x11.”
3. Square footage of terrazzo installed and materials used.
4. Reference letters from Owner and General Contractor/Const Manager attesting to the quality of installation and workmanship.
5. Address of facility with contact name and phone number of Owner and GC.
6. Provide field experience resumes of key project personnel including lead supervisor and field technicians to be used on this project.

G. Material Certificates: For each type of terrazzo material or product, from manufacturer.

H. Maintenance Manual: Submit written instructions, specifically designed for this project, for repair procedures and periodic maintenance of all resinous matrix terrazzo surfaces, including floors, walls and stairs. Submit the required information in three ring binders with clear identification labels on the front cover and spline and on DVD inserted in binder.

I. Coefficient of Friction reports on completed terrazzo installation.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who is acceptable to terrazzo resin manufacturer to install manufacturer's products and with at least five years of satisfactory experience in installation of resinous epoxy terrazzo. See Division 01 “Submittals” section for additional requirements and documentation.

1. Engage an installer who is certified in writing by terrazzo manufacturer as qualified to install manufacturer's products.
2. Engage an installer who is a contractor member in good standing of NTMA.

3. Engage an installer who has completed a minimum of three terrazzo installations similar in material and extent to that indicated for Project over the last five years and that have resulted in construction with a record of successful in-service performance.

B. Source Limitations: Obtain primary Resinous Matrix terrazzo flooring system materials including membranes, primers, moisture vapor reducing and hardening agents from a single manufacturer with documented experience providing resinous matrix terrazzo flooring materials and proof of NTMA membership in good standing. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.

C. Source Limitations for Marble Chips Aggregates: Obtain each color, grade, type, and variety of granular materials from one source with resources to provide materials of consistent quality in appearance and physical properties.

D. Source Limitations for Supplemental Aggregates: Obtain each color, grade, type, and variety of granular materials from one source with resources to provide materials of consistent quality in appearance and physical properties.

E. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.

F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution of further work.

1. Build mockups for terrazzo including accessories.
   a. Size: Minimum 100 sq. ft. for each mock-upof typical poured-in-place flooring and base condition for each color and pattern, including divider strips, in locations directed by Architect and/or as indicated on drawings.
2. Sample installations shall be complete with all bedding, jointing, and sealants as shown in accordance with the final shop drawings. Sample installations shall be reviewed by the Architect for acceptance of terrazzo assemblies including jointing and workmanship. Replace unsatisfactory work as directed. Maintain sample installations during construction as a standard for judging acceptability of terrazzo work. Properly finished and maintained sample installations shall be retained as a portion of the completed work

G. Preinstallation Conference: Conduct conference at project site.

1. Review methods and procedures related to terrazzo including, but not limited to, the following:
   a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
   b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   c. Review special terrazzo designs and patterns.
   d. Review dust-control procedures.

e. Review Phasing Plan and Operational Constraints

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.

B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Provide minimum substrate and atmospheric temperature of 55 degrees F during stripping and pouring and until 48 hours after pouring. Do not allow substrate or air temperature to fall below 40 degrees F after terrazzo has been poured. Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation if more stringent than the requirements listed previously.

B. Terrazzo contractor shall, prior to surface preparation:

1. Evaluate slab condition, including slab moisture content and extent of repairs required, if any.
2. Test concrete substrates according to ASTM F2170 (Determining Relative Humidity in Concrete Floor Slabs using in situ Probes). Do not install terrazzo or terrazzo accessories until test results are 75% or less RH. If RH is not met consult resin manufacturer for additional drying or negative side moisture mitigating measures. Testing shall be by an independent testing laboratory acceptable to the manufacturer of the epoxy materials and the Construction Manager/Architect. Prior to and during each day of installation, the terrazzo contractor shall verify that the dew point is at least 5 degrees F less than the slab and air temperature.

C. Field Measurements: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.

D. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation. Provide a minimum of 50 foot-candles in areas where terrazzo system is being installed

E. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.

F. Control and collect dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

1. Provide dustproof partitions and temporary enclosures to limit dust migration and to isolate areas from noise.

1.8 WARRANTY

A. Manufacturer and Installer shall provide a three year Joint and Several Project Warranty signed by the terrazzo installer and the manufacturer of resinous terrazzo materials stating that the Moisture Vapor Barrier shall protect the epoxy terrazzo installation from moisture related blistering or disbondment. Under the terms of the Warranty, the Contractor shall promptly repair or replace all defective or damaged items delivered under the contract, at no cost to LAWA.

B. The Contractor warrants that installation of the resinous terrazzo floor completed as part of the Work of this contract will be free from defects in design, material or workmanship and against damage prior to final inspection and acceptance.

PART 2 - PRODUCTS

2.1 EPOXY-RESIN TERRAZZO

A. Basis-of-Design Product: Subject to compliance with requirements, provide Resinous Matrix Terrazzo Flooring as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 25 00 “Substitution Procedures” and 01 60 00 “Product Requirements” for comparable product requirements.

B. System Performance: The epoxy resin flooring system shall possess the following properties:

1. Compressive Strength, ASTM D695: 10,000 psi
2. Water Absorption, ASTM D570: 0.10 %
3. Tensile Strength, ASTM D638: 3,000 psi
4. Flexural Strength, ASTM D790: 4,500 psi
5. Adhesion, ACI 503R: 350 psi, 100% concrete failure
6. Hardness, ASTM D2240: 65-85 Shore D
7. Impact Resistance – MIL-D-3134, Sec. 4.7.3: Withstands 16 ft/lbs. no chipping, cracking, spalling or loss of adhesion.
8. Abrasion Resistance, ASTM D4060, CS 17 Wheel: 70-90 milligrams lost
9. Slip Resistance: Meets ADA Standards
10. Critical Radiant Flux, ASTM D648: .90
11. Thermal coefficient of linear expansion, ASTM D696: 25 x 10^{-6} in/in/ degree F.

C. Recycled Content of Epoxy Resin Terrazzo System: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

D. Low Emitting Flooring

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

E. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:

1. Product specific declarations in accordance with ISO 1404
2. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
3. Industry Wide Product Specific Type III EPD Third Party Certification

F. Accessory Materials:

1. Moisture Vapor Barrier: Provide one of the following:
   a. Moisture Vapor Treatment; Terrazzo and Marble (T & M) Supply Companies or comparable approved product meeting all requirements including sustainability requirements.
      1) Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.
2. Flexible Epoxy Membrane (Crack Bridging Membrane): 100% solids for crack preparation followed by full coverage application. Provide one of the following:
   a. Isocrack Membrane; Terrazzo and Marble (T & M) Supply Companies or comparable approved product meeting all requirements including sustainability requirements.
      1) Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.
   b. System Performance: The flexible epoxy membrane shall possess the following properties:
      1) Tensile Strength, ASTM D412: 1,000-1,300 psi
      2) Elongation at Break, ASTM D412: 130-145%
      3) Adhesion, ACI 503R: 350 psi, 100% concrete failure
      4) Hardness, ASTM D2240: 23 Shore D
      5) Thermal Cycling, ASTM C884 (24 hours,-21C to +25C: No Cracking
      6) Flammability: Self-extinguishing over concrete
3. Fabric Reinforcing: Fiberglass of type and manufacture recommended and acceptable to the matrix manufacturer.
   a. FS38-4.4 Fiberglass Scrim; General Polymers or comparable approved product meeting all requirements including sustainability requirements.
      1) Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.
4. Primer: 100% solids, moisture insensitive, two-component resin recommended by matrix manufacturer and meeting low emitting flooring requirements. No solvent containing primers are allowed.
5. Moisture Vapor Barrier to be used throughout. For areas on grade use 2 coats and 1 coat for areas on suspended concrete slab above Level 1.
   a. Moisture Vapor Treatment; Terrazzo and Marble (T & M) Supply Companies or comparable approved product meeting all requirements including sustainability requirements.
      1) Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

6. Epoxy Mortar Fill/Underlayment: 100% solids fill mortar system including blended aggregate of a type recommended by the epoxy resin terrazzo manufacturer and meeting low emitting flooring requirements.
   a. Terroxy Fill; Terrazzo and Marble (T & M) Supply Companies or comparable approved product meeting all requirements including sustainability requirements.
      1) Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.
7. Aggregates: Natural, sound, crushed stone chips, mother of pearl, glass, mirror, plastic, and metal filings with colors selected and graded to match Architect's samples, but with maximum size within limits of workability for terrazzo thickness indicated.
   a. Sizes shall be #1, #2, and #3, conforming with NTMA gradation standards.
   b. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.
   c. 24-Hour Absorption Rate: Less than 0.75 percent.
   d. Chips shall contain no deleterious or foreign matter.
   e. Dust Content: Less than 1.0 percent by weight.
   f. Obtain and stockpile each aggregate material from a single source of consistent quality in appearance and physical properties for the entire project.
8. Finishing Grout: 100% solids resin-based grout with filler and pigments as recommended by matrix manufacturer and meeting low emitting flooring requirements.
   a. Terroxy Fill; Terrazzo and Marble (T & M) Supply Companies or comparable approved product meeting all requirements including sustainability requirements.
      1) Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.
9. Divider Strip Adhesive: Epoxy bed, Morticite or equal, thickened by Aerosil or equal recommended by manufacturer.
10. Control Joint Filler: Grindable Epoxy Joint Filler in color selected by Architect to match/compliment terrazzo and meeting low emitting flooring requirements with the following properties:
    a. Tensile Strength ASTM D2370 @ 68 F 1600 psi
    b. Elongation ASTM D2370 @ 68 F 100%
    c. Tensile Modulus ASTM D2370 @ 68 F 27,800 psi

2.2 PRECAST EPOXY-RESIN TERRAZZO

A. Precast Terrazzo Units: Precast epoxy-resin terrazzo stair tread and riser units. Comply with NTMA’s written recommendations for fabricating precast terrazzo units in sizes and profiles indicated. Reinforce units as required by unit sizes, profiles, and thicknesses and as recommended by manufacturer. Finish exposed-to-view edges and reveals to match face finish. Ease exposed edges to 1/8-inch radius.

B. Precast Terrazzo Stair Treads and Risers: Profile and thickness as indicated on Drawings.

1. Portland Cement: ASTM C150, Type I, non0air entraining, non-staining white and gray as required to match Architect's epoxy terrazzo samples. Obtain cement from a single source for all work of one color.
2. Sand: ASTM C33 for fine aggregates as required to match Architect's epoxy terrazzo samples.
   Water: Fresh, clean and potable.
3. Aggregates, Glass, Plastic and Shell Materials: As required to match Architect's epoxy terrazzo samples.
4. Abrasive Strips: Three-line abrasive inserts at nosings Aluminum Oxide non-slip #46-70 grit for combination with matrix cast into treads.
5. Color, Pattern, and Finish: Match Architect's sample.

C. Reinforcing, Anchors and Fasteners for Precast Units:

1. Reinforcing for Treads and Risers: ASTM A615, grade as selected by fabricator. Reinforcing adjacent to the exposed surface of panels is to be positioned and firmly held in place by hangers, or other means without the use of form-contact bar supports.
2. Welded Wire Fabric for Treads and Risers: ASTM A185, 2- x 2-inches x 16 gage, galvanized.
3. Anchors and Fasteners: All anchors, clips, shapes, fasteners, dowels, cramps, and accessories for erecting precast terrazzo units shall be galvanized steel devices of grade, type, size and number required to attach precast terrazzo to supporting stair substrates.

D. Precast Terrazzo Treads and Risers Fabrication:

1. Minimum thickness of precast terrazzo treads shall be 1-1/2"-inch.
2. Forms: Construct forms of non-staining metal, fiberglass reinforced polyester, plywood, or other acceptable material. Fabricate and reinforce forms for close control of dimensions and details. Construct forms tightly to prevent leakage of mixes. Form joints will not be permitted on faces exposed to view in the finished work.
3. Reinforcement: place welded wire and reinforcing bars of size and spacings as required to resist shrinkage, temperature and handling stresses. Support an space reinforcement using devices to ensure that it will remain positioned in the precast terrazzo units as required. Keep reinforcement from the edges and surfaces of the units.
4. Mixing and Placing: mix terrazzo mixes to distribute fine and coarse aggregate evenly throughout. Place terrazzo to prevent segregation in the forms.
5. Curing: allow units to cure.
6. Casting Tolerances: as required to achieve installation tolerances. Units which have bowed, warped, or curled shall not be acceptable.

E. Precast Terrazzo Finishing:

1. Finish exposed-to-view edges or reveals to match face finish. Grind and polish to match terrazzo floor finish.
2. Ease exposed edges to 1/8-inchradius U.O.N.

2.3 STRIP MATERIALS

A. Thin-Set Divider Strips: L-type angle or T-type, 1/4 inch +deep or as indicated on Drawings.

1. Material: White-zinc alloy.
2. Top Width: 1/4 inch-unless indicated otherwise on drawings.
3. Verify compatibility of divider strips with resin supplier prior to ordering.

B. Control-Joint Strips: Separate, double L-type zinc angles, positioned back to back, that match material, thickness, and color of divider strips and in depth required for topping thickness indicated, filled with Flexible Epoxy Membrane pigmented to match resin color of terrazzo. Verify compatibility of control-joint strips with resin supplier prior to ordering.

C. Accessory Strips: Match divider strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:

1. Base-bead strips for exposed top edge of terrazzo base.
2. Edge-bead strips for exposed edges of terrazzo.
3. Nosings for terrazzo stair treads and landings.
4. Verify compatibility of accessory strips with resin supplier prior to ordering.

