

PROJECT MANUAL

WINDOW REPLACEMENT SHAKOPEE FIRE STATION NO.2

SHAKOPEE, MN

**March 1, 2018
Project No. 18010.00**

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SECTION 00 0110

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SECTION 07 1900
WATER REPELLENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Water repellents applied to exterior masonry surfaces.
- B. Pressure washing.

1.02 REFERENCE STANDARDS

- A. ASTM C67 - Brick and Structural Clay Tile, Part 7 - Water Absorption; 98% reduction in water absorption.
 - 1. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2013).
- B. ASTM D5095 - Standard Test Method for Determination of the Nonvolatile Content in Silanes, Siloxanes, and Silane-Siloxane Blends Used in Masonry Water Repellent Treatments; 1991 (Reapproved 2013).
- C. ASTM E514 - Water Permeance of Masonry; 100% reduction in leakage rate over the control; control wall must have a leakage rate of at least 2.0 liters/hour.
- D. ASTM G23 - Accelerated Weathering for 2000 hours; only 5% loss effectiveness over initial water repellency.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a meeting at least one week prior to starting work; require attendance of affected installers; invite Architect and Owner.

1.04 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention; cautionary procedures required during application.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Field Reports: Report whether manufacturer's "best practices" are being followed; if not, state corrective recommendations. Email report to Architect the same day as inspection occurs; mail report on manufacturer's letterhead to Architect within 2 days after inspection.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Water Repellent Material: Two gallons of the type installed.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years experience.
- C. Owner reserves the right to provide continuous independent inspection of surface preparation and application of water repellent.

1.06 MOCK-UP

- A. Prepare a representative surface 36 by 36 inch in size using specified materials and preparation and application methods on surfaces identical to those to be coated; approved mock-up constitutes standard for workmanship.
- B. Locate where directed.

- C. Mock-up may remain as part of the Work.

1.07 FIELD CONDITIONS

- A. Protect liquid materials from freezing.
- B. Do not proceed with application on materials if ice or frost is covering the substrate.
- C. Do not proceed with application of materials in rainy conditions or heavy rain is anticipated within 4 hours after application.
- D. Do not apply water repellent when ambient temperature is lower than 20 degrees F or higher than 100 degrees F.
- E. Verify compatibility with curing compounds, patching materials, repair mortar, sealants, etc., to be used on masonry surfaces to ensure compatibility with the water repellent.

1.08 WARRANTY

- A. Manufacturer shall warrant system for a period of 10 years, labor and materials, from Date of Substantial Completion against conditions noted below. When notified in writing from the Owner, Manufacturer shall correct said deficiencies promptly and without inconvenience and cost to the Owner.
 - 1. Loss of water repellency: Brick Masonry - 1.0 mil/20 minutes or greater (80 mph wind driven rain equivalent.)

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Silane Repellent for Brick Masonry:
 - 1. Protectosil Chem-Trete 40 VOC, Evonik Degussa Building A&S Division; 1.800.828.0919.
 - 2. Substitutions: Not permitted.

2.02 MATERIALS

- A. Surface appearance: No change in the surface appearance or texture.
- B. Penetration: Visual penetration into brick - 0.25 inches average.
- C. Product shall comply with State and local regulations concerning AIM (Architectural, Industrial and Maintenance) coatings regarding VOC. The use of 1,1,1 trichloroethane shall not be allowed.
- D. Water Repellent: Non-glossy, colorless, penetrating, water-vapor-permeable, non-yellowing sealer, that dries invisibly leaving appearance of substrate unchanged.
 - 1. Applications: Vertical surfaces.
 - 2. Number of Coats: As recommended by manufacturer.
 - 3. VOC Content: Less than 600 g/L, when tested in accordance with ASTM D3960 or ASTM D5095.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify joint sealants are installed and cured.
- C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of water repellent.

3.02 PREPARATION

- A. Protection of Adjacent Work:
 - 1. Protect adjacent landscaping, property, and vehicles from drips and overspray.
 - 2. Protect adjacent surfaces not intended to receive water repellent.
- B. Prepare surfaces to be coated as recommended by water repellent manufacturer for best results.
- C. Remove loose particles and foreign matter.

- D. Remove oil and foreign substances with a chemical solvent that will not affect water repellent.
- E. Pressure wash surfaces to be coated:
 - 1. Firm Masonry (Concrete Masonry Units, Brick, and Dense Stone): High pressure wash at 1500 to 4000 psi, at 6 to 12 inches from surface.
 - 2. Weathered Masonry (Brick and Stone): Pressure wash at 600 to 1500 psi at 6 inches from surface.
- F. Allow surfaces to dry completely to degree recommended by water repellent manufacturer before starting coating work.

3.03 APPLICATION

- A. Product shall be applied as supplied by the manufacturer without dilution or alteration.
- B. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended as producing the best results.
- C. Apply at a rate of 125 SF/gal by airless spray, continuously over entire surface, with a low-pressure (15psi) sprayer with a fan nozzle, flooding the surface to obtain uniform coverage unless otherwise recommended by the manufacturer. Field tests may determine that a heavier rate of application is necessary to meet the performance requirements.
- D. Apply one coat, minimum, or as recommended by manufacturer.
- E. Remove water repellent from unintended surfaces immediately by a method instructed by water repellent manufacturer.
- F. Provide manufacturer's field service representative to inspect preparation and application work to ensure that manufacturer's "best practices" for preparation and application are being followed.

3.04 CLEANING

- A. As Work Progresses: Clean spillage and overspray from adjacent surfaces using materials and methods as recommended by water repellent manufacturer.
- B. Remove protective coverings from adjacent surfaces when no longer needed.

3.05 COMPLETION

- A. Work that does not conform to specified requirements shall be corrected and/or replaced as directed by the Owner's representative at the contractor's expense without extension of time.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 08 4313 - Aluminum-Framed Storefronts.
- B. Section 08 8000 - Glazing: Glazing sealants and accessories.
- C. Section 09 2116 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.
- D. Section 12 3600 - Sills: New window sills.

1.03 REFERENCE STANDARDS

- A. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- D. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).
- E. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2014.
- F. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants; 2002 (Reapproved 2013).
- G. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2013.
- H. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015.
- I. SWRI (VAL) - SWR Institute Validated Products Directory; Current Listings at www.swrionline.org.

1.04 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedure
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
 - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 - 2. List of backing materials approved for use with the specific product.
 - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 - 4. Substrates the product should not be used on.
 - 5. Substrates for which use of primer is required.
 - 6. Substrates for which laboratory adhesion and/or compatibility testing is required.
 - 7. Installation instructions, including precautions, limitations, and recommended backing materials and tools.
 - 8. Sample product warranty.
 - 9. Certification by manufacturer indicating that product complies with specification requirements.
 - 10. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.

- C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.
- D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.
- F. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

1.05 QUALITY ASSURANCE

- A. Maintain one copy of each referenced document covering installation requirements on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.
- D. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or other applicable method as recommended by manufacturer.

1.06 WARRANTY

- A. See Division 1 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
 - 1. BASF Construction Chemicals-Building Systems; www.buildingsystems.basf.com.
 - 2. Dow Corning Corporation; www.dowcorning.com/construction/sle.
 - 3. Pecora Corporation; www.pecora.com.
 - 4. Tremco Global Sealants; www.tremcosealants.com.
 - 5. Sherwin-Williams Company; www.sherwin-williams.com.
 - 6. Sika Corporation; www.usa-sika.com.
 - 7. W.R. Meadows, Inc; www.wrmeadows.com/sle.
 - 8. Substitutions: See Division 1 - Product Requirements.
- B. Self-Leveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
 - 1. Adhesives Technology Corporation; www.atcepoxy.com.
 - 2. BASF Construction Chemicals-Building Systems; www.buildingsystems.basf.com.
 - 3. Bostik Inc; www.bostik-us.com.
 - 4. Dow Corning Corporation; www.dowcorning.com/construction/sle.
 - 5. Pecora Corporation; www.pecora.com.
 - 6. Tremco Global Sealants; www.tremcosealants.com.
 - 7. Sherwin-Williams Company; www.sherwin-williams.com.
 - 8. Sika Corporation; www.usa-sika.com.
 - 9. W.R. Meadows, Inc; www.wrmeadows.com/sle.
 - 10. Substitutions: See Division 1 - Product Requirements.

2.02 JOINT SEALANT APPLICATIONS

- A. Scope:
 - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on the drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. Joints between different exposed materials.
 - c. Openings below ledge angles in masonry.
 - d. Other joints indicated below.
 - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
 - a. Joints between door, window, and other frames and adjacent construction.
 - b. Other joints indicated below.
 - 3. Do not seal the following types of joints.
 - a. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
 - b. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
- B. Exterior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
- C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

2.03 JOINT SEALANTS - GENERAL

- A. Colors: As selected from Manufacturer's standard pallet.

2.04 NONSAG JOINT SEALANTS

- A. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
 - 1. Movement Capability: Plus and minus 25 percent, minimum.

2.05 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
 - 1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
 - 2. Type for Joints Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type B - Bi-Cellular Polyethylene.
 - 3. Open Cell: 40 to 50 percent larger in diameter than joint width.
 - 4. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.
 - 5. Manufacturers:
 - a. "Sof Rod" by Nomaco.
 - b. Substitutions: See Division 1 - Product Requirements.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joints are ready to receive work.

- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location shown in the test plan.
 - 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
 - 2. Notify Architect of date and time that tests will be performed, at least 7 days in advance.
 - 3. Record each test on Preinstallation Adhesion Test Log as indicated.
 - 4. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
 - 5. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 FIELD QUALITY CONTROL

- A. Perform field quality control inspection/testing.
- B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.05 CLEANING

- A. Clean adjacent soiled surfaces.
- B. Protect sealants until cured.

