SECTION 08 41 23 - Steel-Framed Entrances and Storefronts

FIRE RATED STEEL FRAMED ENTRANCES AND STOREFRONT

Display hidden notes to specifier. (Don't know how? [Click Here](http://www.arcat.com/sd/display_hidden_notes.shtml))

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\*\* NOTE TO SPECIFIER \*\* Vetrotech - Fire-Rated Glass & Systems; Fire-Rated Steel Framed Entrances and Storefront.  
This section is based on the products of Vetrotech - Fire-Rated Glass & Systems, which is located at:  
2108 B St. N. W. Suite 110  
Auburn, WA 98001  
Toll Free Tel: 888-803-9533  
Tel: 253-333-0660  
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Email: [request info (Lori.Jerome@saint-gobain.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Vetrotech+-+Fire-Rated+Glass+%26+Systems&coid=42422&rep=&fax=253-333-5166&message=RE:%20Spec%20Question%20(08420vet):%20%20&mf=)  
Web: [www.vetrotechusa.com](http://www.vetrotechusa.com)   
  
 [ [Click Here](http://www.arcat.com/arcatcos/cos42/arc42422.html) ] for additional information.  
  
Specialists in fire rated glass products, Vetrotech - Fire-Rated Glass and Systems is recognized worldwide as an industry leader. For over 300 years companies have trusted the Saint-Gobain companies for high quality building products. Working with Vetrotech - Fire-Rated Glass and Systems you'll benefit from Saint-Gobain's global network of research and development facilities, producing the industry's broadest range of clear fire rated glass, fire rated ceramic and heat absorbing laminates.  
Fire rated glass safety testing specialists in fire rated glass products, Vetrotech - Fire-Rated Glass and Systems is recognized worldwide as an industry leader. We perform over 500 fire tests per year. Vetrotech - Fire-Rated Glass and Systems products are tested and listed in accordance with all United States and Canadian national standards by Underwriters Laboratory and Warnock Hersey/Intertek Testing Services. All Vetrotech - Fire-Rated Glass and Systems products meet or exceed all building code requirements.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Fire rated glazing, framing systems and hardware for the following applications:
       1. Interior vision lights and frames.
       2. Interior doors and frames.
       3. Exterior insulated vision lights and frames.
       4. Exterior insulated doors and frames.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 05 50 00 - Metal Fabrications.
    2. Section 07 27 00 - Air Barriers.
    3. Section 07 62 00 - Sheet Metal Flashing and Trim.
    4. Section 07 84 53 - Building Perimeter Firestopping .
    5. Section 08 11 13 - Hollow Metal Doors and Frames.
    6. Section 08 71 53 - Security Door Hardware.
    7. Section 08 71 13 - Automatic Door Operators.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete standards AAMA 2603 through 2605 according to type of finish specified in Part 2. For most applications, if the system is used for an interior application then all air and water infiltration testing and standards may be deleted. Delete references from the list below that are not actually required by the text of the edited section.

* + 1. ASTM International (ASTM):
       1. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
       2. ASTM A 1011/A 1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
       3. ASTM E 283 - Test Method for Determining the Rate of Airflow through Exterior Windows, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen.
       4. ASTM E 90 - Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
       5. ASTM E 119 - Methods for Fire Tests of Building Construction and Materials.
       6. ASTM E 330 - Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
       7. ASTM E 331 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
       8. ASTM E 413 - Standard Classification for Rating Sound Insulation.
       9. ASTM E 547 - Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Difference.
       10. ASTM E 783 - Test Method for Field Measurement of Air Leakage through Installed Exterior Windows and Doors.
       11. ASTM E 1105 - 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.
       12. ASTM F1915 - Standard Test Methods for Glazing for Detention Facilities
    2. American Architectural Manufacturers Association (AAMA):
       1. AAMA 501.1 - Standard Test Method for Water Penetration of Windows, Curtain Walls, and Doors Using Dynamic Pressure.
       2. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.
       3. AAMA 501.4 - Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Interstory Drifts.
       4. AAMA 501.5 - Test Method for Thermal Cycling of Exterior Walls.
       5. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
       6. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
       7. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
    3. American Welding Society (AWS):
       1. AWS D1.3 - Structural Welding Code - Sheet Steel.
    4. Builders Hardware Manufacturers Association, Inc.:
       1. BHMA A156 - American National Standards for door hardware; (ANSI/BHMA A156).
    5. Canadian Standards:
       1. CAN4-S104-M, "Fire Tests of Door Assemblies
       2. CAN4-S106-M, "Standard Method for Fire Tests of Window and Glass Block Assemblies"
    6. National Fire Protection Association (NFPA):
       1. NFPA 80: Fire Doors and Windows.
       2. NFPA 251: Fire Tests of Building Construction and Materials.
       3. NFPA 252: Fire Tests of Door Assemblies.
       4. NFPA 257: Fire Test of Window Assemblies.
    7. Underwriters Laboratories, Inc. (UL):
       1. UL 9: Fire Tests of Door Assemblies.
       2. UL 10 B: Fire Tests of Door Assemblies.
       3. UL 10 C: Positive Pressure Fire Tests of Window and Door Assemblies.
       4. UL 263: Fire tests of Building Construction and Materials.
       5. UL 752: The Standard of Safety for Bullet-Resisting Equipment.
       6. UL 972: Burglary Resisting Glazing Material.
    8. Consumer Product Safety Commission (CPSC):
       1. CPSC 16 CFR 120: Safety Standard for Architectural Glazing Materials.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00 - Administrative Requirements.
     2. Product Data: Submit manufacturer's descriptive literature, specifications, installation instructions, warranty, and laboratory test data.
     3. Shop Drawings:
        1. Include plans, elevations and details of product showing component dimensions; framed opening requirements, dimensions, tolerances, and attachment to structure.
        2. Provide templates for the location of embeds and anchor locations required any adjoining work.
     4. Calculations: For the performance requirements listed below requiring structural design provide data, calculations and Drawings signed and sealed by an engineer licensed in the state or province where the project is located.
     5. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

\*\* NOTE TO SPECIFIER \*\* Delete selection samples for glass type if glazing has already been selected.

* + 1. Selection Samples for Glass Type and Color: For each glazing type specified, two samples representing manufacturer's full range of available styles and finishes.
    2. Verification Samples for Glass Type and Color: For each product specified, two samples, two samples that are 6 inches by 6 inches (152 mm by 152 mm), representing actual product and finishes.
    3. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
    4. Installer Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
    5. Field Quality-Control Reports.
    6. Maintenance Data.
    7. Warranties: Submit manufacturer's warranty and ensure that forms have been completed in the Owner's name and registered with the manufacturer.
  1. PERFORMANCE REQUIREMENTS
     1. Fire Rating Requirements: As specified in Part 2 of this section.

\*\* NOTE TO SPECIFIER \*\* For exterior units fill in blanks below with wind load design pressure in psf and include applicable building code.

* + 1. Structural Performance:
       1. Wind loads: Provide system; include anchorage, capable of withstanding wind load design pressures of \_\_\_\_ lbs./sq. ft. inward and \_\_\_\_ lbs./sq. ft. outward. The design pressures are based on the (\_\_\_\_) Building Code.
       2. Air Infiltration: The test specimen shall be tested in accordance with ASTM E 283. Air infiltration rate shall not exceed 0.06 cfm/ft2 (0.3 l/(s x m2)) at a static air pressure differential of 6.27 psf.
       3. Water Resistance, Static: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a static air pressure differential of 15 psf as defined in AAMA 501.
       4. Water Resistance, Dynamic: The test specimen shall be tested in accordance with AAMA 501.1. There shall be no leakage at an air pressure differential of 15 psf as defined in AAMA 501.
       5. Uniform Load: A static air design load of 50 psf (2394 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member at design load. At structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2 percent of their clear spans shall occur.

\*\* NOTE TO SPECIFIER \*\* Coordinate the level of bullet resistance with the type of glazing selected in Part 2 of this specification. Delete bullet resistance rating not required.

* + - 1. Bullet Resistance: Provide systems that meet a bullet resistance level of 1 for glass when tested per UL 752.
      2. Bullet Resistance: Provide systems that meet a bullet resistance level of 2 for glass when tested per UL 752.
      3. Bullet Resistance: Provide systems that meet a bullet resistance level of 3 for glass when tested per UL 752.
      4. Bullet Resistance: Provide systems that meet a bullet resistance level of 4for glass when tested per UL 752.
      5. Bullet Resistance: Provide systems that meet a bullet resistance level of 5 for glass when tested per UL 752.
      6. Bullet Resistance: Provide systems that meet a bullet resistance level of 6 for glass when tested per UL 752.
      7. Bullet Resistance: Provide systems that meet a bullet resistance level of 7 for glass when tested per UL 752.
      8. Bullet Resistance: Provide systems that meet a bullet resistance level of 8 for glass when tested per UL 752.

\*\* NOTE TO SPECIFIER \*\* Delete detention rating not required.

* + - 1. Detention Rating: Provide systems that meet a security Grade 1 for glass when tested per ASTM F 1915.
      2. Detention Rating: Provide systems that meet a security Grade 2 for glass when tested per ASTM F 1915.
      3. Detention Rating: Provide systems that meet a security Grade 3 for glass when tested per ASTM F 1915.
      4. Detention Rating: Provide systems that meet a security Grade 4 for glass when tested per ASTM F 1915.

\*\* NOTE TO SPECIFIER \*\* Delete burglary rating not required.

* + - 1. Burglary Rating: Provide systems that meet a security level for glass, frames and doors when tested per UL 972.
  1. QUALITY ASSURANCE

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Manufacturer Qualifications: Manufacturer shall have five years experience manufacturing and fabricating products of similar type and scope as those specified in this section.

\*\* NOTE TO SPECIFIER \*\* Fill in blank below or delete if not required.

* + 1. Testing Agency Qualifications: \_\_\_\_\_\_\_\_\_\_\_\_\_.
    2. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).

\*\* NOTE TO SPECIFIER \*\* Delete paragraph above or below. If retaining above, verify with prospective installers that they can comply with glazier certification requirements.

* + 1. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
    2. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

\*\* NOTE TO SPECIFIER \*\* Include a mock-up if the project size and/or quality warrant taking such a precaution. The following is one example of how a mock-up on a large project might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Provide a mock-up for evaluation of materials and workmanship.
       1. Finish areas designated by Architect.
       2. Do not proceed with remaining work until workmanship, finish are approved by Architect.
       3. Refinish mock-up area as required to produce acceptable work. Mock-up may be incorporated into finished work upon approval from Owner.

\*\* NOTE TO SPECIFIER \*\* Retain first paragraph below for doors and second paragraph below for windows if wire glass or another fire-resistive glazing product is specified in Part 2. Delete if not required.

* + 1. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by UL, for fire ratings indicated, based on testing according to NFPA 252, ASTM E 119. Assemblies must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.
    2. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by UL, for fire ratings indicated, based on testing according to NFPA 257, ASTM E 119. Assemblies must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.
    3. Certification: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

\*\* NOTE TO SPECIFIER \*\* Delete certifications from list below as required.

* + - 1. Door assemblies shall be tested to the acceptance criteria of NFPA 252, UL 10-C Standard Methods of Fire Tests of Door Assemblies.
      2. Window assemblies shall be tested to the acceptance criteria of NFPA 257, UL 9 Standard methods for Fire Tests of Window Assemblies.
      3. Wall assemblies shall be tested to the acceptance criteria of ASTM E 119, NFPA 251, UL 263 Standard Test Methods for Fire Tests of Building Construction and Materials.
      4. Underwriters Laboratories (UL) shall conduct fire test.
    1. Impact Safety Resistance: CPSC 16, CFR1201 (Cat. I and II).

\*\* NOTE TO SPECIFIER \*\* Retain paragraph below unless types of glass selected do not require labeling by authorities having jurisdiction or if certification is required as well as labels.

* + 1. Listings and Labels, Fire Rated Assemblies: Under current follow-up service by an approved independent agency maintaining a current listing or certification. Label assemblies in accordance with limits of manufacturer's listing.
    2. Window assemblies with ratings of less than 60 minutes may be tested in accordance with NFPA 257, UBC 7-4, UL 9, CAN4-S106 Standard Test Methods.
    3. Regulatory Requirements: Comply with provisions of the following:
    4. Generally retain Americans with Disabilities Act Accessibility Guidelines below for private projects; FED-STD-795 for Federal, State, and local government projects. Verify with authorities having jurisdiction.

\*\* NOTE TO SPECIFIER \*\* Delete option below not required for project.

* + - 1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)."
      2. Where indicated to comply with accessibility requirements, comply with ANSI A117.1.
      3. Where indicated to comply with accessibility requirements, comply with FED-STD-795, "Uniform Federal Accessibility Standards."

\*\* NOTE TO SPECIFIER \*\* Compliance with this standard requires automatic opening devices to be added to opening due to weight of doors. Coordinate addition of auto-openers with Division 8 section "Door Hardware" or other section containing these devices. Verify that Authority Having Jurisdiction is using NFPA 101 and that this is a requirement for the facility.

* + - 1. Comply with NFPA 101 for means of egress doors.
  1. DELIVERY, STORAGE, AND HANDLING
     1. Deliver, store and handle in accordance with manufacturer's recommendations:
        1. Inspect all containers for damage at time of delivery.
        2. Examine glass and frame units for damage.
        3. List all damage to containers on the shipping company's Bill of Lading.
        4. Report damage to manufacturer immediately.
        5. Store glazing materials and frame units in original packing containers
        6. Do not expose glazing material of frame units to sunlight or weather.
        7. Place glass and frames upright, no less than 6 degrees from vertical. Do not store horizontally.
        8. Store all materials in dry conditions, off the ground.
        9. Protect from construction activities.
        10. Glass and frame units must be separated by non abrasive pads such as cloth or cork.
  2. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
     2. Field Measurements: Obtain field measurements prior to fabrication of frame units. If field measurements will not be available in a timely manner coordinate planned measurements with the work of other sections. Show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.
     3. Coordinate the work of this section with others affected including but not limited to: Other exterior envelope components and door hardware beyond that provided by this section.
  3. PRE-INSTALLATION MEETING
     1. Conduct a pre-installation conference at least one week prior to the work of this section.
  4. WARRANTY
     1. Provide manufacturer's standard CONTRAFLAM and VDS FRAMING limited five year warranty dated from shipment.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Vetrotech - Fire-Rated Glass & Systems, which is located at: 2108 B St. N. W. Suite 110; Auburn, WA 98001; Toll Free Tel: 888-803-9533; Tel: 253-333-0660; Fax: 253-333-5166; Email: [request info (Lori.Jerome@saint-gobain.com)](http://admin.arcat.com/users.pl?action=UserEmail&company=Vetrotech+-+Fire-Rated+Glass+%26+Systems&coid=42422&rep=&fax=253-333-5166&message=RE:%20Spec%20Question%20(08420vet):%20%20&mf=); Web: [www.vetrotechusa.com](http://www.vetrotechusa.com)

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.
  1. MATERIALS - GLAZING

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Interior Glazing: CONTRAFLAM by VETROTECH Saint-Gobain NA.

\*\* NOTE TO SPECIFIER \*\* Delete options for time duration of fire rating and associated text not required.

* + - 1. Fire Rating: 60 minutes.
         1. Manufacturer's Designation: CONTRAFLAM 60.
         2. Glazing Type: Monolithic.
         3. Nominal Thickness: 1 inch (25 mm).
         4. Weight: 11 lbs / sq. ft.
         5. Visible Light Transmission: 82 percent.
         6. Sound Transmission Coefficient: 40 dB.

\*\* NOTE TO SPECIFIER \*\* Delete bullet resistance rating not required.

* + - * 1. Bullet Resistance Rating per UL-752: Level 1; Contraflam ULTIMAX.
        2. Bullet Resistance Rating per UL-752: Level 2; Contraflam ULTIMAX.
        3. Bullet Resistance Rating per UL-752: Level 3; Contraflam ULTIMAX.
        4. Bullet Resistance Rating per UL-752: Level 4; Contraflam ULTIMAX.
        5. Bullet Resistance Rating per UL-752: Level 5; Contraflam ULTIMAX.
        6. Bullet Resistance Rating per UL-752: Level 6; Contraflam ULTIMAX.
        7. Bullet Resistance Rating per UL-752: Level 7; Contraflam ULTIMAX.
        8. Bullet Resistance Rating per UL-752: Level 8; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete detention rating not required.

* + - * 1. Detention Rating per ASTM F 1915: Grade 1; Contraflam ULTIMAX.
        2. Detention Rating per ASTM F 1915: Grade 2; Contraflam ULTIMAX.
        3. Detention Rating per ASTM F 1915: Grade 3; Contraflam ULTIMAX.
        4. Detention Rating per ASTM F 1915: Grade 4; Contraflam ULTIMAX.
        5. Burglary Resistance Rating per UL 972; Contraflam ULTIMAX.
      1. Fire Rating: 60 minutes.
         1. Manufacturer's Designation: CONTRAFLAM STRUCTURE 60.
         2. Glazing Type: Wireless, laminated glazing material with intumescent interlayers.
         3. Nominal Thickness: 1-3/16 inch (31 mm).
         4. Weight: 13.0 lbs / sq. ft. (65 kg per sq. meter).
         5. Visible Light Transmission: 80 percent.
         6. Sound Transmission Coefficient: 41 dB.

\*\* NOTE TO SPECIFIER \*\* Delete bullet resistance rating not required.

* + - * 1. Bullet Resistance Rating per UL-752: Level 1; Contraflam ULTIMAX.
        2. Bullet Resistance Rating per UL-752: Level 2; Contraflam ULTIMAX.
        3. Bullet Resistance Rating per UL-752: Level 3; Contraflam ULTIMAX.
        4. Bullet Resistance Rating per UL-752: Level 4; Contraflam ULTIMAX.
        5. Bullet Resistance Rating per UL-752: Level 5; Contraflam ULTIMAX.
        6. Bullet Resistance Rating per UL-752: Level 6; Contraflam ULTIMAX.
        7. Bullet Resistance Rating per UL-752: Level 7; Contraflam ULTIMAX.
        8. Bullet Resistance Rating per UL-752: Level 8; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete detention rating not required.

* + - * 1. Detention Rating per ASTM F 1915: Grade 1; Contraflam ULTIMAX.
        2. Detention Rating per ASTM F 1915: Grade 2; Contraflam ULTIMAX.
        3. Detention Rating per ASTM F 1915: Grade 3; Contraflam ULTIMAX.
        4. Detention Rating per ASTM F 1915: Grade 4; Contraflam ULTIMAX.
        5. Burglary Resistance Rating per UL 972; Contraflam ULTIMAX.
        6. Burglary Resistance Rating per UL 972; Contraflam ULTIMAX.
      1. Fire Rating: 90 minutes.
         1. Manufacturer's Designation: CONTRAFLAM 90.
         2. Glazing Type: Monolithic.
         3. Nominal Thickness: 1-3/8 inches (34 mm).
         4. Weight: 18 lbs / sq. ft.
         5. Visible Light Transmission: 80 percent.
         6. Sound Transmission Coefficient: 45 dB.

\*\* NOTE TO SPECIFIER \*\* Delete bullet resistance rating not required.

* + - * 1. Bullet Resistance Rating per UL-752: Level 1; Contraflam ULTIMAX.
        2. Bullet Resistance Rating per UL-752: Level 2; Contraflam ULTIMAX.
        3. Bullet Resistance Rating per UL-752: Level 3; Contraflam ULTIMAX.
        4. Bullet Resistance Rating per UL-752: Level 4; Contraflam ULTIMAX.
        5. Bullet Resistance Rating per UL-752: Level 5; Contraflam ULTIMAX.
        6. Bullet Resistance Rating per UL-752: Level 6; Contraflam ULTIMAX.
        7. Bullet Resistance Rating per UL-752: Level 7; Contraflam ULTIMAX.
        8. Bullet Resistance Rating per UL-752: Level 8; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete detention rating not required.

* + - * 1. Detention Rating per ASTM F 1915: Grade 1; Contraflam ULTIMAX.
        2. Detention Rating per ASTM F 1915: Grade 2; Contraflam ULTIMAX.
        3. Detention Rating per ASTM F 1915: Grade 3; Contraflam ULTIMAX.
        4. Detention Rating per ASTM F 1915: Grade 4; Contraflam ULTIMAX.
        5. Burglary Resistance Rating per UL 972; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete burglary rating not required.

* + - * 1. Burglary Resistance Rating per UL 972; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Not available with VDS LITE framings system. Delete if not required.

* + - 1. Fire Rating: 120 minutes.
         1. Manufacturer's Designation: CONTRAFLAM 120.
         2. Glazing Type: Monolithic.
         3. Nominal Thickness: 1-9/16 inches (39 mm).
         4. Weight: 19 lbs / sq. ft.
         5. Visible Light Transmission: 78 percent.
         6. Sound Transmission Coefficient: 46 dB.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - * 1. Bullet Resistance Rating per UL-752: Level III available.

\*\* NOTE TO SPECIFIER \*\* Delete bullet resistance rating not required.

* + - * 1. Bullet Resistance Rating per UL-752: Level 1; Contraflam ULTIMAX.
        2. Bullet Resistance Rating per UL-752: Level 2; Contraflam ULTIMAX.
        3. Bullet Resistance Rating per UL-752: Level 3; Contraflam ULTIMAX.
        4. Bullet Resistance Rating per UL-752: Level 4; Contraflam ULTIMAX.
        5. Bullet Resistance Rating per UL-752: Level 5; Contraflam ULTIMAX.
        6. Bullet Resistance Rating per UL-752: Level 6; Contraflam ULTIMAX.
        7. Bullet Resistance Rating per UL-752: Level 7; Contraflam ULTIMAX.
        8. Bullet Resistance Rating per UL-752: Level 8; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete detention rating not required.

* + - * 1. Detention Rating per ASTM F 1915: Grade 1; Contraflam ULTIMAX.
        2. Detention Rating per ASTM F 1915: Grade 2; Contraflam ULTIMAX.
        3. Detention Rating per ASTM F 1915: Grade 3; Contraflam ULTIMAX.
        4. Detention Rating per ASTM F 1915: Grade 4; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete burglary rating not required.

* + - * 1. Burglary Resistance Rating per UL 972; Contraflam ULTIMAX.
      1. Fire Rating: 120 minutes.
         1. Manufacturer's Designation: CONTRAFLAM STRUCTURE 120.
         2. Glazing Type: Wireless, laminated glazing material with intumescent interlayers.
         3. Nominal Thickness: 2-1/16 inch (52 mm).
         4. Weight: 22.5 lbs / sq. ft. (112 kg per sq. meter).
         5. Visible Light Transmission: 80 percent.
         6. Sound Transmission Coefficient: 46 dB.

\*\* NOTE TO SPECIFIER \*\* Delete bullet resistance rating not required.

* + - * 1. Bullet Resistance Rating per UL-752: Level 1; Contraflam ULTIMAX.
        2. Bullet Resistance Rating per UL-752: Level 2; Contraflam ULTIMAX.
        3. Bullet Resistance Rating per UL-752: Level 3; Contraflam ULTIMAX.
        4. Bullet Resistance Rating per UL-752: Level 4; Contraflam ULTIMAX.
        5. Bullet Resistance Rating per UL-752: Level 5; Contraflam ULTIMAX.
        6. Bullet Resistance Rating per UL-752: Level 6; Contraflam ULTIMAX.
        7. Bullet Resistance Rating per UL-752: Level 7; Contraflam ULTIMAX.
        8. Bullet Resistance Rating per UL-752: Level 8; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete detention rating not required.

* + - * 1. Detention Rating per ASTM F 1915: Grade 1; Contraflam ULTIMAX.
        2. Detention Rating per ASTM F 1915: Grade 2; Contraflam ULTIMAX.
        3. Detention Rating per ASTM F 1915: Grade 3; Contraflam ULTIMAX.
        4. Detention Rating per ASTM F 1915: Grade 4; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete burglary rating not required.

* + - * 1. Burglary Resistance Rating per UL 972; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Exterior Glazing: CONTRAFLAM by VETROTECH Saint-Gobain NA.

\*\* NOTE TO SPECIFIER \*\* Delete options for time duration of fire rating and associated text not required.

* + - 1. Fire Rating: 60 minutes.
         1. Manufacturer's Designation: CONTRAFLAM 60 IGU.
         2. Glazing Type: Insulated glass unit.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - * 1. Coating: Low-e coating on insulating glass.
        2. Nominal Thickness: 1-1/2 inches (38 mm).
        3. Weight: 15 lbs / sq. ft.
        4. Visible Light Transmission: 80 percent.
        5. Sound Transmission Coefficient: 44 dB.

\*\* NOTE TO SPECIFIER \*\* Delete bullet resistance rating not required.

* + - * 1. Bullet Resistance Rating per UL-752: Level 1; Contraflam ULTIMAX.
        2. Bullet Resistance Rating per UL-752: Level 2; Contraflam ULTIMAX.
        3. Bullet Resistance Rating per UL-752: Level 3; Contraflam ULTIMAX.
        4. Bullet Resistance Rating per UL-752: Level 4; Contraflam ULTIMAX.
        5. Bullet Resistance Rating per UL-752: Level 5; Contraflam ULTIMAX.
        6. Bullet Resistance Rating per UL-752: Level 6; Contraflam ULTIMAX.
        7. Bullet Resistance Rating per UL-752: Level 7; Contraflam ULTIMAX.
        8. Bullet Resistance Rating per UL-752: Level 8; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete detention rating not required.

* + - * 1. Detention Rating per ASTM F 1915: Grade 1; Contraflam ULTIMAX.
        2. Detention Rating per ASTM F 1915: Grade 2; Contraflam ULTIMAX.
        3. Detention Rating per ASTM F 1915: Grade 3; Contraflam ULTIMAX.
        4. Detention Rating per ASTM F 1915: Grade 4; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete burglary rating not required.

* + - * 1. Burglary Resistance Rating per UL 972; Contraflam ULTIMAX.
      1. Fire Rating: 90 minutes.
         1. Manufacturer's Designation: CONTRAFLAM 90 IGU.
         2. Glazing Type: Insulated glass unit.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - * 1. Coating: Low-e coating on insulating glass.
        2. Nominal Thickness: 1-7/8 inches (48 mm).
        3. Weight: 24 lbs / sq. ft.
        4. Visible Light Transmission: 75 percent.
        5. Sound Transmission Coefficient: 47 dB.

\*\* NOTE TO SPECIFIER \*\* Delete bullet resistance rating not required.

* + - * 1. Bullet Resistance Rating per UL-752: Level 1; Contraflam ULTIMAX.
        2. Bullet Resistance Rating per UL-752: Level 2; Contraflam ULTIMAX.
        3. Bullet Resistance Rating per UL-752: Level 3; Contraflam ULTIMAX.
        4. Bullet Resistance Rating per UL-752: Level 4; Contraflam ULTIMAX.
        5. Bullet Resistance Rating per UL-752: Level 5; Contraflam ULTIMAX.
        6. Bullet Resistance Rating per UL-752: Level 6; Contraflam ULTIMAX.
        7. Bullet Resistance Rating per UL-752: Level 7; Contraflam ULTIMAX.
        8. Bullet Resistance Rating per UL-752: Level 8; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete detention rating not required.

* + - * 1. Detention Rating per ASTM F 1915: Grade 1; Contraflam ULTIMAX.
        2. Detention Rating per ASTM F 1915: Grade 2; Contraflam ULTIMAX.
        3. Detention Rating per ASTM F 1915: Grade 3; Contraflam ULTIMAX.
        4. Detention Rating per ASTM F 1915: Grade 4; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete burglary rating not required.

* + - * 1. Burglary Resistance Rating per UL 972; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Not available with VDS LITE framings system. Delete if not required.

* + - 1. Fire Rating: 120 minutes.
         1. Manufacturer's Designation: CONTRAFLAM 120 IGU.
         2. Glazing Type: Insulated glass unit.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - * 1. Coating: Low-e coating on insulating glass.
        2. Nominal Thickness: 2-5/16 inches (58 mm).
        3. Weight: 24 lbs / sq. ft.
        4. Visible Light Transmission: 75 percent.
        5. Sound Transmission Coefficient: 48 dB.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - * 1. Bullet Resistance Rating per UL-752: Level III available.

\*\* NOTE TO SPECIFIER \*\* Delete bullet resistance rating not required.

* + - * 1. Bullet Resistance Rating per UL-752: Level 1; Contraflam ULTIMAX.
        2. Bullet Resistance Rating per UL-752: Level 2; Contraflam ULTIMAX.
        3. Bullet Resistance Rating per UL-752: Level 3; Contraflam ULTIMAX.
        4. Bullet Resistance Rating per UL-752: Level 4; Contraflam ULTIMAX.
        5. Bullet Resistance Rating per UL-752: Level 5; Contraflam ULTIMAX.
        6. Bullet Resistance Rating per UL-752: Level 6; Contraflam ULTIMAX.
        7. Bullet Resistance Rating per UL-752: Level 7; Contraflam ULTIMAX.
        8. Bullet Resistance Rating per UL-752: Level 8; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete detention rating not required.

* + - * 1. Detention Rating per ASTM F 1915: Grade 1; Contraflam ULTIMAX.
        2. Detention Rating per ASTM F 1915: Grade 2; Contraflam ULTIMAX.
        3. Detention Rating per ASTM F 1915: Grade 3; Contraflam ULTIMAX.
        4. Detention Rating per ASTM F 1915: Grade 4; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Delete burglary rating not required.

* + - * 1. Burglary Resistance Rating per UL 972; Contraflam ULTIMAX.

\*\* NOTE TO SPECIFIER \*\* Available with VDS LITE framing system. Delete if not required.

* + 1. Interior Glazing: SWISSFLAM by VETROTECH Saint-Gobain NA.
       1. Fire Rating: As specified with framing system in this Section.

\*\* NOTE TO SPECIFIER \*\* Available with VDS LITE framing system. Delete if not required.

* + 1. Interior Glazing: KERALITE by VETROTECH Saint-Gobain NA.
       1. Fire Rating: As specified with framing system in this Section.
    2. Labeling: Each piece of fire-rated glazing shall be labeled with a permanent logo including name of product, manufacturer, testing laboratory (UL), fire rating period, safety glazing standards, and date of manufacture.
    3. Glazing Accessories: Manufacturer's installation accessories including but not limited to compression gaskets and spacers.
  1. MATERIALS - STEEL FRAMING

\*\* NOTE TO SPECIFIER \*\* Delete framing system if not required.

* + 1. Steel Framing System: VDS FRAMING fire-rated steel frame system as manufactured by VETROTECH Saint-Gobain NA.

\*\* NOTE TO SPECIFIER \*\* Delete options for rating not required.

* + - 1. Rating: As indicated on Drawings.
      2. Rating: 60 minutes.
      3. Rating: 90 minutes.
      4. Rating: 120 minutes.
      5. Compliance: NFPA 80, NFPA 251, NFPA 252, NFPA 257, UL 263, UL 10B, UL 10C.

\*\* NOTE TO SPECIFIER \*\* Delete finish type not required.

* + - 1. Finish: Stainless Steel.
      2. Finish: As indicated on Drawings.
      3. Finish: Powder coated.
      4. Finish: Enamel.
      5. Finish: Kynar.

\*\* NOTE TO SPECIFIER \*\* Fill in blank below as applicable. Delete finish colors not required.

* + - * 1. Finish Color: As indicated on Drawings.
        2. Finish Color: Standard, as indicated on Drawings.
        3. Finish Color: Custom, as indicated on Drawings.
        4. Finish Color: Custom, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
      1. Steel Frame: Profiled steel tubing permanently joined with steel bolts.
      2. Insulation: Insulate framing system against effects of fire, smoke, and heat transfer from either side. Insulate profiled steel tubing using a shell construction that incorporates PROMATECT intermediate interlayer. Firmly pack perimeter of framing system to rough opening with mineral wool fire stop insulation or appropriately rated intumescent sealant.
      3. Steel Glazing Beads: rolled steel beads with dimensions recommended by manufacturer to securely hold glazing material in place.
      4. Fasteners: Type recommended by manufacturer.
      5. Glazing Accessories: Set CONTRAFLAM glass using calcium silicate or neoprene setting blocks.
      6. Glaze CONTRAFLAM glass with glazing gaskets, compounds and tapes with the following:

\*\* NOTE TO SPECIFIER \*\* Delete options for glazing accessories not required.

* + - * 1. Manufacturer approved EPDM glazing gaskets.
        2. Manufacturer approved closed cell PVC tape.
        3. Manufacturer approved pure silicone sealant.

\*\* NOTE TO SPECIFIER \*\* Delete bullet resistance rating not required.

* + - * 1. Bullet Resistance Rating per UL-752: Level 1.
        2. Bullet Resistance Rating per UL-752: Level 2.
        3. Bullet Resistance Rating per UL-752: Level 3.
        4. Bullet Resistance Rating per UL-752: Level 4.
        5. Bullet Resistance Rating per UL-752: Level 5.
        6. Bullet Resistance Rating per UL-752: Level 6.
        7. Bullet Resistance Rating per UL-752: Level 7.
        8. Bullet Resistance Rating per UL-752: Level 8.

\*\* NOTE TO SPECIFIER \*\* Delete detention rating not required.

* + - * 1. Detention Rating per ASTM F 1915: Grade 1.
        2. Detention Rating per ASTM F 1915: Grade 2.
        3. Detention Rating per ASTM F 1915: Grade 3.
        4. Detention Rating per ASTM F 1915: Grade 4.

\*\* NOTE TO SPECIFIER \*\* Delete burglary rating not required.

* + - * 1. Burglary Resistance Rating per UL 972.

\*\* NOTE TO SPECIFIER \*\* VDS LITE is a narrow style framing system that meets fire ratings from 20 to 90 minutes. VDS LITE is easy to assemble, reducing installation time and cost compared to other conventional door and window systems. Max door leaf size 42 inches x 96 inches (1067 mm x 2438 mm). Delete framing system if not required.

* + 1. Steel Framing System: VDS LITE FRAMING fire-rated steel frame system as manufactured by VETROTECH Saint-Gobain NA.

\*\* NOTE TO SPECIFIER \*\* Delete options for rating not required.

* + - 1. Rating: As indicated on Drawings.
      2. Rating: 20 minutes.
      3. Rating: 45 minutes.
      4. Rating: 60 minutes.
      5. Rating: 90 minutes.
      6. Compliance: NFPA 80, NFPA 251, NFPA 252, NFPA 257, UL 9, UL 10B, UL 10C.

\*\* NOTE TO SPECIFIER \*\* Delete finish type not required.

* + - 1. Finish: As indicated on Drawings.
      2. Finish: Powder coated.
      3. Finish: Enamel.
      4. Finish: Kynar.

\*\* NOTE TO SPECIFIER \*\* Fill in blank below as applicable. Delete finish colors not required.

* + - * 1. Finish Color: As indicated on Drawings.
        2. Finish Color: Standard, as indicated on Drawings.
        3. Finish Color: Custom, as indicated on Drawings.
        4. Finish Color: Custom, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
      1. Steel Frame: cold rolled profiled steel tubing.
      2. Fasteners: Type recommended by manufacturer.
      3. Glazing Accessories: Set glass using calcium silicate or neoprene setting blocks.
      4. Glaze with glazing gaskets, compounds and tapes with the following:

\*\* NOTE TO SPECIFIER \*\* Delete options for glazing accessories not required.

* + - * 1. Manufacturer approved EPDM glazing gaskets.
        2. Manufacturer approved closed cell PVC tape.
        3. Manufacturer approved pure silicone sealant.
  1. FABRICATI0N
     1. Frame: Furnish frame assemblies pre-welded.
        1. Field splice frames too large for shop fabrication or shipping or to fit in available building openings.
        2. Fit with manufacturer approved fasteners.
        3. Knock-down door perimeter frames are not permitted.
     2. Door and Frame Assemblies: Field glazed.
     3. Steel Door Assemblies Factory prepared for field mounting of hardware.
     4. Fabrication Dimensions: Fabricate fire rated assembly to dimensions verified in field.
     5. Obtain Architect reviewed and approved Shop Drawings prior to fabrication.
  2. FINISHES, GENERAL
     1. Comply with NAAMM's (National Association of Architectural Metal Manufacturers) "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
     2. Finish frames after assembly.
     3. Protect finishes on exposed surfaces from damage by applying a removable, temporary protective cladding before shipping.
     4. Appearance of Finished Work: Variations in appearance of adjacent frame sections are acceptable. Noticeable variations in the same piece are not acceptable.
     5. Color-Coated Finish: Apply manufacturer's standard powder coating finish system complying with AAMA 2603 applied to factory-assembled frames before shipping, complying with manufacturer's written instructions for surface preparation including pretreatment, application, and minimum dry film thickness.

\*\* NOTE TO SPECIFIER \*\* Fill in blank below with color and gloss designation or delete line. Delete options for color not required.

* + - 1. Color and Gloss: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
      2. Color and Gloss: As indicated on Drawings.
      3. Color and Gloss: As selected by Architect from manufacturer's full range.
  1. DOOR HARDWARE FOR SINGLE AND PAIRED DOORS
     1. Furnish hardware with fire door by the manufacturer. Select hardware from door manufacturer's standard recommended and approved hardware groups.

\*\* NOTE TO SPECIFIER \*\* Recommended for high traffic areas and required by code in some applications. Delete if not required.

* + 1. Provide areas requiring a door motion force of greater than 20 pounds (9 kg) with power assisted hardware for use with manufacturer's frame system.
    2. Operating Hardware: For steel doors as manufactured by VETROTECH Saint-Gobain NA.

\*\* NOTE TO SPECIFIER \*\* Delete options not required.

* + - 1. Configuration: As indicated on Drawings.
      2. Configuration: As selected by Architect from manufacturer's full range.
      3. Configuration: Single In-swing Doors with Mortise Locking.
      4. Configuration: Single Out-swing Doors with Mortise Locking.
      5. Configuration: Single Out-swing Doors with Exit Device.
      6. Configuration: Active-Fixed In-swing Pair of Doors with Mortise Locking.
      7. Configuration: Active-Fixed Out-swing Pair of Doors with Mortise Locking.
      8. Configuration: Active-Fixed Out-swing Pair of Doors with Exit Device.
      9. Configuration: Active-Active Out-swing Pair of Doors with Exit Device.

\*\* NOTE TO SPECIFIER \*\* The following hardware sets are supplied by the manufacturer and are provided here for coordination with other hardware products specified for other openings. Please note the standard furnishings, but contact the product representative for other options with respect to availability of specific brands, types and finishes. Delete hardware items not required or add as preferred.

* + - 1. Hanging Devices: Weld on adjustable mechanical hinges, weld on pivots or 3-part bolt on hinges.
      2. Mortise Lock: Mortise lock with panic function (Standard: by ACCURATE).
      3. Cylinder: Standard Mortise Cylinder (Standard: by BALDWIN).
      4. Exit Device: Narrow Stile Exit Device concealed or surface mounted (Standard: by DORMA 9600 / 9700 / 9800 Series).
      5. Lever Trim: Narrow Stile (Standard: by FSB).
      6. Closing Device: Surface applied closer (Standard: by DORMA TS93 Series).
      7. Bottom Door Seal: Smoke Seal (Standard: PEMKO).
      8. Weather Seal: Perimeter Gasket (by VETROTECH).

1. EXECUTION
   1. EXAMINATION
      1. Inspect conditions of substrate and other conditions which may affect installation of signage.
      2. Do not begin installation until substrates are within manufacturer's specified tolerances and have been prepared in accordance with manufacturer's instructions. Provide openings plumb, square and within allowable tolerances. The manufacturer recommends 3/8 inch (9.5 mm) shim space at all walls.
      3. If substrate preparation is the responsibility of another installer, do not proceed with installation. Notify Architect of unsatisfactory preparation immediately.
      4. Commencement of work is deemed as acceptance of installation conditions.
   2. INSTALLATION
      1. As written in manufacturer's installation instructions and shop drawing details, place if required sill flashing, shims and sealant into the wall or door opening prior to framing installation
      2. Place window or door frame in prepared opening. Shim at anchor points. Plumb and level frame as required per manufacturer's instructions.
      3. Attach frame around the perimeter using #10 screws x appropriate length through factory prepared access holes.
      4. Shim space must be properly sealed to maintain fire rating either with tightly packed mineral wool or a fire rated intumescent sealant per manufacturer's instructions.
      5. Install glass as required per manufacturer's glazing installation instructions. Modifications of framing material or glass in the field is not permissible.
      6. Upon completion, the frame may be trimmed with architectural sealant or material of choice ie: wood, tile, painted gypsum board etc. \*Reference architectural details.

\*\* NOTE TO SPECIFIER \*\* Manufacturer's Recommendations: It is strongly encouraged that the architect requires field testing. However, testing costs money. Carefully weigh the benefit of field testing, and air and water resistant opening resistant up to the ASTM standards referenced in this specification, vs. the first cost savings to the Owner. Furthermore, select a corner unit or other bay that requires the joining of many parts for the test area(s). These areas must be noted on the drawings or described in the specification prior to bid or additional costs to the Owner may result. Delete if not required.

* 1. FIELD QUALITY CONTROL

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Field Tests: Architect shall select units to be tested as soon as a representative portion of the project has been installed, glazed, perimeter caulked and cured. Conduct tests for air infiltration and water penetration with manufacturer's representative present. Tests not meeting specified performance requirements and units having deficiencies shall be corrected as part of the contract amount.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + 1. Testing: Testing shall be performed by a qualified independent testing agency. Refer to Testing Section for payment of testing and testing requirements.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Air Infiltration Tests: Conduct tests in accordance with ASTM E 783. Allowable air infiltration shall not exceed 1.5 times the amount indicated in the performance requirements or 0.09 cfm/ft2, which ever is greater.

\*\* NOTE TO SPECIFIER \*\* Delete if not required.

* + - 1. Water Infiltration Tests: Conduct tests in accordance with ASTM E 1105. No uncontrolled water leakage is permitted when tested at a static test pressure of two-thirds the specified water penetration pressure but not less than 10 psf (479 Pa).
  1. ADJUSTING
     1. Adjust door function and hardware for smooth operation. Coordinate with other hardware suppliers for function and use of any other attached hardware.
  2. PROTECTION AND CLEANING
     1. Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
        1. Do not clean with astringent cleaners. Use a clean "grit free" cloth and a small amount of mild soap and water or mild detergent.
        2. Bullet resistant glazing materials with sensitive protect surface applied film on exterior surface. Do not use any of the following:
           1. Steam jets.
           2. Abrasives.
           3. Strong acidic or alkaline detergents, or surface-reactive agents.
           4. Detergents not recommended by manufacturer.
           5. Detergent above 77 degrees F (25 degrees C).
           6. Organic solvents including but not limited to those containing ester, ketones, alcohols, aromatic compounds, glycol ether, or halogenated hydrocarbons.
           7. Metal or hard parts of cleaning equipment must not touch the glass surface.
     2. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
     3. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.
  3. REPAIR AND TOUCH UP
     1. Limited to minor repair of small scratches. Use only manufacturer's recommended products.
        1. Such repairs shall match original finish for quality or material and view.
        2. Repairs and touch-up not visible from a distance of 5 feet (1.5 m). Owner and Architect to approve.
     2. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged.

END OF SECTION