D. Abrasive Strips: Silicon carbide or aluminum oxide, or combination of both, in epoxy-resin binder and set in channel.

1. Width: 1/2 inch.
2. Depth: As required by terrazzo thickness.
3. Length: 4 inchesless than stair width.
4. Color: As selected by Architect from manufacturer's full range.
5. Verify compatibility of abrasive strips with resin supplier prior to ordering.

2.4 MISCELLANEOUS ACCESSORIES

A. Strip Adhesive: Epoxy-resin adhesive recommended by adhesive manufacturer for this use and acceptable to terrazzo manufacturer.

1. Low Emitting Adhesives and Sealants
   a. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
   b. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

B. Anchoring Devices:

1. Precast Terrazzo: Provide mechanical anchoring devices and setting bed as recommended by fabricator for proper anchorage and support of units for conditions of installation and support.

C. Joint Compound: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.

D. Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, free from crystallizing salts or water soluble alkaline salts, and recommended by sealer manufacturer for use on terrazzo type indicated.

E. Sealer: Water-based, colorless, slip- and stain-resistant penetrating-type sealer that is chemically neutral with pH factor between 6 and 9; does not affect color or physical properties of terrazzo; is recommended by sealer manufacturer; and complies with NTMA's "Terrazzo Specifications and Design Guide" for terrazzo type indicated.

1. Product shall meet low emitting flooring requirements.
2. Surface Friction: Not less than ADA Guidelines of 0.6 tested on level and 0.8 on ramps according to ASTM D 2047.
3. Acid-Base Properties: With pH factor between 6 and 9.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and areas, with Contractor and Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions, including flatness and levelness tolerances, have been corrected.

3.2 PREPARATION

A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.

B. Concrete Slabs:

1. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with terrazzo.
   a. Prepare slab substrates to “open” surface pores by means of shot-blast surfaces to medium sandpaper texture (approximately ICRI profile #5) with an apparatus that physically abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by magnets and utilizes vacuum pickup for debris.
   b. All oil or grease not removed by scarification or blasting shall be removed by either detergent scrubbing with heavy duty cleaner/degreaser, low pressure water cleaning, steam cleaning, or chemical cleaning methods in accordance with the manufacturer’s written instructions.
   c. All spalled or deteriorated slab surfaces shall be mechanically removed by scabbling or chipping hammers.
   d. Acid etching is not acceptable.
   e. Repair damaged and deteriorated concrete according to terrazzo manufacturer's written recommendations.

f. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer's written instructions.
g. Use patching and fill material to provide level substrate as needed to meet installation tolerance specified herein.
h. Fill all concrete slab-on-grade control joints solid with epoxy resin rigid joint filler.

2. Verify that concrete substrates are visibly dry and free of moisture.
3. Substrates to Receive Epoxy Terrazzo: Before the terrazzo flooring installation, visit the jobsite to evaluate substrate condition. The evaluation shall include a determination of the suitableness of the substrate to receive the epoxy terrazzo materials and to test for moisture and alkalinity of the substrate.
   a. Test for moisture by relative humidity probe and digital meter method according to ASTM F 2170 "Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In-situ Probes" and the probe manufacturer's instructions.
   b. Use a minimum of 1 probe for every 5,000 s.f. of surface to receive terrazzo flooring.
   c. Proceed with the epoxy floor system installation only after substrates have a maximum relative-humidity-measurement reading of 75 percent in 24 hours.
   d. If the pH of the slab is 10 or lower, notify the manufacturer for preparations required to ensure a good bond:.
   e. Proceed with installation only after substrates have a maximum 80 percent relative-humidity-level measurement.

C. Protect other work from dust generated by grinding operations. Control dust to prevent air pollution and comply with environmental protection regulations.
   1. Erect and maintain temporary enclosures and other suitable methods to limit dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

D. Installation of terrazzo indicates acceptance of surfaces and conditions.

E. Cracks: Cracks and non-expansion joints greater than 1/16" wide after surface preparation shall be prepared until sound and treated with membrane materials in accordance with the instructions of the epoxy terrazzo manufacturer and as follows. Allow in base bid for above crack detailing as follows - 5% of lineal footage of total project square footage for combined Type 1 & 2, and 3% of lineal footage of Type 3. (i.e., a 10,000 sq ft project would allow for a combined 500 lineal feet of Type 1 & 2 repairs and 300 lineal feet of Type 3 repairs.
   1. Type 1 Crack Detailing: Hairline cracks shall receive detail coat of epoxy primer with 6" fabric reinforcement.
   2. Type 2 Crack Detailing Fill cracks greater than hairline but less than 1/16" wide after surface preparation with neat, epoxy membrane. Place detail coat of epoxy membrane over crack and embed 12" fiberglass cloth. Lightly abrade or solvent wipe treated cracks prior to applying primer.
   3. Type 3 Crack Detailing Fill cracks greater than 1/16" with flexible epoxy membrane. Place 25-30 mil detail coat so that flexible epoxy membrane extends at least 9" to 12" on each side of crack or joint. After flexible epoxy

membrane has leveled, lay precut reinforcing fabric into wet membrane. Smooth cloth with a flat steel trowel, allowing cloth to be encapsulated but remain exposed on the surface of flexible epoxy membrane. Lightly abrade or solvent wipe treated cracks prior to applying primer

3.3 EPOXY-RESIN TERRAZZO INSTALLATION

A. General:

1. Comply with NTMA's written recommendations for terrazzo and accessory installation.
2. Extend terrazzo work into recesses and under equipment in the spaces shown or scheduled to receive terrazzo. Form a complete covering without interruptions or seams, except provide divider strips where shown. Place and finish terrazzo uniformly and neatly around obstructions so as to achieve continuous color, pattern and finish throughout the Work.
3. Place, rough grind, grout, cure grout, fine grind, and finish terrazzo according to manufacturer's written instructions and NTMA's "Terrazzo Specifications and Design Guide."
4. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10 feet; non-cumulative with maximum variation of 1/8” in 1 foot circle.
5. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
6. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.
7. Refer to Section 01 35 46 “Indoor Air Quality” for additional requirements.

B. Thickness: 3/8 inch minimum.

C. Moisture Vapor Reducing System

1. On concrete slabs on grade apply two coats of Moisture Vapor Reducing Primer and one coat on concrete slabs above Level 1 per manufacturer’s written instructions.

D. Flexible Reinforcing Membrane:

1. Prepare and prefill substrate cracks with membrane material.
2. Install membrane 25 mils thick to produce full substrate coverage in all areas to receive terrazzo.
3. Reinforce membrane with fiberglass scrim in second coat 15 mils thick.
4. Prepare membrane according to manufacturer's written instructions before applying substrate primer.

E. Strip Materials:

1. Divider and Control-Joint Strips:
   a. Locate divider strips in locations indicated.
   b. Install dual “L” control-joint strips bookended in locations indicated. Control-joint strips shall be located directly above all concrete control joints.
   c. Install control-joint strips with nominal 1/4-inch gap between strips, and install sealant in gap, unless indicated otherwise on Drawings.

d. Install strips in epoxy adhesive without voids below strips, as recommended by strip manufacturer. If flexible membrane was placed greater than 72 hours before placement of epoxy terrazzo, solvent wipe completely prior to installing epoxy primer and terrazzo.

2. Accessory Strips: Install accessory strips as required to provide a complete installation and in locations indicated.
3. Abrasive Strips: Install with surface of abrasive strip positioned 1/32 inch higher than terrazzo surface.

F. Priming: Apply epoxy primer evenly over prepared flexible membrane at the rate of 200-300 square feet per gallon, to thoroughly wet surface, but avoiding "ponding" the material.

G. Epoxy Terrazzo: Carefully proportion, thoroughly mix all components and trowel apply blended terrazzo matrix topping-to thickness of nominally 3/8 inches minimum and allow to cure as recommended by written instructions from manufacturer.

H. Grinding: Exercise extreme care to ensure fluids from grinding operation do not react with dividers and strips to produce a stain on aggregate. Delay grinding until heavy trade work is completed and construction traffic through the area is restricted.

1. Rough Grinding: Grind with 24 grit silicon carbide or D-36 Diamond matrix stones until all terrazzo strips and chips are uniformly exposed.
2. Intermediate Grinding: Follow initial grind with 80 or finer grit stones.
3. Grouting:
   a. Clean floor with clean water and rinse.
   b. Remove excess rinse water by wet vacuum, dry and fill voids with epoxy-resin matrix or clear resin.
   c. Allow grout to cure.
4. Fine Grinding: Grind with stones 120 grit or finer until all grout is removed from surface. Repeat rough grinding, grout coat, and fine grinding if large voids exist after initial fine grinding. Produce surface with a minimum of 70- to 75-percent aggregate exposure.

I. Surface Finishing:

1. Flood mop and wet vacuum all slurry from surface insuring all latency and particulate matter is removed.
2. Continue grinding process with Genesis diamond grits 220, 400 and 600 repeating flood mop and wet vacuum between steps insuring all previous grit latency and particulate matter is removed.
3. Inspect entire surface for consistent appearance, manifesting no abrasion scratches from previous grits. Readdress any area manifesting previous grit scratch pattern not matching 600 grit finish before continuing.
4. Mechanically polish surface using 1,000 grit Ceramica diamond pads. Surface shall have uniform reflective appearance showing no high or low sheen variances.
5. Flood mop and wet vacuum as described in Step 1 insuring no presence of any particulate matter or other trades' dirt or oils.
6. Final polish surface using manufacturer's standard polish using white polishing pad.

7. Thoroughly scrub and agitate entire surface using manufacturer's recommended cleaning fluid, wet vacuum scrub from surface insuring all final chemistry is removed.

J. Repair: Remove and replace terrazzo areas that evidence lack of bond with substrate. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Architect.

K. Termination of pours: Terminate pours with jagged fingers approximately 4 inches in length unless terminated against zinc strip to ensure that color of next pour blends with previous pour. Any noticeable color variation between pours is not acceptable.

L. Acceptance: Replace any terrazzo that does not match the approved mock-ups' color, appearance, finish and pattern.

3.4 PRECAST TERRAZZO INSTALLATION

A. Preparation: Clean precast terrazzo surfaces which have become dirty or stained prior to setting to remove soil, stains and foreign materials. Clean precast terrazzo by thoroughly scrubbing with fiber brushes followed by a thorough drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh filler or abrasives.

B. Installation, General:

1. Employ only skilled and experienced workmen to install the precast terrazzo work. Use carborundum or diamond tipped power saws to cut precast terrazzo units which need to be fitted to existing field conditions.

C. Install precast terrazzo units using method recommended NTMA and manufacturer unless otherwise indicated.

1. Set precast terrazzo units to comply with requirements indicated on drawings and final shop drawings. Install anchors, supports, fasteners and other attachments indicated or necessary to secure precast terrazzo work in place. Shim and adjust anchors, supports and accessories to set precast terrazzo work accurately in locations indicated with uniform joints of widths indicated and with edges and faces aligned

D. Installation Tolerance: Set units with alignment level and true to dimensions, varying 1/8-inch maximum in length, height, or width; non-cumulative.

1. Additional Tolerances:
   a. Joint Widths: +/- 1/16 inch.
   b. Variation from Plumb: +/- 1/16 inch.
   c. Variation from Level: +/- 1/8 inch in 20 feet, non-cumulative.
   d. Piece Alignments (Edge to Edge): +/- 1/32 inch.

E. Installation of Stair Tread/Risers:

1. Place setting bed on steel pan and poured in place concrete type stairs where shown and in accordance with NTMA, and the applicable provisions of TCA

S151 Method F111 (for steel pan stairs) and Methods F112 and W211 (for concrete stairs) and ANSI A108.1A.

2. Tamp units into setting bed to achieve a full bond without voids. Level units at joints. Grind at joints to remove any minor discrepancies in level of units.

F. Do not install units that are chipped, cracked, discolored, or not properly finished.

G. Seal joints between units with joint compound matching precast terrazzo matrix color.

3.5 FIELD QUALITY CONTROL

A. Installer shall provide Coefficient of Friction testing in accordance with ANSI A137.1.

1. Provide written reports to Architect.

3.6 CLEANING AND PROTECTION

A. Cleaning:

1. Remove grinding dust from installation and adjacent areas.
2. Wash surfaces with cleaner according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow to thoroughly dry.
3. Refer to Section 01 74 23 “Final Cleaning” for additional requirements.

B. Sealing:

1. Seal surfaces according to NTMA written recommendations.

C. Protection: Provide final protection from other trades with minimum 1/4 inch Masonite hardboard with taped joints on top of minimum 6 mils Visqueen to ensure that terrazzo is without damage or deterioration at time of Substantial Completion and that no color bleed from Masonite to terrazzo occurs.

D. Protect zinc strips at edges and terminations from damage from other trades by installing tapered hardwood thresholds against strips until final adjoining material is installed.

E. Before Final Acceptance clean and polish complete terrazzo installation.

END OF SECTION 09 66 23

SECTION 09 67 23 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. High-performance resinous flooring systems.
2. Decorative flake polymeric floor coating.

B. Related Sections:

1. Division 07 Section "Joint Sealants" for sealants installed at joints in resinous flooring systems.
2. Division 09 Section “Finish Key” for finish selections.
3. Division 09 Section "Resinous Matrix Terrazzo Flooring" for thin-set, resinous matrix terrazzo.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.

B. Sustainable Design Submittal:

1. Product Data: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C” for Leadership Extraction Practices for the following:
   a. Extended Producer Responsibility
   b. Recycled content
   c. Regional material requirements
2. Product Certificates: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C” for the following:
   a. Environmental Product Declarations (EPD’s)
   b. Corporate Sustainability Reporting (CSR’s)
   c. Health Product Declarations (HPD’s)

C. Samples for Initial Selection: For each type of exposed finish required.

D. Samples for Verification: For each resinous flooring system required, 6 inches quare, applied to a rigid backing by Installer for this Project.

E. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

F. Material Certificates: For each resinous flooring component, from manufacturer.

G. Material Test Reports: For each resinous flooring system.

H. Maintenance Data: For resinous flooring to include in maintenance manuals.

I. Warranty: Sample of manufacturer’s standard warranty.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.

1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

C. Preinstallation Conference: Conduct conference at project site.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless manufacturer recommends a longer period.

1.6 WARRANTY

A. Special Warranty: Contractor shall provide a five-year Project Warranty jointly signed by the resinous flooring installer and the manufacturer of the resinous flooring materials guaranteeing the Work against material or installation defects. Under the terms of the Warranty, the Contractor shall promptly repair or replace all defective or damaged items delivered under the contract.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, provide Basis of Design product indicated.

2.2 INDUSTRIAL RESINOUS FLOORING

A. Resinous Flooring: Abrasion-, impact- and chemical-resistant, industrial-aggregate-filled, resin-based, monolithic floor surfacing designed to produce a seamless floor and integral cove base.

B. Low Emitting Flooring

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

C. Basis-of-Design Product: Subject to compliance with requirements, provide Crossfield Products Corp., Dex-O-Tex; “Cheminert K” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 25 00 “Substitution Procedures” and 01 60 00 “Product Requirements” for comparable product requirements.
2. Wearing Surface: Textured for slip resistance.
3. Overall System Thickness: 1/4 inch.

D. Body Coats:

1. Resin: Epoxy.
2. Formulation Description: 100 percent solids.
3. Application Method: Troweled.
   a. Thickness of Coats: 1/4 inch.
   b. Number of Coats: One.
4. Aggregates: Manufacturer's standard.

E. Topcoat: Sealing or finish coats.

1. Resin: Epoxy.
2. Formulation Description: 100 percent solids Water based.
3. Type: Clear.
4. Finish: Gloss.
5. Number of Coats: One.

F. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. Compressive Strength: 10,000 psi per ASTM C 579.
2. Tensile Strength: 1,640 per ASTM C 307.
3. Flexural Modulus of Elasticity: 4,300 per ASTM C 580.
4. Water Absorption: 0.3 percent per ASTM C 413.
5. Impact Resistance: No chipping, cracking, or delamination and not more than 0.014-inchpermanent indentation per MIL-D-3134.
6. Abrasion Resistance: 0.04 gr maximum weight loss per ASTM D 4060.
7. Electrical Conductivity (NFPA 56A): Di-electric.
8. Flammability: Self-extinguishing per ASTM D 635.
9. Hardness: 80-85, Shore D per ASTM D 2240.
10. Bond Strength: >400 psi, 100 percent concrete failure per ACI 503R.

11. Coefficient of Friction: Static friction with saltwater on surface 0.95 per MIL-PRF-3134).

G. System Chemical Resistance: Test specimens of cured resinous flooring system are unaffected when tested according to ASTM D 1308 for 50 percent immersion and ASTM C 267 for immersion in the following reagents for no fewer than seven days:

1. Urea.

2.3 DECORATIVE FLAKE POLYMERIC FLOOR COATING

A. Basis-of-Design Product: Subject to compliance with requirements, provide PPI Epoxy Coatings; VE Terrazzo or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 25 00 “Substitution Procedures” and 01 60 00 “Product Requirements” for comparable product requirements.

B. System Components:

1. Base Coat: Manufacturer’s standard two-part UV resistant epoxy base coat.
2. Color Flakes: Manufacturer’s standard decorative flakes broadcast at density and color combination to match Architect’s sample.
3. Grout Coats: Two coats of manufacturer’s standard chemical resistant. non-ambering resin.
4. Finish Coat: Clear, three-part high solids chemical and wear resistant aliphatic urethane.

~~2.3~~2.4 ACCESSORIES

A. Low Emitting Flooring

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

B. Primer: Type recommended by manufacturer for substrate and body coats indicated.

1. Formulation Description: 100 percent solids.

C. Reinforcing Membrane: Flexible resin formulation that is recommended by manufacturer for substrate and primer and body coats indicated and that prevents substrate cracks from reflecting through resinous flooring.

1. Formulation Description: 100 percent solids.
   a. Provide fiberglass scrim embedded in reinforcing membrane.

D. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

1. Roughen concrete substrates as follows:
   a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
   b. Comply with ASTM C 811 requirements unless manufacturer's written instructions are more stringent.
2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.
3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.
   a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. of slab area in 24 hours.
4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

3.2 APPLICATION

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
3. At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.

B. Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Apply reinforcing membrane to entire substrate surface.

D. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.

E. Apply self-leveling slurry body coats in thickness indicated for flooring system.

1. Broadcast aggregates at rate recommended by manufacturer and, after resin is cured, remove excess aggregates to provide surface texture indicated.

F. Apply troweled or screeded body coats in thickness indicated for flooring system. Hand or power trowel and grout to fill voids. When cured, remove trowel marks and roughness using method recommended by manufacturer.

G. Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat and to produce wearing surface indicated.

H. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.

3.3 PROTECTION

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 09 67 23

SECTION 09 68 13 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes modular carpet tile.

B. Related Requirements:

1. Section 09 65 19 "Resilient Tile Flooring" for resilient wall base and accessories installed with carpet tile.
2. Section 09 68 16 "Sheet Carpeting" for carpet roll goods.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
   a. Review delivery, storage, and handling procedures.
   b. Review ambient conditions and ventilation procedures.
   c. Review subfloor preparation procedures.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include manufacturer's written installation recommendations for each type of substrate.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Flooring
3. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)
   b. Corporate Sustainability Reporting (CSR’s)
   c. Health Product Declarations (HPD’s)

C. Shop Drawings: For carpet tile installation, plans showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.

7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

D. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.

E. Samples for Initial Selection: For each type of carpet tile.

1. Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.

F. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.

G. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

H. Sustainable Product Certification: Provide ANSI/NSF 140 certification for carpet products.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

B. Mockups: Build mockups to comply with Section 01 43 39 (Visual Mock-Up Requirements”.

1. Build mockups at locations and in sizes shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI's "CRI Carpet Installation Standard."

1.9 FIELD CONDITIONS

A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.10 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, the following:
   a. More than 10 percent edge raveling, snags, and runs.
   b. Dimensional instability.

c. Excess static discharge.
d. Loss of tuft-bind strength.
e. Loss of face fiber.
f. Delamination.

3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Basis-of-Design Product: Subject to compliance with requirements, provide Tile Carpet as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

B. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

C. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard

D. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:

1. Product specific declarations in accordance with ISO 1404
2. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
3. Industry Wide Product Specific Type III EPD Third Party Certification

E. Corporate Sustainability Report: Provide third-party verified Corporate Sustainability Report (CPD) including impacts of extraction operations and activities associated with the manufacturer’s product and product’s supply chain conforming the following:

1. Global Reporting Initiative (GRI) Sustainability report
2. Organization for Economic Co-operation and Development (OOECD) Guidelines for Multinational Enterprises.
3. U.N. Global Compact: Communication of Progress
4. ISO 26000: 2010 Guidance on Social Responsibility
5. USGBC Approved Program: Other approved programs meeting the CSR criteria.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability

requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

1. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
   a. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.

B. Examine carpet tile for type, color, pattern, and potential defects.

C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 03 30 00 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
   a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
   b. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.

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

3.2 PREPARATION

A. General: Comply with CRI's "Carpet Installation Standards" and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates.

Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. Installation Method: As recommended in writing by carpet tile manufacturer.

B. Maintain dye-lot integrity. Do not mix dye lots in same area.

C. Maintain pile-direction patterns indicated on Drawings.

D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern parallel to walls and borders.

H. Access Flooring: Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI's "Carpet Installation Standard," Section 20, "Protecting Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

D. Refer to Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 09 68 13

SECTION 09 68 16 - SHEET CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes sheet carpet.

B. Related Requirements:

1. Section 09 65 19 "Resilient Tile Flooring" for resilient wall base and accessories installed with carpet.
2. Section 09 68 13 "Tile Carpeting" for modular carpet tiles.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to carpet installation including, but not limited to, the following:
   a. Review delivery, storage, and handling procedures.
   b. Review ambient conditions and ventilation procedures.
   c. Review subfloor preparation procedures.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics and durability.
2. Include manufacturer's written installation recommendations for each type of substrate.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Flooring
3. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)
   b. Corporate Sustainability Reporting (CSR’s)
   c. Health Product Declarations (HPD’s)

C. Shop Drawings: For carpet installation, showing the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
2. Carpet type, color, and dye lot.
3. Locations where dye lot changes occur.
4. Seam locations, types, and methods.
5. Type of subfloor.
6. Type of installation.
7. Pattern type, repeat size, location, direction, and starting point.

8. Pile direction.
9. Types, colors, and locations of insets and borders.
10. Types, colors, and locations of edge, transition, and other accessory strips.
11. Transition details to other flooring materials.

D. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet: 12-inch-square Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.
3. Carpet Seam: 6-inch Sample.

E. Samples for Initial Selection: For each type of product.

1. Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.

F. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet: 12-inch-square Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch-long Samples.
3. Carpet Cushion: 6-inch-square Sample.
4. Carpet Seam: 6-inch Sample.

G. Product Schedule: For carpet. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet, for tests performed by a qualified testing agency.

C. Sample Warranties: For special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

B. Mockups: Build mockups to comply with Section 01 43 39 (Visual Mock-Up Requirements".

1. Build mockups at locations and in sizes shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI's "CRI Carpet Installation Standard."

B. Deliver carpet in original mill protective covering with mill register numbers and tags attached.

1.9 FIELD CONDITIONS

A. Comply with CRI's "CRI Carpet Installation Standard" for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.

1.10 WARRANTY

A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, the following:
   a. More than 10 percent loss of face fiber, edge raveling, snags, and runs.
   b. Loss of tuft bind strength.
   c. Excess static discharge**.**
   d. Delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET CARPET

A. Basis-of-Design Product: Subject to compliance with requirements, provide Sheet Carpet types as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

B. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

C. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard

D. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:

1. Product specific declarations in accordance with ISO 1404
2. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
3. Industry Wide Product Specific Type III EPD Third Party Certification

E. Corporate Sustainability Report: Provide third-party verified Corporate Sustainability Report (CPD) including impacts of extraction operations and activities associated with the manufacturer’s product and product’s supply chain conforming the following:

1. Global Reporting Initiative (GRI) Sustainability report
2. Organization for Economic Co-operation and Development (OOECD) Guidelines for Multinational Enterprises.
3. U.N. Global Compact: Communication of Progress
4. ISO 26000: 2010 Guidance on Social Responsibility
5. USGBC Approved Program: Other approved programs meeting the CSR criteria.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.

2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

1. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.
   a. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance.

B. Examine carpet for type, color, pattern, and potential defects.

C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 03 30 00 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.

1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
   a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
   b. Perform additional moisture tests recommended in writing by adhesive and carpet manufacturers. Proceed with installation only after substrates pass testing.

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

3.2 PREPARATION

A. General: Comply with CRI's "CRI Carpet Installation Standard" and with carpet manufacturer's written installation instructions for preparing substrates.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or

silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.3 CARPET INSTALLATION

A. Comply with CRI's "CRI Carpet Installation Standard" and carpet manufacturer's written installation instructions for the following:

1. Direct-glue-down installation.

B. Comply with carpet manufacturer's written instructions and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.

C. Install as indicated on Drawings.

D. Install borders with mitered corner seams.

E. Do not bridge building expansion joints with carpet.

F. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

G. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

H. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet as marked on subfloor. Use nonpermanent, nonstaining marking device.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
2. Remove yarns that protrude from carpet surface.
3. Vacuum carpet using commercial machine with face-beater element.

B. Protect installed carpet to comply with CRI's "CRI Carpet Installation Standard."

C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods recommended in writing by carpet manufacturer and carpet adhesive manufacturer.

D. Refer to Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 09 68 16

SECTION 09 69 00 - ACCESS FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Composite board panel access flooring.

1.2 COORDINATION

A. Coordinate location of mechanical and electrical work in underfloor cavity to prevent interference with access flooring.

B. Mark pedestal locations on subfloor to enable mechanical and electrical work to proceed without interfering with access-flooring pedestals installed after mechanical and electrical work.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review connections between access flooring and mechanical and electrical systems.
2. Review requirements related to sealing the plenum.
3. Review procedures for keeping underfloor space clean.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for access flooring.
2. Include loading capacities.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Flooring
3. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)

C. Samples: For the following products:

1. Floor Coverings: Full-size units for each color and texture specified.
2. Exposed Metal Accessories: Approximately 10 inches in length.
3. One full-size floor panel, pedestal, and understructure unit for each type of access flooring required.

D. Samples for Initial Selection: For each type of exposed finish.

E. Samples for Verification: For the following products:

1. Floor Coverings: Full-size units.
2. Exposed Metal Accessories: Approximately 10 inches in length.
3. One full-size floor panel, pedestal, and understructure unit for each type of access flooring required.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and testing agency.

B. Product Certificates: For each type of access flooring.

C. Product Test Reports: For each type of access-flooring material and floor covering, performed by a qualified testing agency.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Panels: Ten.
2. Pedestals: Ten.
3. Stringers: Ten.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Mockups: Build mockups to comply with Section 01 43 39 (Visual Mock-Up Requirements".

1. Build mockup of typical access flooring, as shown on Drawings. Size to be an area no fewer than five floor panels in length by five floor panels in width.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install access flooring until spaces are enclosed, ambient temperature is between 50 and 90 deg F, and relative humidity is not less than 20 and not more than 70 percent.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide access flooring capable of complying with the following performance requirements according to testing procedures in CISCA's "Recommended Test Procedures for Access Floors":

1. Concentrated Loads: 2500 lbs. applied on one square inch area at any location on the panel without experiencing permanent set as defined by CISCA. The loading method used to determine design (allowable) load shall be in conformance with CISCA Concentrated Load test method but with panel tested on actual understructure instead of steel blocks.
2. Ultimate Loads: Panel supported on actual understructure system shall be capable of supporting a point load of at least 5000 lbs. applied through a load indenter on a one square inch area at any location on the panel without failure (i.e. minimum safety factor if 2) when tested in accordance with CISCA A/F, Section 2, “Ultimate Loading”.
3. Rolling Loads: Panel supported on actual understructure system shall be able to withstand the following rolling loads at any location on the panel without developing a local and overall surface deformation greater than 0.040 inches when tested in accordance with CISCA A/F Section 3, “Rolling Loads”. Note: wheel 1 and wheel 2 tests shall be performed on two separate panels.
   a. CISCA Wheel 1: 10 passes at Size: 3” dia x 1 13/16” wide Load: 2000 lbs. Passes: 10.
   b. CISCA Wheel 2: Size: (A) 6” dia x 2” wide Load: 2000 lbs. Passes: 10,000 (B) 10” dia. X 4” wide.
4. Stringer Concentrated Load: Stringer shall be capable of withstanding a concentrated load of 450 lbs. placed in its midspan on a one square inch area using a round or square indentor without exceeding a permanent set of 0.010” after the load is removed when tested in accordance with CISCA A/F, Section 4, “Stringer Load Testing”.
5. Pedestal Axial Load: Pedestal support assembly shall provide a 6000 lb. axial load without permanent deformation when tested in accordance with CISCA A/F, Section 5, “Pedestal Axial Load Test”.
6. Pedestal-Overturning-Moment: Pedestal support assembly shall provide an average overturning moment of 1000 in-lbs. when glued to a clean, sound, uncoated concrete surface when tested in accordance with CISCA A/F, Section 6, “Pedestal Overturning Moment Test”.
7. Uniform Load: Panel supported on actual understructure system shall be capable of supporting a point load of at least 5000 lbs. applied through a load indentor on a one square inch area at any location on the panel without failure (i.e. minimum safety factor if 2) when tested in accordance with CISCA A/F, Section 2, “Ultimate Loading”.
8. Drop Impact Load Test: Panel shall be capable of being dropped face up onto to a concrete slab from a height of 36”, after which it shall continue to meet all load performance requirements as previously defined.

B. Fire Performance:

1. System shall meet *Class A* Flame spread requirements for flame spread and smoke development. Tests shall be performed in accordance with ASTM-E84-1998, Standard Test Method for Surface Burning Characteristics for Building Materials.

C. Recycled Content of Access Floor System: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 50 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

2.2 COMPOSITE BOARD PANEL ACCESS FLOORING

A. Fabricate panels with particleboard core laminated to bottom steel face sheets, and with a flame-spread index of 25 or less according to ASTM E 84. Provide core edges enclosed with upturned, die-formed, bottom-sheet edge or with perimeter steel channel welded to top sheet and welded or bonded to bottom sheet. Protect metal surfaces against corrosion by manufacturer's standard factory-applied finish.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Tate Access Floors, Inc; ConCore 2500 or a comparable product by one of the following:
   a. ASM Modular Systems, Inc.
   b. Computer Environments, Inc.
   c. Location: Ticketing and TSA Security areas.
2. Basis-of-Design Product: Subject to compliance with requirements, provide Tate Access Floors, Inc; ConCore 1250 or a comparable product by one of the following:
   a. ASM Modular Systems, Inc.
   b. Computer Environments, Inc.
   c. Location: Ground Transportation Level office areas and all other areas not indicated.
2.3. Panels shall consist of a top steel sheet welded to a formed steel bottom pan filled internally with a lightweight cementitious material. Mechanical or adhesive methods for attachment of the steel top and bottom sheets are unacceptable.
3.4. Cementitious fill material shall be totally encased within the steel welded shell except where cut for special conditions.
4.5. Configuration: Provide modular panels with nominal size of 24 by 24 inches, interchangeable with other field panels without disturbing adjacent panels or understructure.
5.6. Attachment to Understructure: Gravity.
6.7. Low Emitting Composite Wood
   a. Provide composite wood products that meet the California Air Resources Board (CARB), Airborne Toxic Measure ATCM requirements for ultra-low emitting formaldehyde (ULEF) resins or no added formaldehyde resins.
   b. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

B. Pedestal System Understructure: System consisting of base, column with provisions for height adjustment, and head (cap); made of steel.

1. Pedestal assemblies shall be corrosive resistant, all steel welded construction, and shall provide an adjustment range of +/- 1” for finished floor heights 6” or greater. Zinc electroplating shall be prohibited on all pedestal components, including head plate, threaded rod, adjustment nut, pedestal tube, base plate, and all fasteners.

2. Pedestal assemblies shall provide a means of leveling and locking the assembly at a selected height, which requires deliberate action to change height setting and prevents vibration displacement.
3. Hot dip galvanized steel pedestal head shall be welded to a threaded rod which includes a specially designed adjusting nut. The nut shall provide location lugs to engage the pedestal base assembly, such that deliberate action is required to change the height setting.
4. Threaded rod shall provide a specially designed anti-rotation device, such that when the head assembly is engaged in the base assembly, the head cannot freely rotate (for FFH of 7” or greater and Types 1A, 2B and 3B square tube bases only).
5. Hot dip galvanized pedestal base assembly shall consist of a formed steel plate with no less than 16 inches of bearing area, welded to a 7/8” square steel tube and shall be designed to engage the head assembly.
6. Pedestal assemblies shall be corrosive resistant, all steel welded construction, and shall provide an adjustment range of +/- 1” for finished floor heights 6” or greater. Zinc electroplating shall be prohibited on all pedestal components, including head plate, threaded rod, adjustment nut, pedestal tube, base plate, and all fasteners.
7. Pedestal assemblies shall provide a means of leveling and locking the assembly at a selected height, which requires deliberate action to change height setting and prevents vibration displacement.
8. Hot dip galvanized steel pedestal head shall be welded to a threaded rod which includes a specially designed adjusting nut. The nut shall provide location lugs to engage the pedestal base assembly, such that deliberate action is required to change the height setting.
9. Threaded rod shall provide a specially designed anti-rotation device, such that when the head assembly is engaged in the base assembly, the head cannot freely rotate (for FFH of 7” or greater and Types 1A, 2B and 3B square tube bases only). Note: This prevents the assembly from inadvertently losing its leveling adjustment when panels are removed from the installation during use.
10. Hot dip galvanized pedestal base assembly shall consist of a formed steel plate with no less than 16 inches of bearing area, welded to a 7/8” square steel tube and shall be designed to engage the head assembly.

C. Stringer System Understructure: Modular steel stringer systems designed to bolt to pedestal heads and form a grid pattern. Protect steel components with manufacturer's standard galvanized or corrosion-resistant paint finish.

1. Stringers shall support each edge of panel.
2. Steel stringer shall have conductive galvannealed coating. Zinc electroplating shall be prohibited on stringers and stringer fasteners.
3. Stringers shall be individually and rigidly fastened to the pedestal with one machine screw for each foot of stringer length. Bolts shall provide positive electrical contact between the stringers and pedestals. Connections depending on gravity or spring action are unacceptable.
4. Stringer grid shall be 4’ stringers in a basketweave configuration ensuring maximum lateral stability in all directions.
5. Stringers shall support each edge of panel.

6. Steel stringer shall have conductive galvannealed coating. Zinc electroplating shall be prohibited on stringers and stringer fasteners.
7. Stringers shall be individually and rigidly fastened to the pedestal with one machine screw for each foot of stringer length. Bolts shall provide positive electrical contact between the stringers and pedestals. Connections depending on gravity or spring action are unacceptable.
8. Stringer grid shall be 4' stringers in a basketweave configuration ensuring maximum lateral stability in all directions. (Also available in 2' x 4' and 2' x 2' grid patterns)

D. Floor Finish: Provide factory-applied floor finish fabricated in one piece to cover entire panel face; with integral trim edging. Refer to drawings and finish key for location of each finish.

1. Resinous Matrix Terrazzo
   a. Refer to Section 09 66 23 "Resinous Matrix Terrazzo Flooring" for color and mix.
2. Resilient Tile
   a. Refer to Section 09 00 01 "Finish Key" for type.
3. Unfinished
   a. Provide suitable surface for field installation of tile carpet. Refer to Section 09 68 13 "Tile Carpeting" for requirements.

2.3 FABRICATION

A. Fabrication Tolerances:

1. Size: Plus or minus 0.020 inch of required size.
2. Squareness: Plus or minus 0.015 inch between diagonal measurements across top of panel.
3. Flatness: Plus or minus 0.035 inch, measured on a diagonal on top of panel.

B. Panel Markings: Clearly and permanently mark floor panels on their underside with panel type and concentrated-load rating.

C. Cutouts: Fabricate cutouts in floor panels for cable penetrations and service outlets. Provide reinforcement or additional support, if needed, to make panels with cutouts comply with structural performance requirements.

1. Number, Size, Shape, and Location: As indicated.
2. Grommets: Where indicated, fit cutouts with manufacturer's standard grommets; or, if size of cutouts exceeds maximum grommet size available, trim edge of cutouts with manufacturer's standard plastic molding with tapered top flange. Furnish removable covers for grommets.
3. Provide foam-rubber pads for sealing annular space formed in cutouts by cables.

2.4 ACCESSORIES

A. Panel Lifting Device: Panel manufacturer's standard portable lifting device for each type of panel required.

B. Perimeter Support: Where indicated, provide manufacturer's standard method for supporting panel edge and forming transition between access flooring and adjoining floor coverings at same level as access flooring.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer and manufacturer's authorized representative present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of conditions and deleterious substances that might interfere with attachment of pedestals.
2. Verify that concrete floor sealer and finish have been applied and cured.

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

3.2 PREPARATION

A. Lay out floor panel installation to keep the number of cut panels at floor perimeter to a minimum. Avoid using panels cut to less than 6 inches.

B. Locate each pedestal, complete any necessary subfloor preparation, and vacuum subfloor to remove dust, dirt, and construction debris before beginning installation.

3.3 INSTALLATION

A. Install access flooring and accessories under supervision of access-flooring manufacturer's authorized representative to produce a rigid, firm installation that complies with performance requirements and is free of instability, rocking, rattles, and squeaks.

B. Adjust pedestals so installed panels are flat, level, and at the proper height.

C. Stringer Systems: Secure stringers to pedestal heads according to access-flooring manufacturer's written instructions.

D. Install flooring panels securely in place, leaving them properly seated with panel edges flush. Do not force panels into place.

E. Scribe perimeter panels to provide a close fit, with adjoining construction having no voids greater than 1/8 inch where panels abut vertical surfaces.

1. To prevent dusting, seal cut edges of steel-encapsulated, wood-core panels with sealer recommended in writing by panel manufacturer.

F. Cut and trim access flooring and perform other dirt-or-debris-producing activities at a remote location or as required to prevent contamination of subfloor under installed access flooring.

G. Grounded Access Flooring: Ground access flooring as recommended by manufacturer and as needed to comply with performance requirements for electrical resistance of floor coverings.

1. Panel-to-Understructure Resistance: Not more than 10 ohms as measured without floor coverings.

H. Clean dust, dirt, and construction debris caused by floor installation, and vacuum subfloor area as installation of floor panels proceeds.

I. Install access flooring without change in elevation between adjacent panels and within the following tolerances:

1. Plus or minus 1/16 inch in any 10-foot distance.

J. Refer to Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning” for additional requirements.

3.4 PROTECTION

A. Prohibit traffic on access flooring for 24 hours and removal of floor panels for 72 hours after installation, to allow pedestal adhesive to set.

B. Replace access-flooring panels that are stained, scratched, or otherwise damaged or that do not comply with specified requirements.

END OF SECTION 09 69 00

SECTION 09 75 13 - STONE WALL FACING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section includes dimension stone paneling on interior walls.

B. Related Requirements:

1. Section 07 92 00 "Joint Sealants" for sealing joints in stone paneling system with elastomeric sealants.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each manufactured product.

B. Sustainable Design Submittals:

C. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Adhesives and Sealants
2. Product Certificates: Provide the following:
   a. Health Product Declarations (HPD’s)

D. Shop Drawings: Show fabrication and installation details for stone paneling system, including dimensions and profiles of stone units.

1. Show locations and details of joints both within stone paneling system and between stone paneling system and other finish materials.

E. Samples for Verification:

1. For each stone type indicated, in sets of Samples not less than 12 inches square. Include three or more Samples in each set and show the full range of variations in appearance characteristics in completed Work.
2. For each color of grout and sealant required.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Material Test Reports:

1. Sealant Compatibility and Adhesion Test Report: From sealant manufacturer indicating that sealants will not stain or damage stone. Include interpretation of test results and recommendations for primers and substrate preparation needed for adhesion.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For stone paneling to include in maintenance manuals. Include product data for stone-care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.7 QUALITY ASSURANCE

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

B. Installer Qualifications: Fabricator of stone paneling.

C. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and installation.

1. Refer to Section 01 43 39” Visual Mock-Up Requirements” for additional requirements.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store and handle stone and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping, and other causes.

1. Lift stone with wide-belt slings; do not use wire rope or ropes that might cause staining. Move stone, if required, using dollies with cushioned wood supports.
2. Store stone on wood A-frames or pallets with nonstaining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to stone. Ventilate under covers to prevent condensation.

B. Mark stone units, on surface that will be concealed after installation, with designations used on Shop Drawings to identify individual stone units. Orient markings on vertical panels so that they are right side up when units are installed.

C. Deliver sealants to Project site in original unopened containers labeled with manufacturer's name, product name and designation, color, expiration period, pot life, curing time, and mixing instructions for multicomponent materials.

D. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

1.9 FIELD CONDITIONS

A. Maintain air and material temperatures to comply with requirements of installation material manufacturers, but not less than 50 deg F during installation and for seven days after completion.

B. Field Measurements: Verify dimensions of construction to receive stone paneling by field measurements before fabrication and indicate measurements on Shop Drawings.

1.10 COORDINATION

A. Coordinate installation of inserts that are to be embedded in concrete or masonry and similar items to be used by stone paneling Installer for anchoring and supporting stone paneling. Furnish setting drawings, templates, and directions for installing such items and deliver to Project site in time for installation.

B. Time delivery and installation of stone paneling to avoid extended on-site storage and to coordinate with work adjacent to stone paneling.

PART 2 - PRODUCTS

2.1 QUARTZ-BASED STONE ST1

A. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard

B. Basis-of-Design Product: Subject to compliance with requirements, provide metal framed wall paneling as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

C. Finish: As indicated.

2.2 SETTING MATERIALS

A. Molding Plaster: ASTM C 59/C 59M.

B. Portland Cement: ASTM C 150/C 150M, Type I or Type II.

1. Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C 114.

C. Hydrated Lime: ASTM C 207, Type S.

D. Aggregate: ASTM C 144.

E. Water: Potable.

2.3 SEALANTS

A. Joint Sealants: Manufacturer's standard sealants that comply with applicable requirements in Section 07 92 00 "Joint Sealants" and will not stain the stone they are applied to.

1. Use mildew-resistant joint sealant at plumbing fixtures and for control and expansion joints in toilet rooms and other wet locations.
2. Colors: Provide colors of exposed sealants to match other joints in stone adjoining sealed joints unless otherwise indicated.

2.4 ADHESIVES

A. Two component, high strength epoxy adhesive formulated to bonding stone installations on vertical surfaces.

1. Basis-of-Design Product: Subject to compliance with requirements, provide LATACRETE International, Inc., Latapoxy 310 or comparable product meeting all requirements including sustainability requirements by, but not limited to, the following manufacturers.
   a. PROFLEX Products, Inc.
   b. MAPEI Corporation
   c. SGM, Inc.
2. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard
3. Low Emitting Adhesives and Sealants
   a. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
   b. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.
   c.

2.5 STONE ACCESSORIES

A. Temporary Setting Shims: Rigid plastic shims, nonstaining to stone, sized to suit joint thickness.

B. Setting Shims for Direct-Mount Anchoring Systems: Strips of resilient plastic or neoprene, nonstaining to stone, of thickness needed to prevent point loading of stone on anchors and of depths to suit anchors without intruding into required depths of pointing materials.

C. Cleaner: Stone cleaner specifically formulated for stone types, finishes, and applications indicated, as recommended by stone producer. Do not use cleaning compounds containing acids, caustics, harsh fillers, or abrasives.

2.6 STONE FABRICATION, GENERAL

A. Select stone for intended use to prevent fabricated units from containing cracks, seams, and starts that could impair structural integrity or function.

1. Repairs that are characteristic of the varieties specified are acceptable provided they do not impair structural integrity or function and are not aesthetically unpleasing, as judged by Architect.

B. Fabricate stone paneling in sizes and shapes required to comply with requirements indicated.

C. Cut stone to produce pieces of thickness, size, and shape indicated and to comply with fabrication and construction tolerances recommended by applicable stone association.

1. Where items are installed with adhesive or where stone edges are visible in the finished work, make items uniform in thickness and of identical thickness for each type of item; gage back of stone if necessary.
2. Clean sawed backs of stones to remove rust stains and iron particles.
3. Dress joints straight and at right angle to face unless otherwise indicated.
4. Cut and drill sinkages and holes in stone for anchors, supports, and lifting devices as indicated or needed to set stone securely in place; shape beds to fit supports.
5. Provide openings, reveals, and similar features as needed to accommodate adjacent work.

D. Finish exposed faces and edges of stone to comply with requirements indicated for finish of each stone type required and to match approved Samples and mockups.

E. Carefully inspect finished stone units at fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units.

1. Grade and mark stone for overall uniform appearance when assembled in place. Natural variations in appearance are acceptable if installed stone units match range of colors and other appearance characteristics represented in approved Samples.

2.7 STONE PANELING ON WALLS

A. Arrange panels in shop or other suitable space in proposed orientation and sequence for examination by Architect. Mark units with temporary sequence numbers to indicate position in proposed layout.

1. Lay out one elevation at a time if approved by Architect.
2. Notify Architect seven days in advance of date and time when layout will be available for viewing.
3. Provide lighting of similar type and level as that of final installation for viewing layout unless otherwise approved by Architect.
4. Rearrange panels as directed by Architect until layout is approved.

5. Do not trim nonmodular-size units to less than modular size until after Architect's approval of layout, unless otherwise approved by Architect.
6. Mark backs of units and Shop Drawings with sequence numbers based on approved layout. Mark backs of units to indicate orientation of units in completed Work.

B. Nominal Thickness: As indicated.

C. Cut stone to produce uniform joints 1/16 inch wide and in locations indicated.

D. Pattern Arrangement: Fabricate and arrange panels with veining and other natural markings to comply with the following requirements:

1. Arrange panels with veining as indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive stone paneling and conditions under which stone paneling will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of stone paneling.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of stone paneling.

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

3.2 SETTING STONE, GENERAL

A. Before setting stone, clean surfaces that are dirty or stained by removing soil, stains, and foreign materials. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.

B. Do necessary field cutting as stone is set. Use power saws with diamond blades to cut stone. Cut lines straight and true, with edges eased slightly to prevent snipping.

C. Contiguous Work: Provide reveals and openings as required to accommodate contiguous work.

D. Set stone to comply with requirements indicated. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure stone in place. Shim and adjust anchors, supports, and accessories to set stone accurately in locations indicated, with edges and faces aligned according to established relationships and indicated tolerances.

E. Erect stone units level, plumb, and true with uniform joint widths. Use temporary shims to maintain joint width.

F. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated.

1. Sealing of expansion and other joints is specified in Section 07 92 00 "Joint Sealants."
2. Keep expansion joints free of plaster, mortar, grout, and other rigid materials.

3.3 CONSTRUCTION TOLERANCES

A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/8 inch in 96 inches, 1/4 inch maximum.

B. Variation from Level: For lintels, sills, chair rails, horizontal bands, horizontal grooves, and other conspicuous lines, do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, 3/8 inch maximum.

C. Variation of Linear Building Line: For position shown in plan and related portion of walls and partitions, do not exceed 1/8 inch in 10 feet, 1/4 inch in 20 feet, 3/8 inch maximum.

D. Variation in Cross-Sectional Dimensions: For thickness of walls from dimensions indicated, do not exceed plus or minus 1/8 inch.

E. Variation in Joint Width: Do not vary from average joint width more than plus or minus 1/16 inch or one-fourth of nominal joint width, whichever is less.

F. Variation in Plane between Adjacent Stone Units (Lipping): Do not exceed 1/32-inch difference between planes of adjacent units.

3.4 INSTALLATION OF STONE FACING

A. Set units firmly against setting spots. Locate setting spots at anchors and spaced not more than 18 inches apart across back of unit, but provide no fewer than one setting spot per 2 sq. ft. unless otherwise indicated.

B. Fill joints with sealant after setting stone.

3.5 JOINT-SEALANT INSTALLATION

A. Prepare joints and apply sealants of type and at locations indicated to comply with applicable requirements in Section 07 92 00 "Joint Sealants." Remove temporary shims before applying sealants.

3.6 ADJUSTING AND CLEANING

A. In-Progress Cleaning: Clean stone paneling as work progresses. Remove adhesive, grout, mortar, and sealant smears immediately.

B. Remove and replace stone paneling of the following description:

1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
2. Defective stone paneling.
3. Defective joints, including misaligned joints.

4. Stone paneling and joints not matching approved Samples and mockups.
5. Stone paneling not complying with other requirements indicated.

C. Replace in a manner that results in stone paneling that matches approved Samples and mockups, complies with other requirements, and shows no evidence of replacement.

D. Clean stone paneling no fewer than six days after completion of grouting and pointing, using clean water and soft rags or stiff-bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning compounds with caustic or harsh fillers, or other materials or methods that could damage stone.

E. Sealer Application: Apply stone sealer to comply with stone producer's and sealer manufacturer's written instructions and recommendations.

3.7 PROTECTION

A. Protect stone surfaces, edges, and corners from construction damage. Use securely fastened untreated wood, plywood, or heavy cardboard to prevent damage.

1. Provide composite wood products that meet the California Air Resources Board (CARB), Airborne Toxic Measure ATCM requirements for ultra-low emitting formaldehyde (ULEF) resins or no added formaldehyde resins.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

B. Before inspection for Substantial Completion, remove protective coverings and clean surfaces.

END OF SECTION 09 75 13

SECTION 09 78 00 – INTERIOR WALL PANELING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Flush phenolic wall paneling.
2. Quartz-based wall paneling.
3. Plastic laminate faced wall paneling.
4. Interior wall panel attachment system.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product, including panel products, adhesives, fire-retardant-treated materials, composite wood, high-pressure decorative laminate, and finishing materials and processes.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Adhesives and Sealants
3. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD’s)

C. Shop Drawings: Show location of paneling, large-scale details, attachment devices, and other components. Include dimensioned plans and elevations.

1. Show details full size.
2. Show locations and sizes of furring and blocking, including concealed blocking specified in other Sections.
3. For paneling produced from premanufactured sets, show finished panel sizes, set numbers, sequence numbers within sets, and method of cutting panels to produce indicated sizes.

D. Samples for Initial Selection:

1. Flush phenolic paneling.

E. Samples for Verification:

1. Flush phenolic paneling products, 12 by 12 inches, for each finish specified.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of product.

B. Evaluation Reports: For fire-retardant-treated materials and fire-retardant-treated paneling, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockups of typical paneling as shown on Drawings.

1.6 DELIVERY, STORAGE, AND HANDLING

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

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install paneling until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where paneling is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support paneling by field measurements before being enclosed and indicate measurements on Shop Drawings.

C. Established Dimensions: Where paneling is indicated to fit to other construction, establish dimensions for areas where woodwork is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that paneling can be installed as indicated.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 75 or less.
2. Smoke-Developed Index: 450 or less.

2.2 FLUSH PHENOLIC PANELING

A. Basis-of-Design Product: Subject to compliance with requirements, provide Flush Phenolic Wall Paneling as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

2.3 QUARTZ-BASED WALL PANELING

A. Basis-of-Design Product: Subject to compliance with requirements, provide Quartz-Based Stone Wall Facing as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 25 00 “Substitution Procedures” and 01 60 00 “Product Requirements” for comparable product requirements.

~~B. Aluminum Honeycomb Stone Backing Panel~~

~~1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:~~
~~a. Aktek Honeycomb, Stone Honeycomb Panel.~~
~~b. Stone Panels, Inc., Stonelight.~~
~~c. Universal Metaltek, HONEYLITE.~~
~~2. Recycled Content of MDF and Particleboard: Post-consumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent. Refer to Section 01 81 13.14 “SUSTAINABLE DESIGN REQUIREMENTS - LEED V4 BD+C” for additional recycled content requirements.~~

2.4 PLASTIC-LAMINATE-FACED WOOD PANELING

A. Grade: Premium.

B. Plastic Laminate: High-pressure decorative laminate complying with NEMA LD 3 and the following requirements:

1. Basis-of-Design Product: Subject to compliance with requirements, provide plastic laminate as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.
a. Refer to Sections 01 25 00 “Substitution Procedures” and 01 60 00 “Product Requirements” for comparable product requirements.

2. Faces: Grade HGS.
3. Backs: Grade BKV.
4. Exposed Edges: Same as faces.

C. Panel Core: MDF.

1. Thickness: ¾-inch.

D. Exposed Panel Edges: Plastic-laminate matching faces.

E. Adhesives for Bonding Plastic Laminate: Unpigmented contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.
2. Low Emitting Adhesives and Sealants for field application
   a. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
   b. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

2.5 STAINLESS STEEL-FACED WOOD PANELING

A. Grade: Premium.

B. Stainless-Steel Sheet: ASTM A 240/A 240M, stainless steel, Type 304.

1. Thickness: 1.5mm

C. Panel Core: MDF

1. Thickness: ¾-inch.

D. Exposed Panel Edges: Wrap face material.

E. Adhesives for Bonding Stainless Steel: Unpigmented contact cement.

1. Low Emitting Adhesives and Sealants for field application
   a. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
   b. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

2.6 VERTICAL SURFACING PANEL

A. Basis-of-Design Product: Subject to compliance with requirements, provide vertical surface panel as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

B. Panel Core: MDF

1. Thickness: 3/8-inch.

2.7 WALL PANEL ATTACHMENT SYSTEM

A. Flush phenolic paneling

1. Products: Subject to compliance with requirements, provide the following:
   a. Wall Panel Systems, Inc., 3/4” Shadow Line System.

B. Quartz-based wall paneling

1. Products: Subject to compliance with requirements, provide the following:
   a. Monarch Metal Fabrication, MF375 Clip.
2. Stainless steel reveal: 16 ga. sheet metal.

C. Plastic laminate and paneling

1. Products: Subject to compliance with requirements, provide the following:
   a. Wall Panel Systems, Inc., 3/4” Shadow Line System.

D. Vertical surface paneling

1. Products: Subject to compliance with requirements, provide the following:
   a. Fry Geglet Corporation, Graph 3/4.
2. Finish: Clear anodized.
3. Framing Assemblies: as indicated.

E. Stainless steel paneling

1. Wall Panels: Subject to compliance with requirements, provide the following:
   a. Wall Panel System, Inc., Complete Reveal System Butt Joint
2. Floor Panels: Subject to compliance with requirements, provide the following:
   a. Wall Panel System, Inc., ES 500 Concealed Fastening system

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure substrate is constructed to sufficiently accommodate attachment of the wall panel system.

B. Before installation, condition paneling to average prevailing humidity conditions in installation areas.

C. Before installing paneling, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Install paneling level, plumb, true, and straight with no distortions. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches. Install with no more than 1/16 inch in 96-inch vertical cup or bow and 1/8 inch in 96-inch horizontal variation from a true plane.

B. Anchor paneling to supporting substrate with concealed panel-hanger clips and splined connection strips. Do not use face fastening unless otherwise indicated.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective paneling, where possible, to eliminate defects; where not possible to repair, replace paneling. Adjust for uniform appearance.

B. Clean paneling on exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

1. Refer to Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 09 78 00

SECTION 09 82 60 - ACOUSTICAL PLASTER SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Acoustic plaster ceiling systems.

B. Related Sections include the following:

1. Division 09 Section “Finish Key” for finish selections.
2. Division 09 Section “Non-Structural Metal Framing” for supports for acoustic plaster ceiling systems.
3. Division 09 Section “Gypsum Board” for substrates for acoustic plaster ceiling systems.

1.3 SUBMITTALS

A. Product Data: For each component of acoustic plaster ceiling systems indicated. Include construction details relative to materials, individual components and profiles, finishes, and fire ratings (if required).

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Adhesives and Sealants

C. Shop Drawings: Show dimensioned ceiling plans with control joint locations, mounting details, transition details to adjacent work, design, weight, thickness, color and other data necessary to install the work and coordinate work with other affected trades.

D. Samples: Provide 8-1/2” x 11” samples of the acoustical finish system on solid substrate in color indicated in Division 09 Section “Finish Key.”

E. Acoustical Performance Data:

1. Provide Certified Acoustical Performance Sound Absorption Test Report data, conducted by a recognized, independent, testing agency, shall be submitted upon request and meet the following minimum requirements. Sound absorption reports shall not be more than 3 years old. Noise Reduction Coefficient (NRC) for the 1.18" (30mm) system shall be 0.75 per ASTM C 423-07 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method. Specific performance of the 1.18” seamless absorptive plaster system shall be as follows:

Frequency, Hz	Absorption Coefficient
100	0.08
125	0.11
200	0.23
250	0.39
400	0.55
800	1.03
1,000	1.00
1,250	1.03
1,600	0.91
2,000	0.82
2,500	0.78
4,000	0.74
5,000	0.71

F. Fire Test Data:

1. Certified Reports on Surface Burning Characteristics Determined by ASTM E 84 Twenty-Five Foot Tunnel Furnace Test Method, conducted by a recognized, independent, testing agency, shall be submitted upon request and meet the following minimum requirements:
   a. Class A Flame Spread Classification
      1) 0 – 25 Flame Spread
      2) 0 – 10 Smoke Development

G. Light Reflectance Coefficient Test Data:

1. Certified Reports on Light Reflectance Coefficient Performance Determined by ASTM E 1477-98 Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating Sphere Reflectometer, conducted by a recognized, independent, testing agency, shall be submitted upon request and meet the following minimum requirements:
   a. Light Reflectance Value
      1) D65 (Daylight) 0.78 or greater
      2) CWF2 (Cool White Fluorescent) 0.79 or greater

H. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items with concealed framing, suspension systems, piping, ductwork, and other construction. Show the following:

1. Ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain all materials through one source from a single manufacturer.

B. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

C. Mock Ups: Install a 4’ x 4’ mock-up of the sound absorptive finish system replicating relative details and conditions in location identified by Design Builder. Obtain mock-

up acceptance from Architect before any additional applications. Accomplish work to equal, or exceed standard established by accepted job site mock-up.

1. Refer to Section 01 43 39 “Visual Mock-up Requirements” for additional requirements.

1.5 PROJECT CONDITIONS

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

B. Cold Weather Requirements: When ambient outdoor temperatures are below 40 deg F, maintain a continuous uniform indoor temperature of at least 50 deg F for at least 3 days before beginning the material application, during its application and until material is dry, but for at least 7 days after application is complete. Distribute heat evenly; prevent concentrated or uneven heat from contacting the materials.

C. Ventilation: Ventilate building spaces as required to remove excess moisture to promote drying of the applied materials.

D. Protect contiguous work form soiling, splattering, moisture deterioration and other harmful effects that may be caused by the application of the materials.

E. Work is not to be performed until a minimum of 50fc of light is available on the work surface.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

B. Warranty: Manufacturer’s standard 5-year warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Subject to compliance with requirements, provide BASWA Acoustic North America; “BASWAphon Sound Absorptive Acoustical Finish System” or comparable product by one of the following:

1. Fellert North America.
2. Pyrok; “StarSilent.”

2.2 MATERIALS

A. Acoustical plaster shall be provided in a total system thickness (adhesive, pre-coated mineral wool panels, base coat and top coat) as indicated in Section 09 00 01 “Finish Key”.

B. The seamless sound absorption system shall consist of pre-coated mineral wool supporting panels, panel adhesive, fill, a base coat and a finish coat.

C. Trim Pieces:

1. All corner beads, reveals, terminations, control joints or other trim pieces shall be white vinyl, manufactured by Trim-Tex or Vinyl Corp. in profiles approved by Architect.
   a. Low Emitting Adhesives and Sealants
      1) Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
      2) Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

D. Base and top coats color: as indicated in Section 09 00 01 “Finish Key”.

PART 3 - EXECUTION

3.1 PREPARATION

A. Advise installers of other work about specific requirements relating to acoustical plaster ceiling system installation, as well as locations of supports, inserts, and anchoring devices.

3.2 INSPECTION

A. Examine, with the Design Builder and Installer present, areas where, and conditions under which, acoustical plaster ceiling system is to be installed. Correct any conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected in order to permit the proper installation of the work.

B. Verify that all mechanical and electrical services within the area of application have been roughed in at the appropriate depth relative to the thickness of the system; tested and approved, prior to commencement of application. Review approved details provided by acoustical plaster ceiling system manufacturer for verification.

3.3 ACCEPTABLE SUBSTRATE

A. General:

1. All acoustical plaster ceiling systems must be installed over a “sealed air tight” substrate. All penetrations shall be “closed off” to prevent air from passing through the acoustical plaster ceiling system thereafter through the substrate and then into the plenum above, or vice versa.
2. All HVAC, electrical, fire sprinkler and other penetrations of the substrate shall be sealed with traditional drywall tape or a self-adhesive fire tape to prevent air movement between the plenum and finished space or vice versa.
3. Adhesive Strength required for bonding to the substrate surface for the application of the acoustical plaster ceiling system is a minimum of 17 N/psf.
4. Plywood substrates are not acceptable due to the potential of excessive expansion and contraction movement.

5. All substrates for the application shall not vary from plumb, level, or a “smooth consistent curvature” by more than 1/4 inch in 12 feet.

B. Substrate Material:

1. Drywall substrates receiving acoustical plaster systems shall be a Level One finish; taped only.

3.4 INSTALLATION

A. Comply with manufacturer's written instructions for installing acoustic plaster systems.

B. Installation shall start only after all other work in the area of installation is complete.

END OF SECTION 09 82 60

SECTION 09 83 16 - SPRAY APPLIED ACOUSTICAL FINISH SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes sprayed cellulose finish system.

B. Related Items:

1. Clips, hangers, supports, sleeves and other attachments to spray bases are to be placed by other trades prior to the application of sprayed insulation.
2. Ducts, piping, conduit or other suspended equipment shall not be positioned until after the application of sprayed insulation.

1.2 SUBMITTALS

A. Copy of manufacturer's ISO 9001:2008 Certification.

B. Test reports indicating compliance with the requirements listed.

C. Manufacturer's written certification that product contains no asbestos, fiberglass or other man-made mineral fibers.

D. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 "Sustainable Design Requirements – LEED V4 BD+C".

1. Product Data: For Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Paints and Coatings

1.3 QUALITY ASSURANCE

A. Manufacturer must have a current listing with Underwriters Laboratories (UL) Code Evaluation Report.

B. Manufacturer must be ISO 9001:2008 Certified.

C. Applicator: Licensed by manufacturer.

D. Manufacturer must subscribe to independent laboratory follow-up inspection services of Underwriters Laboratories. Each bag shall be labeled accordingly.

E. Mock-up: Apply a 100 square foot representative sample to be reviewed by the Architects and/or Owner prior to proceeding.

1. Refer to Section 01 43 39 "Visual Mock-up Requirements" for additional requirements.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver in original, unopened containers bearing name of manufacturer, product identification and reference to U.L. testing.

B. Store materials dry, off ground and under cover.

C. Protect liquid adhesive from freezing.

PART 2 - PRODUCTS

2.1 PRODUCTS

1. Basis-of-Design Product: Subject to compliance with requirements, provide International Cellulose Corporation; Sonaspray “FC” Acoustical Finish or comparable product by one of the following:
   a. Acoustical Surfaces, Inc.
   b. United States Gypsum Company.
2. Color to match Architect’s sample.

2.2 SPRAY-APPLIED ACOUSTICAL FINISH CHARACTORISTICS

A. NRC values per ASTM C-423 conducted by a NVLAP certified testing laboratory:

Spray Applied Acoustical Finish System on Solid Backing							
Thickness	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	NRC
0.50”	.00	.14	.49	.87	1.00	.99	.65
1.00”	.05	.40	.94	1.04	.97	.99	.85

Spray Applied Acoustical Finish System on Ribbed Metal Deck							
Thickness	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	NRC
0.75”	.17	.58	.91	.89	.87	.84	.80

B. Flame Spread Index: 5 ASTM E-84/UL 723

C. Smoke Developed: 5 ASTM E-84/UL 723

D. Bond Strength >600 psf ASTM E-736

E. Compression Strength >400 psf ASTM E-761

F. Comply with Florida Building Code, Building 803.3 stability requirements for interior finishes.

G. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 25 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

H. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and report unsatisfactory conditions in writing. Do not proceed until unsatisfactory conditions are corrected.

B. Verify surfaces to receive spray insulation to determine if priming/sealing is required to ensure bonding and/or to prevent discoloration caused by migratory stains.

3.2 PREPARATION

A. Provide masking, drop cloths or other satisfactory coverings for materials/surfaces that are not to receive insulation to protect from over-spray.

B. Coordinate installation of the sprayed cellulose fiber with work of other trades.

C. Prime surfaces as required by manufacturer’s instructions or as determined by examination.

3.3 INSTALLATION

A. Average thickness to achieve NRC as indicated.

B. Install spray applied acoustical finish according to manufacturer’s recommendations.

C. Cure material with continuous natural or mechanical ventilation.

D. Remove and dispose of over spray.

END OF SECTION 09 83 16

SECTION 09 84 00 - METAL WALL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section includes metal wall panel systems.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of metal wall panel.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 "Sustainable Design Requirements – LEED V4 BD+C".

1. Product Data: Documentation for Leadership Extraction Practices in the following:
   a. Leadership Extraction Practices for Recycled Content
2. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Paints and Coatings (applied on-site only)
   b. Low Emitting Materials for Adhesives and Sealants
3. Product Certificates: Provide the following:
   a. Environmental Product Declarations (EPD's)

C. Shop Drawings: Show fabrication and installation details for wall panels.

D. Coordination Drawings: Show all items to be attached to and inserted into the wall panels.

E. Samples for Initial Selection: For products involving selection of color, texture, or design.

F. Samples for Verification: For each type of exposed finish required, prepared on 6-inch-square Samples of metal of same thickness and material indicated for the Work.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of product.

1.6 QUALITY ASSURANCE

A. Manufacturer: Firm with manufacturing and delivery capacity required for the project, shall have successfully completed at least ten projects within the past five years, utilizing systems, materials and techniques as herein specified.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build in-place mockups in location as selected by the Architect.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver wall panels wrapped in protective coverings and strapped together in suitable packs or in heavy-duty cartons. Remove protective coverings before they stain or bond to finished surfaces.

PART 2 - PRODUCTS

2.1 METAL WALL SYSTEMS, GENERAL

A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide metal wall systems by Gordon, Inc. or comparable products by one of the following manufacturers meeting all requirements including sustainability requirements.

1. BellPro Architectural, LLC.
2. C.R. Laurence Co., Inc.
3. Fry Reglet Architectural Metals

2.2 MATERIALS

A. Metal Wall Panel System, secondary framing, anchors, clips and extrusion shall be provided as complete package of this work. No exposed fasteners for metal closures are allowed.

B. Provide metals free from surface blemishes where exposed to view in finished unit. Surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished units are not acceptable.

C. Aluminum sheet, 3003 alloy, 0.063 inch thick.

1. Finish: Custom Powder Coat
2. Color: Match Benjamin Moore, Dove White (OC17)
3. Smooth, High-Gloss

D. Mounting Accessories

1. For surface mounting to structural wall, furnish Z Clips in extruded aluminum.

E. Recycled Content: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 35 percent.

1. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional information and requirements for recycled content.

F. Environmental Product Disclosure: Provide an Environmental Product Declarations (EPD) that conforms with one of the following:

1. Product specific declarations in accordance with ISO 1404
2. Environmental Product Declarations conforming to ISO 14025, 14040, 14044 and EN 15804 or ISO 21930
3. Industry Wide Product Specific Type III EPD Third Party Certification

2.3 FABRICATION, GENERAL

A. Coordinate dimensions and attachment methods of wall panels with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

B. Form metal to profiles indicated, in maximum lengths to minimize joints. Produce flat, flush, oil-can free surfaces without cracking or grain separation at bends.

2.4 GENERAL FINISH REQUIREMENTS

A. Complete mechanical finishes of flat sheet metal surfaces before fabrication where possible. After fabrication, finish all joints, bends, abrasions, and other surface blemishes to match sheet finish.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of column covers.

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

3.2 INSTALLATION

A. Install wall panels in accordance with manufacturer’s written installation instructions and shop drawings.

B. Wall Panels shall be erected plumb, level, square, true to line, securely anchored, and in proper alignment and relationship to work of other trades. Exterior joints shall be sealed by installer with backer rods and sealant.

C. Wall Panels shall be inspected before installation and shall be free from dents, scratches, and other defects.

3.3 CLEANING

A. Removal of protective covering shall occur immediately after installation to prevent adhesive transfer.

B. Clean all surfaces following installation according to manufacturer's written instructions.

1. Cleaning: Refer to section 01 74 23 "Final Cleaning" for approved cleaning products.

3.4 PROTECTION

A. Protect finishes from damage during construction period. Remove temporary protective coverings at time of Substantial Completion.

END OF SECTION 09 84 00

SECTION 09 84 33 - SOUND-ABSORBING WALL UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes shop-fabricated, fabric-wrapped panel units tested for acoustical performance, including:

1. Sound-absorbing wall panels.

B. Related Sections:

1. Section 09 00 01 “Finish Key” for finish selection information.

1.2 DEFINITIONS

A. NRC: Noise Reduction Coefficient.

B. SAA: Sound Absorption Average.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of fabric facing, panel edge, core material, and mounting indicated.

B. Sustainable Design Submittals:

1. Product Data: Documentation for Low Emitting Materials

C. Shop Drawings: For sound-absorbing wall units. Include mounting devices and details; details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge and core materials.

1. Include elevations showing panel sizes and direction of fabric weave and pattern matching.

D. Samples for Initial Selection: For each type of fabric facing from sound-absorbing wall unit manufacturer's full range.

E. Samples for Verification: For the following products, prepared on Samples of size indicated below:

1. Fabric: Full-width by approximately 36-inch-long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
2. Panel Edge: 12-inch-long Sample(s) showing each edge profile, corner, and finish.
3. Core Material: 12-inch-square Sample at corner.
4. Mounting Devices: Full-size Samples.
5. Assembled Panels: Approximately 36 by 36 inches, including joints and mounting methods.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Electrical outlets, switches, and thermostats.
2. Items penetrating or covered by sound-absorbing wall units including the following:
   a. Lighting fixtures.
   b. Air outlets and inlets.
   c. Speakers.
   d. Alarms.
   e. Sprinklers.
   f. Access panels.
3. Show operation of hinged and sliding components covered by or adjacent to sound-absorbing wall units.

B. Product Certificates: For each type of sound-absorbing wall unit, from manufacturer.

C. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sound-absorbing wall units to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal recommendations.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials from same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fabric: For each fabric, color, and pattern installed, provide length equal to 10 percent of amount installed, but no fewer than 10 yards.
2. Mounting Devices: Full-size units equal to 5 percent of amount installed, but no fewer than five devices, including unopened adhesives.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain sound-absorbing wall units from single source from single manufacturer.

B. Fire-Test-Response Characteristics: Provide sound-absorbing wall units meeting the following as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. Surface-Burning Characteristics: As determined by testing per ASTM E 84.
   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 450 or less.
2. Fire Growth Contribution: Meeting acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265.

C. Mockups: Build mockups to comply with Section 01 43 39 (Visual Mock-Up Requirements".

1. Build mockup of typical wall area as shown on Drawings. Include intersection of wall and ceiling, corners, and perimeters.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

D. Preinstallation Conference: Conduct conference at Project site.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with fabric and sound-absorbing wall unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not install sound-absorbing wall units until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Lighting: Do not install sound-absorbing wall units until a permanent level of lighting is provided on surfaces to receive the units.

C. Air-Quality Limitations: Protect sound-absorbing wall units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.

D. Field Measurements: Verify locations of sound-absorbing wall units and actual dimensions of openings and penetrations by field measurements before fabrication.

1.10 WARRANTY

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

1. Failures include, but are not limited to the following:
   a. Acoustical performance.
   b. Fabric sagging, distorting, or releasing from panel edge.
   c. Warping of core.
2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOUND-ABSORBING WALL UNITS

A. Products

1. Refer to Section 09 00 01 “Finish Key”.

B. Sound-Absorbing Wall Panel: Manufacturer's standard ultra-high impact panel construction consisting of facing material laminated to front face, edges, and back edge border of core.

1. Mounting: Back mounted with manufacturer's standard metal z-clips, secured to wall-mounted rails.
2. Core: Manufacturer's standard glass-fiber board.
   a. Core-Face Layer: Manufacturer's standard impact-resistant, acoustically transparent, perforated copolymer sheet.
3. Edge Construction: Manufacturer's standard chemically hardened core with no frame.
4. Edge Profile: Square.
5. Corner Detail in Elevation: Square with continuous edge profile indicated.
6. Reveals between Panels: Flush reveals as selected by Architect from manufacturer's full range or as indicated on Drawings.
7. Facing Material: as indicated in Section 09 00 01 “Finish Key.”
8. Acoustical Performance: Sound absorption NRC of not less than 0.65 according to ASTM C 423 for Type A mounting according to ASTM E 795.
9. Nominal Overall Panel Thickness: 9/16 inch minimum.
10. Panel Width: As indicated on Drawings.
11. Panel Height: As indicated on Drawings.

2.2 MATERIALS

A. Sustainability Requirements:

1. Low Emitting Materials: Comply with the requirements of the California Air Resources Board (CARB), Airborne Toxic Measure ATCM requirements for ultra-low emitting formaldehyde (ULEF) resins or no added formaldehyde resins. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

B. Core Materials: Manufacturer's standard.

1. Glass-Fiber Board: ASTM C 612, Type standard with manufacturer; nominal density of 6 to 7 lb/cu. ft., unfaced, and dimensionally stable, molded rigid board; and with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.
2. Impact-Resistant, Acoustically Transparent, Copolymer Sheet for Face Layer: 1/16- to 1/8-inch-thick layer of perforated, noncombustible, copolymer sheet laminated to face of core.

C. Facing Material: Fabric from same dye lot; color and pattern as indicated by manufacturer's designations in Section ~~09 00 01.7~~09 00 01 “Finish Key.”

D. Mounting Devices: Concealed on back of unit, recommended by manufacturer to support weight of unit, and as follows:

1. Metal Clips or Bar Hangers: Manufacturer's standard two-part metal "Z" clips, with one part of each clip mechanically attached to back of unit and the other part to substrate, designed to permit unit removal.

2.3 FABRICATION

A. General: Use manufacturer's standard construction except as otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

1. Glass-Fiber Board Cores: Chemically harden core edges and areas of core where mounting devices are attached.

B. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, or sags.

C. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.

1. Square Corners: Tailor corners.
2. Fabrics with Directional or Repeating Patterns or Directional Weave: Mark fabric top and attach fabric in same direction so pattern or weave matches in adjacent units.

D. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:

1. Thickness.
2. Edge straightness.
3. Overall length and width.
4. Squareness from corner to corner.
5. Chords, radii, and diameters.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fabric, fabricated units, substrates, areas, and conditions, for compliance with requirements, installation tolerances, and other conditions affecting performance of sound-absorbing wall units.

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

3.2 INSTALLATION

A. Install sound-absorbing wall units in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

B. Comply with sound-absorbing wall unit manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

C. Align and level fabric pattern and grain among adjacent units.

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb and Level: Plus or minus 1/16 inch.

B. Variation of Panel Joints from Hairline: Not more than 1/32 inch wide.

3.4 CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

C. Refer to Section 01 35 46 “Indoor Air Quality” and Section 01 74 23 “Final Cleaning” for additional requirements.

END OF SECTION 09 84 33

SECTION 09 91 13 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on exterior substrates.

B. Related Requirements:

1. Section 05 50 00 "Metal Fabrications" for shop priming metal fabrications.
2. Section 05 52 13 "Pipe and Tube Railings" for shop priming pipe and tube railings.
3. Section 09 96 00 "High-Performance Coatings" for tile-like coatings.

1.2 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inchessquare.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gallonof each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals in. Refer to Section 01 43 39 “Visual Mock-up Requirements” for additional requirements.

1. Final approval of color selections will be based on mockups.
   a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

~~2.1 MANUFACTURERS~~

~~A. Products: Subject to compliance with requirements, provide product listed in Section 09 00 01 “Finish Key”.~~

~~2.2~~2.1 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

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

C. Colors: As indicated in Section 09 00 01 “Finish Key”.

~~2.3~~2.2 GALVANIZING REPAIR PAINT

A. High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Masonry (Clay and CMUs): 12 percent.
3. Portland Cement Plaster: 12 percent.
4. Gypsum Board: 12 percent.

C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.

D. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

H. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Paint entire exposed surface of window frames and sashes.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:
    a. Equipment, including panelboards.
    b. Uninsulated metal piping.
    c. Uninsulated plastic piping.
    d. Pipe hangers and supports.
    e. Metal conduit.
    f. Plastic conduit.
    g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

A. Installer shall provide field quality control by certified staff and shall provide the following reports and checklists.

1. BECxA shall provide initial BECx checklists. Contractor shall provide weekly updates verifying all locations have been inspected and are free of installation defects and damage.

a. BECx Checklists shall include specific locations of the work and specific location and description of any repairs.
b. BECx checklist shall be completed in its entirety and shall be provided weekly to the Construction Manager, Architect, and Owner.

2. Provide field inspection reports within 5 working days of inspection.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. CMU Substrates:

1. Latex over Alkali-Resistant Primer System MPI EXT 4.2L:
   a. Prime Coat: Primer, alkali resistant, water based, MPI #3.
   b. Intermediate Coat: Latex, exterior, matching topcoat.
   c. Topcoat: Latex, exterior, low sheen (MPI Gloss Level 3-4), MPI #15.

B. Steel and Iron Substrates:

1. Water-Based Light Industrial Coating System MPI EXT 5.1C:
   a. Prime Coat: Primer, alkyd, anti-corrosive for metal, MPI #79.
   b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
   c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5), MPI #163.

C. Galvanized-Metal Substrates:

1. Water-Based Light Industrial Coating System MPI EXT 5.3J:
   a. Prime Coat: Primer, galvanized, water based, MPI #134.
   b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
   c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5), MPI #163.

END OF SECTION 09 91 13

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on interior substrates.

B. Related Requirements:

1. Section 05 50 00 "Metal Fabrications" for shop priming metal fabrications.
2. Section 05 51 13 "Metal Pan Stairs" for shop priming metal pan stairs.
3. Section 05 52 13 "Pipe and Tube Railings" for shop priming pipe and tube railings.
4. Section 09 96 00 "High-Performance Coatings" for tile-like coatings.

1.2 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Paints and Coatings
2. Product Certificates: Provide the following:
   a. Corporate Sustainability Reporting (CSR’s)
   b. Health Product Declarations (HPD’s)

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.

4. Label each Sample for location and application area.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gallon of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals in. Refer to Section 01 43 39 “Visual Mock-up Requirements” for additional requirements.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
   a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
   b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups.
   a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Interior Paint types as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

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

C. Low Emitting Paints & Coatings

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

D. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard

E. Corporate Sustainability Report: Provide third-party verified Corporate Sustainability Report (CPD) including impacts of extraction operations and activities associated with the manufacturer’s product and product’s supply chain conforming the following:

1. Global Reporting Initiative (GRI) Sustainability report
2. Organization for Economic Co-operation and Development (OOECD) Guidelines for Multinational Enterprises.
3. U.N. Global Compact: Communication of Progress
4. ISO 26000: 2010 Guidance on Social Responsibility
5. USGBC Approved Program: Other approved programs meeting the CSR criteria.

F. Colors: As indicated in Section 09 00 01 “Finish Key”.

2.3 GALVANIZING REPAIR PAINT

A. High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Masonry (Clay and CMUs): 12 percent.
2. Gypsum Board: 12 percent.

3. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
2. Refer to Section 01 74 23 “Final Cleaning” for additional requirements.

D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in equipment rooms:
   a. Equipment, including panelboards.
   b. Uninsulated metal piping.
   c. Pipe hangers and supports.
   d. Metal conduit.
   e. Tanks that do not have factory-applied final finishes.
   f. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
2. Paint the following work where exposed in occupied spaces:
   a. Equipment, including panelboards.
   b. Uninsulated metal piping.
   c. Pipe hangers and supports.
   d. Metal conduit.
   e. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
   f. Other items as directed by Architect.
3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 INTERIOR PAINTING SCHEDULE

A. CMU Substrates:

1. Latex System MPI INT 4.2A:
   a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
   b. Intermediate Coat: Latex, interior, matching topcoat.
   c. Topcoat: Latex, interior (MPI Gloss Level 3), MPI #52.

B. Steel Substrates:

1. Water-Based Dry-Fall System MPI INT 5.1C:
   a. Prime Coat: Shop primer specified in Section where substrate is specified.
   b. Topcoat: Dry fall, water based, for galvanized steel, flat (MPI Gloss Level 1), MPI #133.

C. Galvanized-Metal Substrates:

1. Water-Based Dry-Fall System MPI INT 5.3H:
   a. Prime Coat: Dry fall, water based, for galvanized steel, matching topcoat.
   b. Topcoat: Dry fall, water based, for galvanized steel, flat (MPI Gloss Level 1), MPI #133.

~~C.~~D. Gypsum Board Substrates:

1. Latex over Latex Sealer System MPI INT 9.2A:
   a. Prime Coat: Primer sealer, latex, interior, MPI #50.
   b. Prime Coat: Latex, interior, matching topcoat.
   c. Intermediate Coat: Latex, interior, matching topcoat.
   d. Topcoat: Latex, interior (MPI Gloss Level 3), MPI #52.

END OF SECTION 09 91 23

SECTION 09 94 13 - TEXTURED PLASTER FINISH

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (including all sustainability requirements), apply to this Section.

1.2 SUMMARY

A. Section Includes

1. Interior decorative polished plaster finish system for installation over walls.

B. Related Sections

1. Section 09 29 00 “Gypsum Board” for preparation of substrate.

1.3 REFERENCES

A. ASTM D 1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes; 1998.

B. ASTM D 2486 - Standard Test Method for Scrub Resistance of Wall Paints; 1996.

C. ASTM D 3363 - Standard Test Method for Film Hardness by Pencil Test; 1992a.

D. ASTM E 84 - Standard Test method for Surface Burning Characteristics of Building Materials; 1999.

E. ASTM D 3273 – Standard Test Method for Resistance to the Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

F. ASTM D 3274 – Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation.

G. ASTM D 3960 – Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.

1.4 SYSTEM PERFORMANCE REQUIREMENTS

A. Polished plaster shall be tested by a qualified independent testing agency for the following properties according to the following test methods:

1. Pencil Hardness: Minimum of 5H+ when tested in accordance with ASTM D3363.
2. Scrub Resistance: Minimum 10,000 cycles using 10 grams of scrubbing medium and 5 grams of water applied by brush.
3. Chemical Exposure: Passes ASTM D 1308.
4. Mold Resistance – Minimum rating of 10 when tested according to ASTM D 3273 and D 3274.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer's technical data on products specified, including installation instructions.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 "Sustainable Design Requirements – LEED V4 BD+C".

1. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Paints and Coatings

C. Shop Drawings: Indicate designs, colors, and locations.

D. Samples: Submit three samples, 6 x 6 inches in size, illustrating finish color and texture.

E. Qualification Data: Certificate issued by distributor indicating that installer has attended training class and is authorized to install specified product.

F. Warranty: Sample copy of manufacturer's warranty stating obligations, remedies, limitations, and exclusions of warranty.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of this Section with a minimum of one year documented experience. Include list of at least three completed projects of similar scope with project names and addresses and names and addresses of architects and owners. Installers must have attended manufacturer's training class.

B. Fire-Test-Response Characteristics: Provide finished system with the following surface-burning characteristics as determined per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Flame Spread: 10 or less.
2. Smoke Contribution: 10 or less.

C. Mockups: Build mockups as indicated in Section 01 43 39 "Visual Mock-up Requirements".

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the construction site in their original packaging with manufacturer's labels identifying manufacturer and product; color designation; lot number; and date of manufacture.

B. Inspect materials upon delivery and immediately report to Architect damaged or defective materials.

C. Store materials in a well ventilated area with minimum ambient temperature of 45º F. Prevent deterioration due to moisture, temperature changes, contamination, or other causes.

1.8 PROJECT CONDITIONS

A. Environmental Requirements: Do not apply polished plaster when substrate or ambient air temperatures is under 45º F or over 95º F.

B. Maintain these conditions 24 hours before, during, and after installation of polished plaster.

1.9 WARRANTY

A. Period of Warranty: 10 years.

PART 2 - PRODUCTS

2.1 TEXTURED PLASTER FINISH

A. Basis-of-Design Product: Subject to compliance with requirements, provide Textured Plaster Finish as indicated in Section 09 00 01 “Finish Key” or comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 25 00 “Substitution Procedures” and 01 60 00 “Product Requirements” for comparable product requirements.

B. Polished Plaster System: Provide manufacturer’s complete system of proprietary materials specifically formulated for compatibility with one another.

C. Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify the suitability of existing conditions before starting work. Do not begin Work of this Section until unsatisfactory conditions have been corrected.

B. Acceptable Substrate Tolerances: Verify that substrates are true and level. Substrates shall be constructed to the following tolerances:

1. ± 0.05 inches in 2 feet and ± 0.15 inches in 6 feet.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for substrate preparation.

B. Remove hardware, electrical switch and outlet plates, lighting fixtures and other items already in place that are not to receive plaster finish.

1. After completion of work, reinstall items using workers skilled in the trades involved.

C. Protect adjacent surfaces and items that are not to receive plaster finish, but which cannot be removed, from finish work. Use masking materials that will not damage protected items and surfaces.

D. Clean substrates of substances that could impair bond including mold, mildew, oil, grease, salts, contamination and dirt using methods recommended by manufacturer.

E. For gypsum board substrates, apply coats of joint compound over joints and fasteners to achieve a minimum of a Level 4 finish. Use ready-mixed or job-mixed, drying-type, all-purpose or topping compound, or proprietary product specifically formulated for joint coating. Touch up and sand as needed to produce a surface free of visual defects, tool marks, or ridges, and conforming to a smooth flat surface. Apply Polished Plaster to Regular Gypsum Board that is fire resistant and complies with ASTM C 1396.

F. Prepare all materials in accordance with manufacturer's recommendations.

3.3 INSTALLATION

A. Prime Coat: Apply K40 primer coat. Allow to dry.

B. Keycoat: Mix and apply K149 Keycoat in accordance with manufacturer's instructions. Allow to dry.

C. Finish: Apply finish coats as recommended by manufacturer to achieve desired results. Number of coats and total dry mil thickness shall be as recommended by manufacturer for specified system. Allow to dry.

D. Wax: Apply Ecowax to obtain sheen in accordance with manufacturer's instructions.

E. Provide finish free of unsightly variations in texture and other defects.

3.4 CLEANING AND PROTECTION

A. Remove temporary coverings used to protect adjacent surfaces and reinstall hardware, plates, lighting fixtures and other items previously removed.

B. Clean and repair adjacent surfaces and items soiled or damaged during Work of this Section.

1. Refer to Section 01 35 46 "Indoor Air Quality" and Section 01 74 23 "Final Cleaning" for additional requirements.

C. Maintain and protect completed polished plaster surfaces until time of acceptance at Substantial Completion.

END OF SECTION 09 94 13

SECTION 09 96 00 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of high-performance coating systems.

B. Related Requirements:

~~1. Section 05 12 13 "Architecturally Exposed Structural Steel Framing" for shop priming of structural steel with primers specified in this Section.~~
~~2.~~1. Section 09 91 13 "Exterior Painting" for general field painting.
~~3.~~2. Section 09 91 23 "Interior Painting" for general field painting.

1.2 DEFINITIONS

A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

B. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

C. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

B. Sustainable Design Documentation Submittals: Refer to section 01 81 13.14 “Sustainable Design Requirements – LEED V4 BD+C”.

1. Product Data: Documentation for Low Emitting Materials
   a. Low Emitting Materials for Paints and Coatings
2. Product Certificates: Provide the following:
   a. Corporate Sustainability Reporting (CSR’s)
   b. Health Product Declarations (HPD’s)

C. Samples for Initial Selection: For each type of topcoat product indicated.

D. Samples for Verification: For each type of coating system and each color and gloss of topcoat indicated.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

E. Product List: Cross-reference to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Coatings: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals in. Refer to Section 01 43 39 “Visual Mock-up Requirements” for additional requirements.

1. Architect will select one surface to represent surfaces and conditions for application of each coating system.
   a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
   b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mockups.
   a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

C. Do not apply exterior coatings in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide High Performance Coating types as indicated in Section 09 00 01 “Finish Key” or

comparable approved product meeting all requirements including sustainability requirements.

1. Refer to Sections 01 2500 “Substitution Procedures” and 01 6000 “Product Requirements” for comparable product requirements.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
3. Products shall be of same manufacturer for each coat in a coating system.

C. Low Emitting Paints & Coatings

1. Provide manufacture statements that confirm that the product used meets the California Department of Public Health (CDPH) Standard Method v1.1 2010 using the applicable exposure scenario.
2. Refer to Section 01 81 13.14 “Sustainable Design Requirements - LEED v4 BD+C” for additional requirements.

D. Health Product Declaration: Provide Health Product Declaration (HPD) with full disclosure of known hazards in compliance with the Health Product Declaration Open Standard

E. Corporate Sustainability Report: Provide third-party verified Corporate Sustainability Report (CPD) including impacts of extraction operations and activities associated with the manufacturer’s product and product’s supply chain conforming the following:

1. Global Reporting Initiative (GRI) Sustainability report
2. Organization for Economic Co-operation and Development (OOECD) Guidelines for Multinational Enterprises.
3. U.N. Global Compact: Communication of Progress
4. ISO 26000: 2010 Guidance on Social Responsibility
5. USGBC Approved Program: Other approved programs meeting the CSR criteria.

F. Low-Emitting Materials: Interior paints and coatings shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers" and additional requirements found in Section 01 81 13.14 “Sustainable Design Requirements – LEED v4 BD+C”.

G. Colors: As indicated in Section 09 00 01 “Finish Key”.

2.3 SOURCE QUALITY CONTROL

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Fiber-Cement Board: 12 percent.
3. Masonry (Clay and CMUs): 12 percent.
4. Gypsum Board: 12 percent.
5. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.
2. Refer to Section 01 74 23 “Final Cleaning” for additional requirements.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

1. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi at 6 to 12 inches.
2. Abrasive blast clean surfaces to comply with SSPC-SP 7/NACE No. 4.

E. Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or alkalinity of mortar joints exceeds that permitted in manufacturer's written instructions.

1. Clean surfaces with pressurized water. Use pressure range of 100 to 600 psi at 6 to 12 inches.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.

3.3 APPLICATION

A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for coating and substrate indicated.
2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Coat backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.

1. Contractor shall touch up and restore coated surfaces damaged by testing.
2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

B. Installer shall provide field quality control by certified staff and shall provide the following reports and checklists.

1. BECxA shall provide initial BECx checklists. Contractor shall provide weekly updates verifying all locations have been inspected and are free of installation defects and damage.
   a. BECx Checklists shall include specific locations of the work and specific location and description of any repairs.
   b. BECx checklist shall be completed in its entirety and shall be provided weekly to the Construction Manager, Architect, and Owner.
2. Provide field inspection reports within 5 working days of inspection.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage to work of other trades by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Concrete Substrates, Vertical Surfaces:

1. Epoxy System MPI EXT 3.1D:
   a. Prime Coat: Epoxy, matching topcoat.
   b. Intermediate Coat: Epoxy, matching topcoat.
   c. Topcoat: Epoxy, high build, low gloss, MPI #108.

B. CMU Substrates:

1. Epoxy System MPI EXT 4.2E:
   a. Block Filler: Block filler, epoxy, MPI #116.
   b. Intermediate Coat: Epoxy, matching topcoat.
   c. Topcoat: Epoxy, high build, low gloss, MPI #108.

C. Steel Substrates:

1. Epoxy System MPI EXT 5.1F:
   a. Prime Coat: Primer, epoxy, anti-corrosive, for metal, MPI #101.
   b. Intermediate Coat: Epoxy, high build, low gloss, MPI #108.
   c. Topcoat: Epoxy, high build, low gloss, MPI #108.

D. Galvanized-Metal Substrates:

1. Epoxy System MPI EXT 5.3C:
   a. Prime Coat: Primer, epoxy, anti-corrosive, for metal, MPI #101.
   b. Intermediate Coat: Epoxy, matching topcoat.
   c. Topcoat: Epoxy, high build, low gloss, MPI #108.

3.7 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. CMU Substrates:

1. Epoxy System MPI INT 4.2F:
   a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
   b. Intermediate Coat: Epoxy, matching topcoat.
   c. Topcoat: Epoxy, high build, low gloss, MPI #108.

B. Gypsum Board Substrates:

1. Epoxy, High-Build System MPI INT 9.2N:
   a. Prime Coat: Primer sealer, latex, interior, MPI #50.
   b. Intermediate Coat: High-build epoxy, matching topcoat.
   c. Topcoat: High-build epoxy, low gloss, MPI #108.

C. Steel Substrates:

1. Epoxy-Modified Latex System MPI INT 5.1K:
   a. Prime Coat: Primer, rust inhibitive, water based, MPI #107.
   b. Intermediate Coat: Epoxy-modified latex, interior, matching topcoat.
   c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5), MPI #215.

END OF SECTION 09 96 00