3.06 POST-OCCUPANCY

- A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at the low temperature in the thermal cycle. Report failures immediately and repair.

END OF SECTION

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SECTION 08 4313

ALUMINUM-FRAMED STOREFRONTS

<<<<<<<<< UPDATE NOTES

OPTIONAL CHECKLIST

BASIS OF DESIGN:

A particular manufacturer's specific storefront product is often used as the "Basis of Design". The specification can explicitly list that product or not, depending on how manufacturer names and brand names are to be handled. Select the approach to be taken:

Don't specify any manufacturer names or brand names at all.

Don't specify "Basis of Design" products but include list of acceptable manufacturers.

Specify particular manufacturer/brand name product(s) as "Basis of Design" for the following categories of products, with or without a list of other acceptable manufacturers:

Storefront for insulating glazing.

Storefront for monolithic glazing.

Entrance doors.

SELECT OTHER COMPONENTS TO BE SPECIFIED:

Interior framing, such as for vestibules.

Solid infill panels, <<insulated; or not insulated>>.

Matching doors.

Weatherstripping by door manufacturer.

Other door hardware, <<manufacturer's standard hardware; to be specified elsewhere; or specified by brand name or other description>>.

Operable window sash, <<project-out; project-in; or specified elsewhere>>.

Finish for all exposed surfaces: <<Class I natural anodized; Class I color anodized; Class II natural anodized; Class II color anodized; Natural anodized with organic seal; Color anodized with organic seal; Superior performing organic coatings; High performance organic coatings; Pigmented organic coatings; or Various finish types, specified elsewhere>>.

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Infill panels of <<metal; glass; and _____>>.
- C. Aluminum doors<<and frames; _____; or None - N/A>>.
- D. Weatherstripping.
- E. Door hardware.

1.02 RELATED REQUIREMENTS

- A. Section _____: Preparation of adjacent work to receive work of this section.
- B. Section 05 1200 - Structural Steel Framing: Steel attachment members.
- C. Section 05 5000 - Metal Fabrications: Steel attachment devices.
- D. Section 07 2500 - Weather Barriers: Sealing framing to weather barrier installed on adjacent construction.
- E. Section 07 8400 - Firestopping: Firestop at system junction with structure.

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- F. Section **07 9200 - Joint Sealants**: Sealing joints between frames and adjacent construction.
- G. Section **08 4229 - Automatic Entrances**.
- H. Section **08 4233 - Revolving Door Entrances**.
- I. Section **08 4413 - Glazed Aluminum Curtain Walls**.
- J. Section **08 5113 - Aluminum Windows: Operable sash within glazing system**.
- K. Section **08 7100 - Door Hardware: Hardware items other than specified in this section**.
- L. Section **08 8000 - Glazing**: Glass and glazing accessories.
- M. Section **09 9123 - Interior Painting: Field painting of <<interior surface of infill panels; and >>**.
- N. Section **12 2113 - Horizontal Louver Blinds: Attachments to framing members**.
- O. Section **12 2216 - Drapery Track and Accessories: Drapery or curtain track supports and attachments to framing members**.
- P. Section **12 2400 - Window Shades: Attachments to framing members**.
- Q. Section _____: **Wall-mounted fintube convectors and supports attached to framing members**.
- R. Section _____: **Placement of structural supporting anchors**.
- S. Section _____: **Supply of <<structural supporting anchors; or >> for placement by this section**.
- T. Section _____: **Electrical connection to low voltage LED lighting system**.

1.03 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- E. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum; 2015.
- F. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- G. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2015.
- H. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.
- I. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.
- J. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- K. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- L. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- M. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

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- N. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- O. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- P. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- Q. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- R. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- S. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).
- T. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.
- U. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2014a.
- V. FLA (PAD) - Florida Building Code Online - Product Approval Directory; database at www.floridabuilding.org.
- W. Miami (APD) - Approved Products Directory; Miami-Dade County; database at www.miamidade.gov/building/pc-search_app.asp.
- X. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- Y. NFRC 100 - Determining Fenestration Product U-Factors.
- Z. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittances at Normal Incidence.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting <<one week; or _____>> before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section **01 3000 - Administrative Requirements, for submittal procedures.**
- B. See Division 1 - Administrative Requirements, for submittal procedures.
- C. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, << door hardware,; _____; or None - N/A>> internal drainage details << and _____; or None - N/A>>.
- D. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- E. Samples: Submit <<two; or _____>> samples _____ x _____ inches in size illustrating finished aluminum surface, glass << infill panels; _____; or None - N/A>>, glazing materials.
- F. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
- G. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.

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- H. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- I. Report of field testing for water leakage.
- J. Designer Qualifications Statement.
- K. Manufacturer Qualifications Statement.
- L. Installer Qualifications Statement.
- M. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
- B. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Minnesota.
- C. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least <<three; or ____>> years of <<documented; ____; or None - N/A>> experience.
- D. Installer Qualifications: Company specializing in performing work of type specified and with at least <<three; or ____>> years of <<documented; ____; or None - N/A>> experience <<and approved by manufacturer; ____; or None - N/A>>.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with <<wrapping; strippable coating; or ____>>. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than <<40 degrees F; ____ degrees F>>. Maintain this minimum temperature during and <<48; or ____>> hours after installation.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. See Division 1 - Closeout Submittals, for additional warranty requirements.
- C. Correct defective Work within a <<five; or ____>> year period after Date of Substantial Completion.
- D. Provide <<five; or ____>> year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- E. Provide <<five; or ____>> year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 BASIS OF DESIGN -- FRAMING FOR EXTERIOR INSULATING GLAZING

- A. Center-Set Style, Wind-Borne-Debris Resistance Tested:
 - 1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; Series FL550: www.coralap.com/#sle.
 - 2. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; Series FL550T: www.coralap.com/#sle.

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3. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum<<**Series IT600 Storm Front (thermal);; Series IG600 Storm Front (non-thermal);; Series DHS-500 Hurricane Resistant Storefront (non-thermal);** or; _____>>: www.crl-arch.com/#sle.
4. Basis of Design: EFCO Corporation; Series 526, Thermal Impact-Grade Storefront Framing: www.efcocorp.com/#sle.
5. Basis of Design: _____.
6. Vertical Mullion Dimensions: <<**1-3/4 inches wide by 5 inches deep;** _____>>.
7. Vertical Mullion Dimensions: <<**2 inches wide by 4-1/2 inches deep;** _____>>.
8. Vertical Mullion Dimensions: <<**2 inches wide by 5 inches deep;** _____>>.
9. Vertical Mullion Dimensions: <<**2-1/2 inches wide by 5 inches deep;** _____>>.
- B. Front-Set Style, Wind-Borne-Debris Resistance Tested:
 1. Basis of Design: _____.
 2. Vertical Mullion Dimensions: <<**2 inches wide by 4-1/2 inches deep;** _____>>.
 3. Vertical Mullion Dimensions: <<**1-1/4 inches wide by 4-1/2 inches deep;** _____>>.
- C. Center-Set Style, Blast Mitigation Tested:
 1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; Series FL550: www.coralap.com/#sle.
 2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum<<**Series BT601 Defender (thermal);; Series BR604 Defender (non-thermal);; Series BR606 Defender (non-thermal);** or; _____>>: www.crl-arch.com/#sle.
 3. Basis of Design: _____.
 4. Vertical Mullion Dimensions: <<**2-1/2 inches wide by 5 inches deep;** _____>>.
- D. Center-Set Style, Thermally-Broken:
 1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; Series FL300T: www.coralap.com/#sle.
 2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series IT451/451-S Storefront: www.crl-arch.com/#sle.
 3. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; ArcticFront Series 45X Storefront: www.crl-arch.com/#sle.
 4. Basis of Design: EFCO Corporation; Series 403, Thermal Storefront Framing: www.efcocorp.com/#sle.
 5. Basis of Design: EFCO Corporation; Series 403I, Thermal Storefront Framing: www.efcocorp.com/#sle.
 6. Basis of Design: EFCO Corporation; Series 403X, Thermal Storefront Framing: www.efcocorp.com/#sle.
 7. Basis of Design: EFCO Corporation; Series 433, Thermal Triple-Set Storefront Framing: www.efcocorp.com/#sle.
 8. Basis of Design: Manko Window Systems, Inc; 2450xpt Series, Center Glazed - 4-1/2 inch Double Thermal Storefront: www.mankowindows.com/#sle.
 9. Basis of Design: Pittco Architectural Metals Inc; TMS 114T Storefront: www.pittcometals.com/#sle.
 10. Basis of Design: Pittco Architectural Metals Inc; TMS 152T Storefront: www.pittcometals.com/#sle.
 11. Basis of Design: Pittco Architectural Metals Inc; TMS 114XT Storefront: www.pittcometals.com/#sle.
 12. Basis of Design: Pittco Architectural Metals Inc; TMS 152XT Storefront: www.pittcometals.com/#sle.
 13. Basis of Design: _____.
 14. Vertical Mullion Dimensions: <<**2 inches wide by 4-1/2 inches deep;** _____>>.
 15. Vertical Mullion Dimensions: <<**2 inches wide by 6 inches deep;** _____>>.
 16. Vertical Mullion Dimensions: <<**2-1/4 inches wide by 4-1/2 inches deep;** _____>>.
- E. Center-Set Narrow Style, Thermally-Broken Entrance System:

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1. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Entice Series Entrance System: www.crl-arch.com/#sle.
 2. Basis of Design: _____.
 3. Vertical Mullion Dimensions: **<<1-1/8 inches wide by 2-1/2 inches deep; 2-5/8 inches wide by 2-1/2 inches deep; _____ >>**.
 4. Door Stiles: Narrow vertical stiles wrapped with metal cladding that is applied using very high bond (VHB) tape mounting strips.
 5. Door Rails: Mechanically clamping seals that eliminate the need for glass stops and controls the clamping force of EPDM glazing gasket against insulating glass units; setting blocks are factory installed.
 6. Cladding Finish: Superior performing organic coating.
 - a. Color: **<<Black; Sandstone; Stone Gray; Medium Bronze (Pearlescent); As selected by Architect from manufacturers standard colors; As selected by Architect from manufacturers standard pearlescent colors; or _____ >>**.
 7. Top Rail Height: **<<4 inch; _____ inch>>**.
 8. Bottom Rail Height: **<<4 inch; 10 inch; _____ inch>>**.
 9. Provide header adapter as required.
 10. Provide reduced sound transmission door seal kits.
 11. Low Voltage LED Lighting System: Provide fully integrated, prewired, lighting system with electrical wiring transferred through the door pivots into the entrance system without any exposed conduits.
 - a. Mounting: Flush lens over LED modules.
 - b. Lighting Film Colors: **<<As selected by Architect; Manufacturers standard colors; or _____ >>**.
 - c. Apply lighting along **<<bottom; top and bottom; or _____ >>** of the entrance door rails.
- F. Center-Set Style, Not Thermally-Broken:
1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; Series FL300: www.coralap.com/#sle.
 2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 451/451-S: www.crl-arch.com/#sle.
 3. Basis of Design: EFCO Corporation; Series 402, Non-Thermal Storefront Framing: www.efcocorp.com/#sle.
 4. Basis of Design: _____.
 5. Water Leakage Test Pressure Differential: **<<15 lbf/sq ft; _____ lbf/sq ft>>**.
 6. Vertical Mullion Dimensions: **<<1-3/4 inches wide by 4-1/2 inches deep; _____ >>**.
 7. Vertical Mullion Dimensions: **<<2 inches wide by 4-1/2 inches deep; _____ >>**.
- G. Front-Set Style, Structural Sealant Glazed Verticals, Thermally-Broken:
1. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum**<<; Series BT525 Vertical Butt Glazed;; Series BT600 Vertical Butt Glazed; or; _____ >>**: www.crl-arch.com/#sle.
 2. Basis of Design: _____.
 3. Vertical Mullion Dimensions: **<<2-1/4 inches wide by 5-1/4 inches deep; _____ >>**.
 4. Vertical Mullion Dimensions: **<<2-1/4 inches wide by 6 inches deep; _____ >>**.
- H. Front-Set Style, Structural Sealant Glazed Verticals, Not Thermally-Broken:
1. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum**<<; Series BG525 Vertical Butt Glazed;; Series BG600 Vertical Butt Glazed;; Series OS451SG Structural Vertical Glazed;; Series OS601SG Structural Vertical Glazed; or; _____ >>**: www.crl-arch.com/#sle.
 2. Basis of Design: _____.
 3. Vertical Mullion Dimensions: **<<2 inches wide by 4-1/2 inches deep; _____ >>**.
 4. Vertical Mullion Dimensions: **<<2 inches wide by 6 inches deep; _____ >>**.
 5. Vertical Mullion Dimensions: **<<2-1/4 inches wide by 5-1/4 inches deep; _____ >>**.
 6. Vertical Mullion Dimensions: **<<2-1/4 inches wide by 6 inches deep; _____ >>**.

ALL TEXT DRAFT

I. Front-Set Style, Thermally-Broken:

1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; Series FS400T: www.coralap.com/#sle.
2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum<< **Series FT451 Flush Front;; Series FT601 Flush Front; ; Series TT451 Top Notch;; Series TT601 Top Notch; or; _____** >>: www.crl-arch.com/#sle.
3. EFCO Corporation; Series 433, Thermal Triple-Set Storefront Framing: www.efcocorp.com/sle.
4. Oldcastle Building Envelope; Series 3000 Thermal MultiPlane; www.obe.com.
5. Basis of Design: EFCO Corporation; Series 406, Thermal Storefront Framing: www.efcocorp.com/#sle.
6. Basis of Design: EFCO Corporation; Series 600R Ribbon Wall, Thermal Storefront Framing: www.efcocorp.com/#sle.
7. Basis of Design: Pittco Architectural Metals Inc; TMS 114T UF Storefront: www.pittcometals.com/#sle.
8. Basis of Design: _____.
9. Vertical Mullion Dimensions: <<**2 inches wide by 4-1/2 inches deep; _____**>>.
10. Vertical Mullion Dimensions: <<**2 inches wide by 6 inches deep; _____**>>.
11. Vertical Mullion Dimensions: <<**2 inches wide by 6-1/2 inches deep; _____**>>.
12. Vertical Mullion Dimensions: <<**2-1/4 inches wide by 4-1/2 inches deep; _____**>>.
13. Vertical Mullion Dimensions: <<**2-1/4 inches wide by 6 inches deep; _____**>>.

J. Front-Set Style, Not Thermally-Broken:

1. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum <<**Series FF451 Flush Front; Series FF601 Flush Front; Series OS451; Series OS601; Series TN451 Top Notch; Series TN601 Top Notch; or _____**>>: www.crl-arch.com/#sle.
2. Basis of Design: _____.
3. Vertical Mullion Dimensions: <<**2 inches wide by 4-1/2 inches deep; _____**>>.
4. Vertical Mullion Dimensions: <<**2 inches wide by 6 inches deep; _____**>>.
5. Vertical Mullion Dimensions: <<**2-1/4 inches wide by 4-1/2 inches deep; _____**>>.
6. Vertical Mullion Dimensions: <<**2-1/4 inches wide by 6 inches deep; _____**>>.

K. Inside-Set Style, Thermally-Broken:

1. Basis of Design: EFCO Corporation; Series 433, Thermal Triple-Set Storefront Framing: www.efcocorp.com/#sle.
2. Basis of Design: _____.
3. Vertical Mullion Dimensions: <<**2 inches wide by 4-1/2 inches deep; _____**>>.

L. Other Manufacturers: Not permitted; provide the product identified as "Basis of Design".

M. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of <<**one of the manufacturers listed below;; another manufacturer.; or _____**>>

1. Coral Architectural Products, a division of Coral Industries, Inc<< _____; or None - N/A>>: www.coralap.com/#sle.
2. C.R. Laurence Company, Inc; U.S. Aluminum<< _____; or None - N/A>>: www.crl-arch.com/#sle.
3. EFCO, a Pella Company<< _____; or None - N/A>>: www.efcocorp.com/#sle.
4. EFCO, a Pella Company; www.efcocorp.com/sle.
5. Pittco Architectural Metals Inc<< _____; or None - N/A>>: www.pittcometals.com/#sle.
6. Trulite Glass & Aluminum Solutions, LLC<< _____; or None - N/A>>: www.trulite.com.
7. YKK AP America Inc<< _____; or None - N/A>>: www.ykkap.com.
8. YKK AP America Inc; www.ykkap.com.
9. Kawneer; www.kawneer.com.
10. Oldcastle Building Envelope; www.obe.com.
11. _____.

ALL TEXT DRAFT

- N. Substitutions: <<See Section 49 - 49; or Not permitted>>.
- O. Substitutions: See Division 1 - Product Requirements.
 - 1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.02 BASIS OF DESIGN -- FRAMING FOR MONOLITHIC INTERIOR GLAZING

- A. Center-Set Style, Wind-Borne-Debris Resistance Tested:
 - 1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; Series FL500 Impact, center set: www.coralap.com/#sle.
 - 2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum Series IG500 Storm Front: www.crl-arch.com/#sle.
 - 3. Basis of Design: _____.
 - 4. Vertical Mullion Dimensions: <<2 inches wide by 4-1/2 inches deep; _____ inches>>.
 - 5. Vertical Mullion Dimensions: <<2-1/2 inches wide by 5 inches deep; _____>>.
- B. Front-Set Style, Wind-Borne-Debris Resistance Tested:
 - 1. Basis of Design: _____.
 - 2. Vertical Mullion Dimensions: <<1-1/4 inches wide by 4-1/2 inches deep; _____>>.
- C. Center-Set Style:
 - 1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; Series FL200: www.coralap.com/#sle.
 - 2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series <<400/400-S; 450/450-S; or _____>>: www.crl-arch.com/#sle.
 - 3. EFCO Corporation; Series 401, Non-Thermal Storefront Framing: www.efcocorp.com/sle.
 - 4. Oldcastle Building Envelope; Series 1000; www.obe.com.
 - 5. Basis of Design: Pittco Architectural Metals Inc; Pittco EMS 114 Storefront: www.pittcometals.com/#sle.
 - 6. Basis of Design: _____.
 - 7. Vertical Mullion Dimensions: <<1-3/4 inches wide by 4 inches deep; _____>>.
 - 8. Vertical Mullion Dimensions: <<1-3/4 inches wide by 4-1/2 inches deep; _____>>.
- D. Front-Set Style, Structural Sealant Glazed Verticals:
 - 1. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum<<; **Series BG450 Vertical Butt Glazed;; Series BG520 Vertical Butt Glazed;; Series OS175SG Structural Vertical Glazed;; Series OS450SG Structural Vertical Glazed;; Series OS600SG Structural Vertical Glazed; or; _____>>**: www.crl-arch.com/#sle.
 - 2. Substitutions: See Division 1 - Product Requirements.
 - 3. Basis of Design: _____.
 - 4. Vertical Mullion Dimensions: <<2 inches wide by 2 inches deep; _____>>.
 - 5. Vertical Mullion Dimensions: <<2 inches wide by 4-1/2 inches deep; _____>>.
 - 6. Vertical Mullion Dimensions: <<2 inches wide by 6 inches deep; _____>>.
 - 7. Vertical Mullion Dimensions: <<2-1/4 inches wide by 4-1/2 inches deep; _____>>.
 - 8. Vertical Mullion Dimensions: <<2-1/4 inches wide by 5-1/4 inches deep; _____>>.
- E. Front-Set Style:
 - 1. EFCO, a Pella Company; www.efcocorp.com/sle.
 - 2. Oldcastle Building Envelope; Series 1000; www.obe.com.
 - 3. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum<<; **Series FF450 Flush Front;; Series FF600 Flush Front;; Series OS450;; Series OS600;; Series OS175; or; _____>>**: www.crl-arch.com/#sle.
 - 4. Basis of Design: _____.
 - 5. Vertical Mullion Dimensions: <<1-3/4 inches wide by 4-1/2 inches deep; _____>>.
 - 6. Vertical Mullion Dimensions: <<1-3/4 inches wide by 6 inches deep; _____>>.
 - 7. Vertical Mullion Dimensions: <<2 inches wide by 4-1/2 inches deep; _____>>.
 - 8. Vertical Mullion Dimensions: <<2 inches wide by 6 inches deep; _____>>.

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- F. Other Manufacturers: Not permitted; provide the product identified as "Basis of Design".
- G. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of **<<one of the manufacturers listed below.; another manufacturer.; or .>>**
1. Coral Architectural Products, a division of Coral Industries, Inc<<.; or None - N/A>>: www.coralap.com/#sle.
 2. C.R. Laurence Company, Inc; U.S. Aluminum<<.; or None - N/A>>: www.crl-arch.com/#sle.
 3. EFCO, a Pella Company<<.; or None - N/A>>: www.efcocorp.com/#sle.
 4. EFCO, a Pella Company; www.efcocorp.com/sle.
 5. Pittco Architectural Metals Inc<<.; or None - N/A>>: www.pittcometals.com/#sle.
 6. Trulite Glass and Aluminum Solutions, LLC<<.; or None - N/A>>: www.trulite.com.
 7. YKK AP America Inc<<.; or None - N/A>>: www.ykkap.com.
 8. YKK AP America Inc; www.ykkap.com.
 9. Kawneer; www.kawneer.com.
 10. Oldcastle Building Envelope; www.obe.com.
 11. _____.
- H. Substitutions: **<<See Section 49 - 49; or Not permitted>>**.
- I. Substitutions: See Division 1 - Product Requirements.
1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.03 BASIS OF DESIGN -- SWINGING DOORS

- A. Blast Mitigation Tested:
1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; MS381, medium stile, monolithic glazing: www.coralap.com/#sle.
 2. Basis of Design: _____.
 3. Thickness: **<<1-3/4 inches; _____ inches>>**.
- B. Wind-Borne-Debris Resistance Tested:
1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; NS281, narrow stile, monolithic glazing: www.coralap.com/#sle.
 2. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; MS381, medium stile, monolithic glazing: www.coralap.com/#sle.
 3. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series IG 500 Storm Door, medium stile: www.crl-arch.com/#sle.
 4. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series IG 600 Storm Door, medium stile: www.crl-arch.com/#sle.
 5. Basis of Design: _____.
 6. Thickness: **<<1-3/4 inches; 2-3/16 inch; _____ inches>>**.
- C. Narrow Stile, Monolithic Glazing:
1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; NS213: www.coralap.com/#sle.
 2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 250 Narrow Stile Door: www.crl-arch.com/#sle.
 3. Basis of Design: EFCO Corporation; Series D200: www.efcocorp.com/#sle.
 4. Basis of Design: Pittco Architectural Metals Inc; Narrow Stile Entrance: www.pittcometals.com/#sle.
 5. Basis of Design: _____.
 6. Thickness: **<<1-3/4 inches; _____ inches>>**.
- D. Narrow Stile, Insulating Glazing, Thermally-Broken:
1. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 250-T Narrow Stile Thermal Entrance Door: www.crl-arch.com/#sle.

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2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum Series 650-T High Performance Narrow Stile Thermal Entrance Door: www.crl-arch.com/#sle.
 3. Basis of Design: EFCO Corporation; Series D202 Thermastile: www.efcocorp.com/#sle.
 4. Basis of Design: _____.
 5. Thickness: **<<1-3/4 inches; 2 inches; 2-1/4 inches; _____ inch>>**.
- E. Narrow Stile, Insulating Glazing, Not Thermally-Broken:
1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; NS213: www.coralap.com/#sle.
 2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 250 Narrow Stile Door: www.crl-arch.com/#sle.
 3. Basis of Design: Pittco Architectural Metals Inc; Narrow Stile Entrance: www.pittcometals.com/#sle.
 4. Basis of Design: _____.
 5. Thickness: **<<1-3/4 inches; 2 inches; _____ inch>>**.
- F. Medium Stile, Monolithic Glazing:
1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; MS380: www.coralap.com/#sle.
 2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 400-T Medium Stile Thermal Door: www.crl-arch.com/#sle.
 3. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 800 Durafront Medium Stile Door: www.crl-arch.com/#sle.
 4. Basis of Design: EFCO Corporation; Series D300: www.efcocorp.com/#sle.
 5. Basis of Design: Pittco Architectural Metals Inc; Medium Stile Entrance: www.pittcometals.com/#sle.
 6. Basis of Design: Pittco Architectural Metals Inc; Monumental Medium Stile Entrance: www.pittcometals.com/#sle.
 7. Basis of Design: _____.
 8. Thickness: **<<1-3/4 inches; 1-7/8 inches; 2 inches; _____ inches>>**.
- G. Medium Stile, Insulating Glazing, **<<Not Thermally-Broken; or Thermally-Broken>>**:
1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; MS380: www.coralap.com/#sle.
 2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 400 Medium Stile Door: www.crl-arch.com/#sle.
 3. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 400-T Medium Stile Thermal Door: www.crl-arch.com/#sle.
 4. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 700-T High Performance Medium Stile Door: www.crl-arch.com/#sle.
 5. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 800 Durafront Medium Stile Door: www.crl-arch.com/#sle.
 6. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; ArcticFront Series 375-T High Performance Medium Stile Thermal Door: www.crl-arch.com/#sle.
 7. Basis of Design: EFCO Corporation; Series D302 Thermastile: www.efcocorp.com/#sle.
 8. Basis of Design: EFCO Corporation; Series D318 Durastile Heavy Duty: www.efcocorp.com/#sle.
 9. Basis of Design: Pittco Architectural Metals Inc; Medium Stile Entrance: www.pittcometals.com/#sle.
 10. Basis of Design: Pittco Architectural Metals Inc; Medium Stile Monumental Entrance: www.pittcometals.com/#sle.
 11. Basis of Design: Pittco Architectural Metals Inc; Medium Stile Thermal Entrance: www.pittcometals.com/#sle.
 12. Basis of Design: _____.
 13. Thickness: **<<1-3/4 inches; 1-7/8 inches; 2 inches; 2-1/4 inches; 2-5/8 inches; _____ inches>>**.

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H. Wide Stile, Monolithic Glazing:

1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; WS500: www.coralap.com/#sle.
2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 550 Wide Stile Door: www.crl-arch.com/#sle.
3. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 850 Wide Stile Door: www.crl-arch.com/sle.
4. Basis of Design: EFCO Corporation; Series D500: www.efcocorp.com/#sle.
5. Basis of Design: Pittco Architectural Metals Inc; Wide Stile Entrance: www.pittcometals.com/#sle.
6. Basis of Design: Pittco Architectural Metals Inc; Wide Stile Monumental Entrance: www.pittcometals.com/#sle.
7. Basis of Design: _____.
8. Thickness: **<<1-3/4 inches; 1-7/8 inches; 2 inches; _____ inches>>**.

I. Wide Stile, Insulating Glazing, **<<Not Thermally-Broken; or Thermally-Broken>>**:

1. Basis of Design: Coral Architectural Products, a division of Coral Industries, Inc; WS500: www.coralap.com/#sle.
2. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 550 Wide Stile Door: www.crl-arch.com/#sle.
3. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 550-T Wide Stile Thermal Door: www.crl-arch.com/#sle.
4. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 750-T High Performance Wide Stile Thermal Door: www.crl-arch.com/#sle.
5. Basis of Design: C.R. Laurence Company, Inc; U.S. Aluminum; Series 850 Durafront Wide Stile Door: www.crl-arch.com/#sle.
6. EFCO Corporation; Series D502 Thermastile: www.efcocorp.com/sle.
7. EFCO Corporation; Series D518 Durastile Heavy Duty: www.efcocorp.com/sle.
8. Oldcastle Building Products; AD-375 Thermal Door; www.obe.com.
9. Basis of Design: Pittco Architectural Metals Inc; Wide Stile Entrance: www.pittcometals.com/#sle.
10. Basis of Design: Pittco Architectural Metals Inc; Wide Stile Monumental Entrance: www.pittcometals.com/#sle.
11. Basis of Design: Pittco Architectural Metals Inc; Wide Stile Thermal Entrance: www.pittcometals.com/#sle.
12. Basis of Design: _____.
13. Thickness: **<<1-3/4 inches; 1-7/8 inches; 2 inches; 2-1/4 inches; _____ inches>>**.

J. Other Manufacturers: Not permitted; provide the product identified as "Basis of Design".

K. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of **<<one of the manufacturers listed below; another manufacturer.; or _____>>**

1. Coral Architectural Products, a division of Coral Industries, Inc<<_____; or None - N/A>>: www.coralap.com/#sle.
2. C.R. Laurence Company, Inc; U.S. Aluminum<<_____; or None - N/A>>: www.crl-arch.com/#sle.
3. EFCO, a Pella Company<<_____; or None - N/A>>: www.efcocorp.com/#sle.
4. EFCO, a Pella Company; www.efcocorp.com/sle.
5. Pittco Architectural Metals Inc<<_____; or None - N/A>>: www.pittcometals.com/#sle.
6. Trulite Glass & Aluminum Solutions, LLC<<_____; or None - N/A>>: www.trulite.com.
7. Kawneer; www.kawneer.com.
8. YKK AP America Inc<<_____; or None - N/A>>: www.ykkap.com.
9. YKK AP America Inc; www.ykkap.com.
10. Oldcastle Building Products; www.obe.com.
11. _____.

ALL TEXT DRAFT

- L. Substitutions: <<See Section 49 - 49; or Not permitted>>.
- M. Substitutions: See Division 1 - Product Requirements.
 - 1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.04 MANUFACTURERS

- A. Aluminum-Framed Storefront and Doors:
 - 1. Coral Architectural Products, a division of Coral Industries, Inc<<____; or None - N/A>>: www.coralap.com/#sle.
 - 2. C.R. Laurence Company, Inc; U.S. Aluminum<<____; or None - N/A>>: www.crl-arch.com/#sle.
 - 3. EFCO Corporation<<____; or None - N/A>>: www.efcocorp.com/#sle.
 - 4. EFCO Corporation; Series 403 (T);www.efcocorp.com/sle.
 - 5. Kawneer North America<<____; or None - N/A>>: www.kawneer.com.
 - 6. Manko Window Systems, Inc<<____; or None - N/A>>: www.mankowindows.com.
 - 7. Oldcastle BuildingEnvelope<<____; or None - N/A>>: www.oldcastlebe.com.
 - 8. Oldcastle Building Envelope; Series 3000 Thermal Multiplane; www.obe.com.
 - 9. Pittco Architectural Metals Inc<<____; or None - N/A>>: www.pittcometals.com/#sle.
 - 10. Tubelite, Inc<<____; or None - N/A>>: www.tubeliteinc.com.
 - 11. Tubelite, Inc; TU24000; www.tubeliteinc.com.
 - 12. Trulite Glass & Aluminum Solutions, LLC<<____; or None - N/A>>: www.trulite.com.
 - 13. United States Aluminum Corp<<____; or None - N/A>>: www.usalum.com.
 - 14. YKK AP America Inc<<____; or None - N/A>>: www.ykkap.com.
 - 15. _____.
 - 16. Substitutions: <<See Section 49 - 49; or Not permitted>>.
 - 17. Substitutions: See Division 1 - Product Requirements.

2.05 STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Unitized, shop assembly.
 - 2. Glazing Rabbet: For <<1 inch; ____ inch>> insulating glazing.
 - 3. Glazing Rabbet: For <<1/4 inch; ____ inch>> monolithic glazing.
 - 4. Glazing Position: <<Centered (front to back); Front-set; or ____>>.
 - 5. Vertical Mullion Dimensions: <<2 inches wide by 4-1/2 inches deep; 2 inches wide by 4 inches deep; 2 inches wide by 5 inches deep; ____>>.
 - 6. Finish: <<Class I natural anodized; Class II natural anodized; Class I color anodized; Class II color anodized; Natural anodized with organic seal; Color anodized with organic seal; Superior performing organic coatings; High performance organic coatings; Pigmented organic coatings; or ____>>.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
 - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 - c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
 - 7. Finish Color: <<Light bronze; Medium bronze; Dark bronze; Black; or ____>>.
 - 8. Finish Color: <<As scheduled; As indicated on the drawings; As selected by Architect from manufacturer's standard line; or ____>>.
 - 9. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 - 10. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.

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11. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 12. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of **<<170 degrees F; _____ degrees F>>** over a **<<12; or _____>>** hour period without causing detrimental effect to system components, anchorages, and other building elements.
 13. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
 14. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 15. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with **<< inside; or None - N/A>>** pane of glazing **<< and inner sheet of infill panel; or None - N/A>>** and heel bead of glazing compound.
 16. Preparation for Window Treatments: Provide reinforced interior horizontal head rail.
- B. Performance Requirements:
1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads **<<1.5 times; or _____>>** the design wind loads and **<<10 second; or _____>>** duration of maximum load.
 - a. Design Wind Loads: Comply with requirements of **<<applicable code; ASCE 7; or _____>>**.
 - b. Positive Design Wind Load: **_____ lbf/sq ft.**
 - c. Negative Design Wind Load: **_____ lbf/sq ft.**
 - d. Member Deflection: Limit member deflection to **<<flexure limit of glass; 1/175; or _____>>** in any direction, with full recovery of glazing materials.
 2. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection, **<<tested by independent agency in accordance with ASTM E1996 for Wind Zone _____ - Enhanced Protection; tested by independent agency in accordance with ASTM E1996 for Wind Zone 3 - Enhanced Protection; tested by independent agency in accordance with ASTM E1996 for Wind Zone 4 - Additional Protection; having Florida Building Code "FLA (PAD)" approval; having Miami-Dade County "Miami (APD)" approval; or _____>>** for Large and Small Missile impact and pressure cycling at design wind pressure.
 3. Water Penetration Resistance: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of **<<12 psf; 10 psf; 8 psf; _____ psf>>**.
 4. Air Leakage: Maximum of **<<0.06 cu ft/min sq ft; _____ cu ft/min sq ft>>** of wall area, when tested in accordance with ASTM E283 at **<<6.27 psf; _____ psf>>** pressure differential across assembly.
 5. Condensation Resistance Factor of Framing: **<<50; 60; 70; or _____>>**, minimum, measured in accordance with AAMA 1503.
 6. Overall U-value Including Glazing: **_____ Btu/(hr sq ft deg F), maximum.**
 7. Overall U-value Including Glazing: Shall meet State of Minnesota Energy Code requirements through prescriptive means required for Zone 6 as follows:
 - a. Storefront and Curtainwall: 0.36.
 - b. Operating Windows: 0.43.
 - c. Entrance Doors: 0.77.

2.06 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections **<< thermally broken with interior section insulated from exterior; None - N/A; or _____>>**, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken.
 2. Glazing Stops: **<<Flush; Applied; or _____>>**.

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3. Cross-Section: As indicated on drawings.
4. Cross-Section: x **inch nominal dimension.**
5. Structurally Reinforced Members: <<**Extruded; Formed sheet; or** >> aluminum with internal reinforcement of structural steel member as appropriate.
 - a. x **inch nominal dimension.**
- B. Glazing: As specified in Section **08 8000**.
 1. For Exterior Framing: Type .
 2. For Interior Framing: Type .
 3. Glass Spandrel Panels: Type .
- C. Infill Panels: inch thick <<**aluminum sheet; or** >>.
 1. Finish: Same as storefront.
 2. Exterior Finish: <<**Class I natural anodized; Class II natural anodized; Class I color anodized; Class II color anodized; Natural anodized with organic seal; Color anodized with organic seal; Superior performing organic coatings; High performance organic coatings; Pigmented organic coatings; or** >>.
 3. Interior Finish: <<**Same as exterior finish; Field painted in accordance with Section 09 9123; Class I natural anodized; Class II natural anodized; Class I color anodized; Class II color anodized; Natural anodized with organic seal; Color anodized with organic seal; Superior performing organic coatings; High performance organic coatings; Pigmented organic coatings; or** >>.
- D. Infill Panels: Insulated, <<**aluminum; steel; or** >> sheet face and back, with edges formed to fit glazing channel <<**and sealed; unsealed to permit air movement; or** >>.
 1. Face Sheet: inch thick.
 2. Core: <<**Glass fiber; Rigid polystyrene; Rigid polyurethane; or** >> insulation core with **R-value of** .
 3. Back Sheet: inch thick.
 4. Finish: Same as storefront.
 5. Exterior Finish: <<**Class I natural anodized; Class II natural anodized; Class I color anodized; Class II color anodized; Natural anodized with organic seal; Color anodized with organic seal; Superior performing organic coatings; High performance organic coatings; Pigmented organic coatings; or** >>.
 6. Interior Finish: <<**Same as exterior finish; Field painted in accordance with Section 09 9123; Class I natural anodized; Class II natural anodized; Class I color anodized; Class II color anodized; Natural anodized with organic seal; Color anodized with organic seal; Superior performing organic coatings; High performance organic coatings; Pigmented organic coatings; or** >>.
- E. **ALTERNATE SWING DOORS:** <<**Glazed aluminum; Flush aluminum; or** >>.
 1. Thickness: <<**1-3/4 inches; 2 inches; inches**>> - interior; 2 inches - exterior.
 2. Hinges: Continuous.
 3. Top Rail: <<**4 inches; inches**>> wide.
 4. Vertical Stiles: <<**4-1/2 inches; inches**>> wide.
 5. Bottom Rail: <<**10 inches; 6 inches; inches**>> wide.
 6. Glazing Stops: <<**Square; Beveled; or** >>.
 7. Finish: Same as storefront.
- F. Interior Sliding Storefront Doors: Full glazed extruded aluminum frame and operable panels; manual operation; bottom rollers; flat or recessed sill.
 1. Configuration and Size: As indicated on drawings.
 2. Glazing Thickness: <<**1/4 inch; 1 inch**>>.
 3. Stile Width: <<**2 inches; inches**>>.
 4. Frame Face Width: <<**1-1/2 inches; inches**>>.
 5. Provide deadlock keyed both sides on each operable panel.
 6. Manufacturers:

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- a. C.R. Laurence Company, Inc; U.S. Aluminum; Series 2000 Mall Sliding Door:
www.crl-arch.com/#sle.
 - b. Trulite Glass & Aluminum Solutions, LLC<<____; or None - N/A>>:
www.trulite.com.
 - c. _____.
 - d. Substitutions: <<See Section 49 - 49; or Not permitted>>.
- G. Oversize Sliding Storefront with Swinging Personnel Doors: Full glazed extruded aluminum frame, operable panels, and personnel doors; manual operation; bottom rollers; recessed sill track; weatherstripped.
1. Configuration and Size: As indicated on drawings.
 2. Design Wind Load: Same as for storefront.
 3. Glazing Thickness: <<1/4 inch; 1 inch>>.
 4. Stile and Frame Face Width: <<4-1/2 inches; _____ inches>>.
 5. Provide personnel doors with hardware as specified for swing doors.
 6. Manufacturers:
 - a. C.R. Laurence Company, Inc; U.S. Aluminum; Series E1200 Elephant Door:
www.crl-arch.com/#sle.
 - b. _____.
 - c. Substitutions: <<See Section 49 - 49; or Not permitted>>.
- H. Operable Sash: As specified in Section 08 5113.
- I. Operable Sash: Aluminum <<project-in hopper; project-out awning; or _____>>; finished to match storefront; <<turn handle; custodial key; or _____>> latch<< with manufacturer's standard insect screen; _____; or None - N/A>>.
- J. Sun Screens: Shop fabricated, shop finished, extruded aluminum outriggers, louvers, and fascia, free of defects impairing strength, durability or appearance.
1. Configuration: As indicated on drawings.
 2. Louver Type: <<Bar; Tube; Pipe; Airfoil; Elliptical; Slat; Trapezoidal; Perforated Panel; Mesh; or _____>>.
 3. Sun Screen Angle: _____ degrees from horizontal.
 4. Outrigger Shape: <<Straight; Bullnose; Curved; Wedge; or _____>>.
 5. Design Criteria: Design and fabricate to resist the same loads as storefront system as well as the following loads without failure, damage, or permanent deflection:
 - a. Snow: _____ psf; minimum.
 - b. Live: _____ psf; minimum.
 - c. Thermal Movement: Plus/minus <<1/8 inch; _____ inch>>, maximum.
 6. Sizes: As indicated on drawings.
 7. Shop fabricate to the greatest extent possible; disassemble if necessary for shipping.

2.07 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209 (ASTM B209M).
- C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
- D. Structural Steel Sections: ASTM A36/A36M; shop primed.
- E. Structural Supporting Anchors: See Section 05 1200.
- F. Structural Supporting Anchors Attached to Structural Steel: Design for <<bolted; or welded>> attachment.
- G. Structural Supporting Anchors Attached to Reinforced Concrete Members: Design for welded attachment to weld plates embedded in concrete.
- H. Fasteners: <<Stainless; Galvanized; or _____>> steel.

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- I. Exposed Flashings: Aluminum sheet, <<20 gage, 0.032 inch; ___ gage, ___ inch>> minimum thickness; finish to match framing members.
- J. Concealed Flashings: Galvanized steel, <<26 gage, 0.0179 inch; ___ gage, ___ inch>> minimum base metal thickness.
- K. Concealed Flashings: Stainless steel, <<26 gage, 0.0187 inch; ___ gage, ___ inch>> minimum thickness.
- L. Concealed Flashings: Sheet aluminum, <<26 gage, 0.017 inch; ___ gage, ___ inch>> minimum thickness.
- M. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.
- N. Sealant for Setting Thresholds: Non-curing butyl type.
- O. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- P. Glazing Accessories: As specified in Section 08 8000.
- Q. Shop and Touch-Up Primer for Steel Components: Zinc oxide, alkyd, linseed oil primer appropriate for use over <<hand cleaned steel; blast cleaned steel; or ___>>.
- R. Touch-Up Primer for Galvanized Steel Surfaces: <<SSPC-Paint 20, zinc rich; or ___>>.

2.08 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611<< AA-M12C22A41; ___; or None - N/A>> Clear anodic coating not less than 0.7 mils thick.
- B. Class II Natural Anodized Finish: AAMA 611<< AA-M12C22A31; ___; or None - N/A>> Clear anodic coating not less than 0.4 mils thick.
- C. Class I Color Anodized Finish: AAMA 611<< AA-M12C22A42; ___; or None - N/A>> Integrally colored anodic coating not less than 0.7 mils thick.
- D. Class I Color Anodized Finish: AAMA 611<< AA-M12C22A44; ___; or None - N/A>> Electrolytically deposited colored anodic coating not less than 0.7 mils thick.
- E. Class II Color Anodized Finish: AAMA 611<< AA-M12C22A32; ___; or None - N/A>> Integrally colored anodic coating not less than 0.4 mils thick.
- F. Class II Color Anodized Finish: AAMA 611<< AA-M12C22A34; ___; or None - N/A>> Electrolytically deposited colored anodic coating not less than 0.4 mils thick.
- G. Natural Anodized Finish with Organic Seal: AAMA 612 Clear anodic coating with non-aqueous electro-deposited organic seal; not less 0.7 mils thick.
- H. Color Anodized Finish with Organic Seal: AAMA 612 Electrolytically deposited colored anodic coating with non-aqueous electro-deposited organic seal; not less 0.7 mils.
- I. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride (PVDF) system.
 - 1. Polyvinylidene fluoride (PVDF) multi-coat thermoplastic fluoropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness of <<0.9 mil; ___ mil>>; color and gloss <<as scheduled; to match sample; as indicated on drawings; as selected from manufacturer's standard line; or ___>>.
 - a. Manufacturers:
 - 1) PPG Metal Coatings<< Duranar;; ___; or None - N/A>>:
www.ppgmetalcoatings.com/#sle.
 - 2) Sherwin-Williams Company<< SHER-NAR 5000;; ___; or None - N/A>>:
oem.sherwin-williams.com/#sle.
 - 3) _____.
 - 4) Substitutions: <<See Section 49 - 49; or Not permitted>>.
- J. High Performance Organic Coatings: AAMA 2604; multiple coats, thermally cured fluoropolymer system.

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1. Manufacturers:
 - a. Sherwin-Williams Company<< **Powdura 4000**; ; _____; or None - N/A>>;
oem.sherwin-williams.com/#sle.
 - b. _____.
 - c. Substitutions: <<**See Section 49 - 49; or Not permitted**>>.
- K. Pigmented Organic Coatings: AAMA 2603; polyester or acrylic baked enamel finish.
- L. Color: <<**Clear; Black; Light bronze; Medium bronze; Dark bronze; As scheduled; As indicated on drawings; or _____**>>.
- M. Color: As selected by **Architect from manufacturer's** <<**standard; full; custom; or _____**>> range.
- N. Color: Bronze Anodized; as selected from manufacturer's bronze pallet.
- O. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.09 HARDWARE

- A. For each door, include <<**weatherstripping; sill sweep strip; threshold; and _____**>>.
- B. Other Door Hardware: As specified in Section **08 7100**.
- C. Other Door Hardware: Storefront manufacturer's standard type to suit application.
 1. Finish on Hand-Contacted Items: <<**Polished stainless steel; Polished chrome; or _____**>>.
 2. For each door, include continuous stainless steel hinges, <<**butt hinges; pivots; push handle; pull handle; exit device; narrow stile handle latch; closer; and _____**>>.
- D. Weatherstripping: <<**Wool; or _____**>> pile, continuous<< **and replaceable; None - N/A; or _____**>>; provide on <<**all doors; all exterior doors; or _____**>>.
- E. Sill Sweep Strips: Resilient seal type,<< **retracting; None - N/A; or _____**>> of <<**neoprene; or _____**>>; provide on <<**all doors; all exterior doors; or _____**>>.
- F. Threshold: Extruded aluminum, one piece per door opening, <<**ribbed; non-slip; or _____**>> surface; provide on <<**all doors; all exterior doors; or _____**>>.
- G. Hinges: Continuous stainless steel type<< **swing clear; _____; or None - N/A**>>; <<**top and bottom; top, intermediate, and bottom; or _____**>>.
 1. Provide on <<**all doors; doors as indicated; or _____**>>.
- H. Pivots: <<**Center; Offset; or _____**>> type; <<**top and bottom; top, intermediate, and bottom; or _____**>>.
 1. Provide on <<**all doors; doors as indicated; or _____**>>.
- I. Push/Pull Set: <<**Standard configuration push/pull handles; Custom configuration push/pull handles; Locking ladder pulls; or _____**>>:
 1. Provide on <<**all doors; doors as indicated; or _____**>>.
 2. Ladder pull: Ives; 9266, Heavy 1-1/4" diameter, polished #316 Stainless Steel; 36 inches in length with flat tips.
- J. Exit Devices: <<**Panic type; Electronic egress handles; Deadbolt handles; or _____**>>.
 1. Provide on <<**all doors; doors as indicated; or _____**>>.
- K. Door Closers: <<**Concealed overhead; Concealed overhead, offset arm type used with offset top pivot; Exposed overhead; Floor mounted; or _____**>>.
 1. Provide on <<**all doors; doors as indicated; or _____**>>.
- L. Handle Latch: _____.
 1. Provide on <<**all doors; doors as indicated; or _____**>>.
- M. Locks: <<**Dead latch with thumbturn inside; Dead latch with turn handle inside; or _____**>><< **keyed cylinder outside; or None - N/A**>>.
 1. Provide on <<**all doors; doors as indicated; or _____**>>.
- N. Automatic Door Operators and Actuators: As specified in Section **08 4229**.

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PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances << aligning with adjacent work; _____; or None - N/A >>.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install << sill; and _____ >> flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation or apply spray foam in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Install << operating sash; or _____ >>.
- J. Set thresholds in bed of sealant and secure.
- K. Install hardware using templates provided.
 - 1. See Section 08 7100 for hardware installation requirements.
 - 2. See Section 08 4229 for operator and actuator installation requirements.
- L. Install glass << and infill panels; _____; or None - N/A >> in accordance with Section 08 8000, using <<glazing method required to achieve performance criteria; exterior wet/dry glazing method; exterior dry glazing method; _____ glazing method; or _____ >>.
- M. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: << 0.06 inches every 3 ft; _____ inches every 3 ft >> non-cumulative or << 1/16 inches per 10 ft; _____ inches per 10 ft >>, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: << 1/32 inch; _____ inch >>.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.
- B. See Division 1 - Quality Requirements, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.
- C. Test installed storefront for water leakage in accordance with AAMA 501.2 hose test.
- D. Test installed storefront for water penetration in accordance with ASTM E1105 with a << uniform; cyclic; or _____ >> test pressure difference of << 2.86 lbf/sq ft; 3.75 lbf/sq ft; 4.50 lbf/sq ft; 6.00 lbf/sq ft; 8.00 lbf/sq ft; _____ lbf/sq ft >>. << Test shall include a minimum of _____ cycles, each lasting a minimum of _____ minutes.; _____; or None - N/A >>

3.05 ADJUSTING

- A. Adjust operating hardware << and sash; _____; or None - N/A >> for smooth operation.

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3.06 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.07 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 4313
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.
- D. Door hardware.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Section 08 8000 - Glazing: Glass and glazing accessories.

1.03 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
- C. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- E. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2015.
- F. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- G. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- I. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- J. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- K. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).
- L. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015.
- M. NFRC 100 - Determining Fenestration Product U-Factors.
- N. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittances at Normal Incidence.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details and color.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- D. Samples: Submit two samples 12 x 12 inches in size illustrating finished aluminum surface, glass, glazing materials.
- E. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
- F. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
- G. Report of field testing for water leakage.
- H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Minnesota.
- B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.08 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.09 WARRANTY

- A. See Division 1 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Aluminum-Framed Storefront and Doors:
 - 1. EFCO Corporation; Series 403 (T); www.efcocorp.com/sle.
 - 2. Oldcastle Building Envelope; Series 3000 Thermal Multiplane; www.obe.com.
 - 3. Tubelite, Inc; TU24000; www.tubeliteinc.com.
 - 4. Substitutions: See Division 1 - Product Requirements.

2.02 STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 - 1. Unitized, shop assembly.

2. Glazing Position: Centered (front to back).
 3. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
 4. Finish: Superior performing organic coatings.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
 - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 5. Finish Color: White.
 6. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 7. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 8. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 9. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
 10. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
 11. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
- B. Performance Requirements:
1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - a. Design Wind Loads: Comply with requirements of ASCE 7.
 - b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
 2. Water Penetration Resistance: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 10 psf.
 3. Air Leakage: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 psf pressure differential across assembly.
 4. Condensation Resistance Factor of Framing: 60, minimum, measured in accordance with AAMA 1503.
 5. Overall U-value Including Glazing: Shall meet State of Minnesota Energy Code requirements through prescriptive means required for Zone 6 as follows:
 - a. Storefront and Curtainwall: 0.36.
 - b. Operating Windows: 0.43.
 - c. Entrance Doors: 0.77.

2.03 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken.
 2. Glazing Stops: Flush.
 3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member as appropriate.
- B. Glazing: As specified in Section 08 8000.
- C. **SWING DOORS:** Glazed aluminum.
1. Thickness: 1-3/4 inches - interior; 2 inches - exterior.
 2. Hinges: Continuous Stainless Steel.
 3. Top Rail: 5 inches wide.

4. Vertical Stiles: 5 inches wide.
5. Bottom Rail: 10 inches wide.
6. Glazing Stops: Square.
7. Finish: Same as storefront.

2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Fasteners: Stainless steel.
- C. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.05 FINISHES

- A. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride (PVDF) system.
 1. Polyvinylidene fluoride (PVDF) multi-coat thermoplastic fluoropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness of 0.9 mil; color and gloss as selected from manufacturer's standard line.
 - a. Manufacturers:
 - 1) PPG Metal Coatings; Duranar: www.ppgmetalcoatings.com/#sle.
 - 2) Sherwin-Williams Company; SHER-NAR 5000: oem.sherwin-williams.com/#sle.
 - 3) Substitutions: See Division 1 - Product Requirements.
- B. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.06 HARDWARE

- A. For each door, include weatherstripping, sill sweep strip, and threshold.
- B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- C. Sill Sweep Strips: Resilient seal type, of neoprene; provide on all doors.
- D. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.
- E. Hinges: Continuous Stainless Steel type.
- F. Push/Pull Set: Ladder pulls:
 1. Provide on all doors.
 2. Ladder Pull: Ives; 9266, Heavy 1-1/4" diameter, Polished #316 Stainless Steel; 36 inches in length with flat tips.
- G. Exit Devices: Panic type with cylinder dogging.
- H. Door Closers: Concealed overhead.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify dimensions, tolerances, and method of attachment with other work.
- B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.

- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation or apply spray foam in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Set thresholds in bed of sealant and secure.
- J. Install hardware using templates provided.
- K. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 FIELD QUALITY CONTROL

- A. See Division 1 - Quality Requirements, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.
- B. Test installed storefront for water leakage in accordance with AAMA 501.2 hose test.

3.05 ADJUSTING

- A. Adjust operating hardware for smooth operation.

3.06 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.07 PROTECTION

- A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 8000

GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing units.
- C. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 9200 - Joint Sealants: Sealants for other than glazing purposes.
- B. Section 08 4313 - Aluminum-Framed Storefronts: Glazing furnished as part of storefront assembly.

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2010.
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- E. ASTM C1036 - Standard Specification for Flat Glass; 2016.
- F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- G. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- H. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.
- I. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- J. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- K. GANA (GM) - GANA Glazing Manual; 2008.
- L. GANA (SM) - GANA Sealant Manual; 2008.
- M. ICC (IBC) - International Building Code; 2018.
- N. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2016).
- O. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2014.
- P. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014.
- Q. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2014.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.05 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data on Insulating Glass Unit and Glazing Unit Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- D. Samples: Submit two samples 12 by 12 inch in size of glass units.
- E. Samples: Submit 4 inch long bead of glazing sealant, color as selected.
- F. Certificate: Certify that products of this section meet or exceed specified requirements.
- G. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), and IGMA TM-3000 for glazing installation methods. Maintain one copy on site.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.07 MOCK-UPS

- A. See Division 1 - Quality Requirements, for additional mock-up requirements.
- B. Provide mock-up of entire wall system including glass and air barrier and vapor retarder seal.
- C. Locate where directed.
- D. Mock-ups may remain as part of the Work.

1.08 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.09 WARRANTY

- A. See Division 1 - Closeout Submittals, for additional warranty requirements.
- B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Float Glass Manufacturers:
 - 1. Cardinal Glass Industries; www.cardinalcorp.com.
 - 2. Guardian Industries Corp; www.sunguardglass.com.
 - 3. Vitro Architectural Glass; www.vitroglazings.com.
 - 4. Oldcastle Building Envelope; www.obe.com.
 - 5. Substitutions: Refer to Division 1 - Product Requirements.
- B. Tempered Glass Manufacturers:
 - 1. Cardinal Glass Industries; www.cardinalcorp.com.
 - 2. Guardian Industries Corp.; www.sunguardglass.com.
 - 3. Vitro Architectural Glass; www.vitroglazings.com.
 - 4. Oldcastle Building Envelope; www.obe.com.
 - 5. Substitutions: Refer to Division 1 - Product Requirements.

2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.

2. **NOTE:** Comply with State of Minnesota "U" Factor Energy Requirements through prescriptive means to meet the following criteria for Zone 6:
 - a. Storefront and Curtainwall: 0.36.
 - b. Operating Windows: 0.43.
 - c. Entrance Doors: 0.77.
 3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 4. Glass thicknesses listed are minimum.
- B. Thermal and Optical Performance: Provide glass products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program and State of Minnesota requirements to achieve "U" values for glazing and aluminum frame composite.
 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 3. Solar Optical Properties: Comply with NFRC 300 test method.

2.03 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless noted otherwise.
1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
 2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.
 3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria.
 4. Thicknesses: 1/4" as indicated on drawings; provide greater thickness as required for exterior glazing wind load design.

2.04 INSULATING GLASS UNITS

- A. Manufacturers:
1. Any of the manufacturers specified for float glass.
 2. Fabricator certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.
 3. Cardinal Glass Industries; www.cardinalcorp.com.
 4. Guardian Industries Corp; www.sunguardglass.com.
 5. Vitro Architectural Glass; www.vitroglazings.com.
 6. Oldcastle Building Envelope; www.obe.com.
- B. Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
 2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
 3. Metal Edge Spacers: Aluminum, bent and soldered corners.
 4. Spacer Color: Black.
 5. Edge Seal:
 - a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone sealant as secondary seal applied around perimeter.
 6. Color: Black.
 7. Purge interpane space with dry air, hermetically sealed.
- C. Insulating Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
 2. Space between lites filled with argon; Low-E.
 3. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Low-E (passive type), on #2 surface.

- c. Product:
 - 1) Guardian: SunGuard SN68.
 - 2) Vitro: Solarban 60 Clear/Clear.
- 4. Inboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
 - a. Tint: Clear.
- 5. Total Thickness: 1 inch.
- 6. Thermal Transmittance (U-Value), Summer - Center of Glass: To be in compliance with State of Minnesota energy requirements.
- 7. Glazing Method: As recommended by window manufacturer to meet testing requirements.

2.05 GLAZING UNITS

- A. Interior Vision Glazing:
 - 1. Applications: Interior glazing unless otherwise indicated.
 - 2. Glass Type: Fully tempered float glass.
 - 3. Tint: Clear.
 - 4. Thickness: 1/4 inch, nominal.

2.06 GLAZING COMPOUNDS

- A. Butyl Sealant: Single component; ASTM C920, Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.
- B. Manufacturers:
 - 1. Bostik Inc; www.bostik-us.com.
 - 2. Dow Corning Corporation; www.dowcorning.com/construction.
 - 3. Momentive Performance Materials, Inc; www.momentive.com.
 - 4. Pecora Corporation; www.pecora.com.
 - 5. BASF Corporation; www.basf.com/us/en.html.
 - 6. Substitutions: Refer to Division 1 - Product Requirements.

2.07 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
- D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.
- E. Glazing Clips: Manufacturer's brushed stainless steel standard type.

2.08 SOURCE QUALITY CONTROL

- A. See Division 1 - Quality Requirements, for additional requirements.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

- A. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

3.04 FIELD QUALITY CONTROL

- A. See Division 1 - Quality Requirements, for additional requirements.
- B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- C. Monitor and report installation procedures and unacceptable conditions.

3.05 CLEANING

- A. See Division 1 - Construction Waste Management and Disposal, for additional requirements.
- B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- C. Remove non-permanent labels immediately after glazing installation is complete.
- D. Clean glass and adjacent surfaces after sealants are fully cured.
- E. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.06 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Gypsum wallboard.
- C. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
- B. Section 07 2119 - Foamed-In-Place Insulation: Sealing construction gaps between dissimilar materials in interior or exterior wall locations.
- C. Section 07 9200 - Joint Sealants: Sealing gaps in construction other than gypsum board or plaster work.

1.03 REFERENCE STANDARDS

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- B. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.
- C. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.
- D. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- E. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2015.
- F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.
- G. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- H. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014a.
- I. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2015.
- J. ASTM C1658/C1658M - Standard Specification for Glass Mat Gypsum Panels; 2013.
- K. GA-216 - Application and Finishing of Gypsum Board; 2013.
- L. ICC (IBC) - International Building Code; 2018.

1.04 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate special details.
- C. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. Samples: Submit two samples of predecorated gypsum board, 12 by 12 inches in size, illustrating finish color and texture.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum five years of experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
 - 1. See PART 3 for finishing requirements.

2.02 METAL FRAMING MATERIALS

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
 - 1. Clarkwestern Dietrich Building Systems LLC; www.clarkdietrich.com.
 - 2. Marino; www.marinoware.com.
 - 3. Phillips Manufacturing Company; www.phillipsmfg.com.
 - 4. Substitutions: See Division 1 - Product Requirements.
- B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/360 at 10 psf.
 - 1. Studs: "C" shaped with flat or formed webs with knurled faces.
 - 2. Runners: U shaped, sized to match studs.
 - 3. Furring: Hat-shaped sections, minimum depth of 7/8 inch.

2.03 BOARD MATERIALS

- A. Manufacturers - Gypsum-Based Board:
 - 1. American Gypsum Company; www.americangypsum.com.
 - 2. CertainTeed Corporation; www.certainteed.com.
 - 3. Continental Building Products; www.continental-bp.com.
 - 4. Georgia-Pacific Gypsum; www.gpgypsum.com.
 - 5. National Gypsum Company; www.nationalgypsum.com.
 - 6. PABCO Gypsum; www.pabco gypsum.com.
 - 7. USG Corporation; www.usg.com.
 - 8. Substitutions: See Division 1 - Product Requirements.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Use for vertical surfaces, unless otherwise indicated.
 - 2. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - 3. Paper-Faced Products:
 - a. USG; Firecode X Gypsum Panels.
 - b. Georgia-Pacific Gypsum; ToughRock Fireguard X.
 - c. National Gypsum Company; Gold Bond BRAND Fire-Shield Gypsum Board.
 - d. Substitutions: See Division 1 - Product Requirements.

2.04 ACCESSORIES

- A. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
 - 1. Types: As detailed or required for finished appearance.
 - 2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
 - 3. Products:
 - a. Same manufacturer as framing materials.
 - b. Substitutions: See Division 1 - Product Requirements.
- B. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - 1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
 - 2. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
 - 3. Ready-mixed vinyl-based joint compound.

- C. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.
- D. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.
- E. Anchorage to Substrate: Screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Studs: Space studs at 16 inches on center.
 - 1. Extend partition framing to structure in all locations.
- C. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- D. Standard Wall Furring: Install at masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.
 - 1. Orientation: Vertical.
 - 2. Spacing: At 16 inches on center.
- E. Blocking: Install wood blocking, as appropriate, for support of:
 - 1. Framed openings.
 - 2. Wall mounted door hardware.

3.03 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Installation on Metal Framing: Use screws for attachment of gypsum board.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

- A. Corner Beads: Install at external corners, using longest practical lengths.
- B. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.05 JOINT TREATMENT

- A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 - 2. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
 - 2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.

3.06 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 9123
INTERIOR PAINTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Gypsum Board walls.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
 - 5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
 - 6. Marble, granite, slate, and other natural stones.
 - 7. Floors, unless specifically indicated.
 - 8. Ceramic and other tiles.
 - 9. Glass.
 - 10. Concrete masonry units in utility, mechanical, and electrical spaces.
 - 11. Acoustical materials, unless specifically indicated.
 - 12. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

- A. Section 09 2116 - Gypsum Board Assemblies.

1.03 REFERENCE STANDARDS

- A. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.
- B. SSPC-SP 1 - Solvent Cleaning; 2015.
- C. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.04 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Allow 30 days for approval process, after receipt of complete samples by Architect.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets

(MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Division 1 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Finish Materials: 1 gallon of each color; from the same product run, store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience and approved by manufacturer.

1.06 , MOCK-UP

- A. See Division 1 - Quality Requirements, for general requirements for mock-up.
- B. Provide Mock-Up panel illustrating paint color, texture and finish.
- C. Provide door and frame assembly illustrating paint color, texture, and finish.
- D. Locate where directed by Contractor and Architect.
- E. Mock-up may remain as part of the work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
- B. Paints:
 - 1. Base Manufacturer: Sherwin-Williams Company.
- C. Substitutions: See Division 1 - Product Requirements, of Equal and Better Performance Characteristics.

2.02 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.

1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 2. Supply each paint material in quantity required to complete entire project's work from a single production run.
 3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Colors: To be selected from manufacturer's full range of available colors.
1. Selection to be made by Architect after award of contract.

2.03 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board. **NOTE: Paint finish shall be Eggshell.**
- B. Latex Paint: Gypsum Board.
1. Two top coats.
 2. Products:
 - a. Sherwin-Williams Company; ProMar 200; B20W2600 Series.
 - b. Substitutions: Division 1 - Product Requirements; of Equal Quality and Better Performance Characteristics.

2.04 PRIMERS

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
1. Latex Primer at Gypsum Board Walls.
 - a. Products:
 - 1) Sherwin-Williams Company; ProMar 200, B28W2600 Series.
 - 2) Substitutions: Division 1 - Product Requirements; of Equal Quality and Better Performance Characteristics.

2.05 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- C. If substrate preparation is the responsibility of another installer, notify Contractor and Architect of unsatisfactory preparation before proceeding.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 1. Gypsum Wallboard: 12 percent.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing paints or finishes that exhibit surface defects.

- D. Remove or mask surface appurtenances, including hot water radiation system, electrical plates, hardware, escutcheons, and fittings, prior to preparing surfaces or finishing.
- E. Seal surfaces that might cause bleed through or staining of topcoat.
- F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- G. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

3.03 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

- A. See Division 1 - Quality Requirements, for general requirements for field inspection.
- B. Inspect and test questionable coated areas in accordance with Architect.

3.05 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 12 3600
WINDOW SILLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Solid Surface window sills.

1.02 RELATED REQUIREMENTS

- A. Section 09 2116 - Gypsum Board Assemblies: Repaired Wall Finish Furred out on Masonry Substrate.

1.03 REFERENCE STANDARDS

- A. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.
- B. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.
- C. PS 1 - Structural Plywood; 2009.

1.04 SUBMITTALS

- A. See Division 1 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.
- D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- F. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- G. Installation Instructions: Manufacturer's installation instructions and recommendations.
- H. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.
- B. Quality Certification:
 - 1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this section.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

PART 2 PRODUCTS

2.01 WINDOW SILLS

- A. Quality Standard: Premium Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Solid Surfacing Window Sills: Solid surfacing sheet or plastic resin casting over continuous substrate.
 - 1. Flat Sheet Thickness: 1/2 inch, minimum.

2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
 - a. Manufacturers:
 - 1) Avonite Surfaces; www.avonitesurfaces.com.
 - 2) Dupont; www.corian.com.
 - 3) Formica Corporation; www.formica.com.
 - 4) Wilsonart; www.wilsonart.com.
 - 5) Substitutions: See Division 1 - Product Requirements.
 - b. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
 - c. Color and Pattern: As selected by Architect from manufacturer's full-range color and pattern pallet.
3. Other Components Thickness: 3/4 inch, minimum.
4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; square edge.
5. Skirts: As indicated on drawings.
6. Fabricate in accordance with manufacturer's standard requirements.

2.02 MATERIALS

- A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
- B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- C. Joint Sealant: Mildew-resistant silicone sealant, clear.

2.03 FABRICATION

- A. Fabricate sills in the largest sections practicable, with top surface of joints flush.
 1. Join lengths of tops using best method recommended by manufacturer.
 2. Fabricate to overhang walls as indicated on drawings.
- B. Solid Surfacing: Fabricate sills up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
- C. Wall-Mounted Counters: Provide skirts and aprons as indicated on drawings, finished to match. Provide counter support as indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Securely attach window sills to using concealed fasteners. Make flat surfaces level; shim where required.
- B. Seal joint between backs and ends of sills.

3.04 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

3.05 CLEANING

- A. Clean window sill surfaces thoroughly.

3.06 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION