

## SECTION 081117

### BRONZE CLAD FRAMES

#### PART 1 - GENERAL

##### 1.1 STIPULATIONS

- A. The specifications sections "General Conditions of the Construction Contract", "Special Conditions", and "Division 1 - General Requirements" form a part of this Section by this reference thereto, and shall have the same force and effect as if printed herewith in full.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Bronze clad over aluminum extrusion frames.
- B. