

SECTION 08 8859

THERMOCHROMIC GLASS

This section includes editing notes to assist the user in editing the section to suit project requirements. These notes are included as hidden text, and can be revealed or hidden by one of the following methods:

Microsoft Word 2010: Display the FILE tab on the ribbon, click OPTIONS, then on left menu click on DISPLAY. Under ALWAYS SHOW THESE select or deselect HIDDEN TEXT.

Microsoft Word 2007: Click the OFFICE button, select WORD OPTIONS, select DISPLAY, then select or deselect the HIDDEN TEXT option.

Corel WordPerfect: From the pull-down menus select VIEW, then select or deselect the HIDDEN TEXT option.

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Thermochromic glass for exterior [windows] [storefront] [curtain wall] [doors] [_____].
- B. Related Sections:
 - 1. Division 01: Administrative, procedural, and temporary work requirements.
 - 2. Section [08 4113 - Aluminum-Framed Entrances and Storefronts.] [_____ - _____].
 - 3. Section [08 4229 - Automatic Entrances.] [_____ - _____].
 - 4. Section [08 4329 - Sliding Storefronts.] [_____ - _____].
 - 5. Section [08 4413 - Glazed Aluminum Curtain Walls.] [_____ - _____].
 - 6. Section [08 5113 - Aluminum Windows and Glass Doors.] [_____ - _____].
 - 7. Section [08 5123 - Steel Windows.] [_____ - _____].
 - 8. Section [08 5200 - Wood Windows and Glass Doors.] [_____ - _____].
 - 9. Section [08 5300 - Plastic Windows and Glass Doors.] [_____ - _____].
 - 10. Section [08 8000 - Glazing:] [_____ - _____].

1.2 REFERENCES

- A. American National Standards Institute (ANSI) Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.
- B. American Society of Civil Engineers (ASCE) 7 - Minimum Design Loads for Buildings and Other Structures.
- C. ASTM International (ASTM):
 - 1. C1036 - Standard Specification for Flat Glass.
 - 2. C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT, Coated and Uncoated Glass.
 - 3. C1172 - Standard Specification for Laminated Architectural Flat Glass.
 - 4. E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.
 - 5. E2141 - Standard Test Methods for Assessing the Durability of Absorptive Electrochromic Coatings on Sealed Insulating Glass Units.
 - 6. E2188 - Standard Test Method for Insulating Glass Unit Performance.
 - 7. E2189 - Standard Test Method for Testing Resistance to Fogging in Insulating Glass Units.
 - 8. E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.
- D. Consumer Product Safety Commission (CPSC) 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.
- E. Glass Association of North America (GANA):

1. Engineering Standards Manual.
2. Glazing Manual.
3. Laminated Glass Design Guide.

F. Insulating Glass Manufacturers Alliance (IGMA):

1. IGMA TB-3001 - Sloped Glazing Guidelines.
2. SIGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units.

1.3 SYSTEM DESCRIPTION

A. Glass Thicknesses:

1. Size glass to withstand positive and negative wind pressure acting normal to plane in accordance with [ASCE 7] [Building Code] [_____] as measured in accordance with ASTM E330.
2. Provide glass in thicknesses and strengths to meet or exceed ASTM E1300.

1.4 SUBMITTALS

A. Submittals for Review:

1. Product Data: Descriptive data and performance attributes for thermochromic glass.
2. Samples: [12 x 12] [__ x __] inch thermochromic glass samples.

B. Sustainable Design Submittals:

1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
2. Regional Materials: Certify distance between manufacturer and project and between manufacturer and extraction or harvest point in miles.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Minimum [2] [__] years [documented] experience in work of this Section.

B. Regulatory Requirements:

1. Provide safety glass for locations subject to human impact as required by [Building Code.] [____].
2. Safety glass: Tested and labeled to CPSC 16 CFR 1201.

C. Perform Work in accordance with [GANA Glazing Manual] [GANA Laminated Glass Design Guide] [SIGMA TM-3000] [and] [IGMA TB-3001].

1.6 WARRANTIES

A. Furnish manufacturer's 10 year warranty providing for replacement of glass units exhibiting filter delamination from glass, optical failures including bubbles, and heat seal failure, not including labor.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Contract Documents are based on products by Ravenbrick LLC. (www.ravenbrick.com)
- B. Substitutions: [Under provisions of Division 01.] [Not permitted.]

2.2 MATERIALS - GLASS

- A. Clear Glass: ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select.
- B. Clear Tempered Glass: ASTM C1048, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select, Kind FT fully tempered.

- C. Clear Heat Strengthened Glass: ASTM C1048, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select, Kind HS heat strengthened.
- D. Tinted Glass:
 1. Type: ASTM C1036, Type 1 transparent flat, Class 2 tinted heat absorbing and light reducing, Quality q3 glazing select.
 2. Color: [Blue.] [Green.] [Bronze.] [Gray.] [____.]
- E. Tinted Tempered Glass:
 1. Type: ASTM C1048, Type 1 transparent flat, Class 2 tinted heat absorbing and light reducing, Quality q3 glazing select, Kind FT fully tempered.
 2. Color: [Blue.] [Green.] [Bronze.] [Gray.] [____.]
- F. Tinted Heat Strengthened Glass:
 1. Type: ASTM C1048, Type 1 transparent flat, Class 2 tinted heat absorbing and light reducing, Quality q3 glazing select, Kind HS heat strengthened.
 2. Color: [Blue.] [Green.] [Bronze.] [Gray.] [____.]
- G. Recycled Content: Minimum [] percent, with minimum [] percent classified as post-consumer.

2.3 MATERIALS - SOLAR FILTER

- A. Source: RavenWindow thermochromic filter.
- B. Performance Characteristics:
 1. Heat and ultraviolet exposure: Pass 216 hour exposure under 700 watt UV curing lamp at sample temperature of 90 degrees C.
 2. Vibration and flexure: No defects, tested for 24 hours between two speakers set to 90 db and using tone generating software generating sounds from 20 to 20,000 Hz in 4 second cycles.
 3. Solar: No change to visual or functional conditions, tested to ASTM E2141.
 4. Fogging: No visual fogging, tested to ASTM E2189.
 5. Heat/humidity and thermal cycling: No damage to filter or visible change in appearance or function, tested to ASTM E2188.
 6. Long term cycling: No damage to filter or visible change in appearance or function, tested to ASTM E2190.

2.4 ACCESSORIES

- A. Glazing Accessories: Specified in Section 08 8000.

2.5 FABRICATION

- A. Laminated Glass:
 1. Comply with ASTM C1172 and ANSI Z97.1.
 2. Laminate glass with laminating film by manufacturer's standard heat and pressure process.
 3. Cut glass to required size at factory.
 4. Discard glass with voids, delamination, or entrapped dirt or foreign matter.
- B. Sealed Insulating Glass:
 1. Comply with ASTM E2190.
 2. Fabricate spacer bar frame of tubular aluminum filled with desiccant.
 3. Bond spacer bar frame to glass panes with twin primary seals.
 4. Fill space outside frame to glass edge with elastomeric sealant.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install glass as specified in Section 08 8000.

3.2 GLASS SCHEDULE

- A. Glass Type [EGL-1:] [__:]
1. Description:
 - a. Outboard lite: [__] inch thick [clear] [tinted] glass, [heat strengthened or] tempered where required.
 - b. Inboard lite: [__] inch thick clear [laminated] glass [, tempered where required].
 2. Total unit thickness: [__] inch.
 3. Performance characteristics:
 - a. Visible transmittance: [__] percent.
 - b. Solar heat gain coefficient: [__] percent.
 - c. Ultraviolet transmittance: [__] percent.
 - d. Visible reflectance: [__] percent outdoor; [__] percent indoor.
 - e. Solar reflectance: [__] percent.
 - f. Shading coefficient: [__].
 4. Locations: [____.]

END OF SECTION