

## SECTION 08 51 23 STEEL WINDOWS

### PART I - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Steel fixed interior windows.
  - 2. Operating Hardware.

#### 1.2 RELATED REQUIREMENTS

- A. Sealing Joints: Section 07 92 00, JOINT SEALANTS.
- B. Glazing: Section 08 80 00, GLAZING.
- C. Finish Color: Section 09 06 00, SCHEDULE FOR FINISHES.

#### 1.3 APPLICABLE PUBLICATIONS

- A. Comply with references to extent specified in this section.
- B. American Architectural Manufacturers Associations (AAMA):
  - AAMA/WDMA/CSA 101/I.S.2/A440-11 - Windows, Doors, and Skylights.
- C. American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI):
  - 7-10 - Minimum Design Loads For Buildings and Other Structures.
- D. American Welding Society (AWS):
  - D1.1/D1.1M-15 - Structural Welding Code - Steel.
- E. ASTM International (ASTM):
  - A123/A123M-15 - Zinc (hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - E283-04(2012) - Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - E330/E330M-14 - Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
  - E331-00(2009) - Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- F. Builders Hardware Manufacturers Association (BHMA):
  - A156.18-12 - American National Standard for Materials and Finishes.
- G. Master Painters Institute (MPI):

No. 18 - Primer, Zinc Rich, Organic.

H. Society for Protective Coatings (SSPC):

SP 5/NACE NO. 1-07 - White Metal Blast Cleaning.

#### 1.4 PREINSTALLATION MEETINGS

A. Conduct preinstallation meeting at project site minimum 30 days before beginning Work of this section.

1. Required Participants:

- a. Contracting Officer's Representative.
- b. Contractor.
- c. Installer.

2. Meeting Agenda: Distribute agenda to participants minimum 3 days before meeting.

- a. Installation schedule.
- b. Installation sequence.
- c. Preparatory work.
- d. Protection before, during, and after installation.
- e. Installation.
- f. Transitions and connections to other work.
- g. Other items affecting successful completion.

3. Document and distribute meeting minutes to participants to record decisions affecting installation.

#### 1.5 SUBMITTALS

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

B. Submittal Drawings:

1. Layout and installation details, including anchors, support framing and sheet metal trim members.
2. Elevations of continuous work at 1: 50 (1/4 inch) scale and typical window unit elevations at 1: 20 (3/4 inch) scale.
3. Full-size section details of typical composite members, including reinforcement.
4. Hardware.
5. Accessories.
6. Glazing details.
7. Color charts for standard finishes and sealants.

C. Manufacturer's Literature and Data:

1. Description of each product.
2. Installation instructions.
3. Warranty.

D. Samples:

1. Typical sash corner 300 mm (12 inch) long each leg.
  2. Typical muntin section 300 mm (12 inch) long.
  3. Window frame with each specified finish on 300 mm (12 inch) long section.
  4. Hardware, each item.
- E. Sustainable Construction Submittals:
1. Recycled Content: Identify post-consumer and pre-consumer recycled content percentage by weight.
- F. Test reports: Certify products comply with specifications.
1. Windows.
- G. Certificates: Certify each product complies with specifications.
1. Factory finish:
    - a. Stating steel members have been given specified thickness of prime coat and finish.
- H. Qualifications: Substantiate qualifications comply with specifications.
1. Manufacturer with project experience list.
  2. Installer with project experience list.
  3. Welders and welding procedures.
- I. Operation and Maintenance Data:
1. Care instructions for each exposed finish product.

## **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications:
1. Regularly manufactures specified products.
  2. Manufactured specified products with satisfactory service on five similar installations for minimum five years.
    - a. Project Experience List: Provide contact names and addresses for completed projects.
- B. Installer Qualifications:
1. Regularly installs specified products.
  2. Installed specified products with satisfactory service on five similar installations for minimum five years.
    - a. Provide contact names and addresses for completed projects when requested by Contracting Officer's Representative.
  3. Approved by manufacturer.

## **1.7 DELIVERY**

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

- B. Mark packaging, legibly. Indicate manufacturer's name or brand, type, color, production run number, and manufacture date.
  - 1. Use padded blankets or other approved protective wrapping for glass, decorative metal work, and other exposed elements.
- C. Do not deliver steel window units until work is ready for installation.
- D. Before installation, return or dispose of products within distorted, damaged, or opened packaging.

## 1.8 STORAGE AND HANDLING

- A. Comply with applicable recommendations of Steel Window Institute (SWI).
- B. Store products indoors in dry, weathertight facility.
- C. Protect products from damage during handling and construction operations.

## 1.9 WARRANTY

- A. Construction Warranty: FAR clause 52.246-21, "Warranty of Construction."
- B. Manufacturer's Warranty: Warrant <specified item> against material and manufacturing defects.
  - 1. Warranty Period: Five years.

## PART 2 - PRODUCTS

### 2.1 SYSTEM PERFORMANCE

- A. Design complying with specified performance:
  - 1. Load Resistance: ASCE/SEI 7; Design criteria as indicated on Drawings.
  - 2. Thermal Transmittance: U-0.65 , maximum.
  - 3. Condensation Resistance: NFRC 500; CRF, Minimum.
  - 4. Water Resistance: ASTM E331; No uncontrolled penetration at 160 Pa (2.86 psf), minimum, pressure differential.
  - 5. Air Infiltration Resistance: ASTM E283; 2.06 cubic meter per hour per meter (0.37 cubic foot per minute per foot) of crack length, maximum at 300 Pa (6.24 psf), minimum, pressure differential.

### 2.2 PRODUCTS - GENERAL

- A. Basis of Design: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Provide each product from one manufacturer.
  - 1. Provide each product exposed to view from one production run.
- C. Sustainable Construction Requirements:
  - 1. Steel Recycled Content: 30 percent total recycled content, minimum.

## 2.3 STEEL WINDOWS

- A. Operation: fixed.

## 2.4 GLAZING

- A. Glass and Glazing: As specified in Section 08 80 00, GLAZING.
  - 1. Factory glaze windows.

## 2.5 INTERIOR METAL WINDOW TRIM

- A. Form window trim of zinc-coated sheet steel.
  - 1. Minimum Thickness:
    - a. Heads and Jambs: 1.2 mm (0.05 inches).
    - b. Stools: 2.33 mm (0.19 inches).
    - c. Moldings: 1.0 mm (0.4 inches).
  - 2. Fabricate trim as welded assembly with hairline mitered corners, dressed flush and smooth.

## 2.6 FABRICATION

- A. General:
  - 1. Fabricate steel windows according to SWI requirements and approved shop drawings.
  - 2. Factory assemble windows.
  - 3. Form sections in one piece, straight, true and smooth.
  - 4. Provide drips and weep holes according to manufacturer's standard.
  - 5. Attachment of manufacturer's metal nameplates is not acceptable on window surface.
- B. Frame: Modified channel shapes with welded miter or coped corners. Fabricate head and jamb members with integral screen-stops. Integrally roll continuous flange at jambs and heads to form a caulking stop between facing and backing masonry.
- C. Exposed and Contact Surfaces: Finished smooth, flush, with adjacent surfaces.
- D. Sills: Stepped rabbeted to receive lower sash bottom rail, allowing rail to be kept clear of sill wash. Perforation of sills at any point is not acceptable. Weld strap anchors to underside of sill, or screw to tapped lugs welded to sill.
- E. Sash:
  - 1. Rails: Tubular shape, formed in one piece from single strips.
  - 2. Stiles: Tubular or modified channel shape formed in one piece from single strips.
  - 3. Sash Rebates: Minimum 15 mm (19/32 inch), with interior horizontal top surfaces of both meeting rails flat and in same plane.

- F. Closures: Miter or cope closure corners and fit with tightly closed joints. Secure closures to window frames with non-corrosive machine screws or expansion rivets, and to masonry with fasteners specified.
- G. Reinforcing: Reinforce window frames for attachment of screens, screen hardware or travel-limit lug. Weld full or limited length 3 mm (1/8 inch) thick reinforcing plates to back of frames, ensuring sufficient width to securely hold fasteners.
- H. Welding: Dress exposed welds and joints, flush and smooth.
  - 1. Install weatherstripping at head, jambs, sill, and meeting rails of sash and of impost. Apply weather-strip to both integral weather-strip grooves of aluminum weather-strip adapter. Secure weather-strip adapter to frame surface.
  - 2. Install window hardware.
  - 3. Fabricate anchor clips and mullions necessary for installation of windows and hardware for operation of ventilators, including fasteners required for attaching such items to window shall be provided by window manufacturer.

## **2.7 FINISHES**

- A. Surface Preparation: Comply with SSPC-SP 5/NACE No. 1.
- B. Apply finishes immediately after cleaning and pretreating.
- C. Prime Finish: Manufacturer's standard primer for steel.
- D. High-Performance Paint Finish:
  - 1. Fluorocarbon Finish: 70 percent fluoropolymer resin, 2-coat system.
  - 2. Color: Refer to Section 09 06 00, SCHEDULE FOR FINISHES.

## **2.8 ACCESSORIES**

- A. Welding Materials: AWS D1.1/D1.1M, type to suit application.
- B. Galvanizing Repair Paint: MPI No. 18.
- C. Screws, Shields, Plugs, and other Fasteners: according to manufacturer's instructions.
- D. Fasteners for Anchoring: Where type, size or spacing of fasteners for securing windows and accessories to building construction is not shown or specified, use expansion or toggle bolts or screws, instructed by manufacturer to suit application.
  - 1. Provide expansion shield and bolt assemblies having holding power beyond tensile and shearing strength of bolt.
  - 2. Power actuated drive pins is acceptable for securing anchors to concrete if recommended by manufacturer.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Examine and verify substrate suitability for product installation.
  - 1. Verify window openings are correctly sized and within allowable tolerances.
- B. Protect existing construction and completed work from damage.
- C. Correct substrate deficiencies.
- D. Clean adjacent masonry before window installation to prevent damage to window finish by masonry cleaning materials.

### **3.2 INSTALLATION**

- A. Install products according to manufacturer's instructions and approved submittal drawings.
- B. Install steel windows according to manufacturer's instructions and approved submittal drawings.
- C. Install steel windows ensuring units are square, plumb, and true to line without racking.
- D. Anchor units securely to surrounding construction with a minimum of three adjustable, asphalt coated or galvanized steel anchors with approved fasteners according to manufacturer's instructions.
  - 1. Bolts or screws: Minimum 6 mm (1/4 inch) diameter and spaced maximum 600 mm (24 inches) on centers.
- E. Seal exterior joints between sash, trim and mullions watertight with sealant as specified in Section 07 92 00, JOINT SEALANTS, and neatly pointed.
- F. Upon complete installation of windows and accessories, and before acceptance of work, adjust movable sash and operating mechanism for free and easy operation, and defects.

### **3.3 CLEANING**

- A. Remove excess sealant.
- B. Clean exposed steel and glass surfaces. Remove contaminants and stains.

### **3.4 PROTECTION**

- A. Protect windows from construction operations.
- B. Remove protective materials immediately before acceptance.
- C. Repair damage.

**END OF SECTION 08 51 23**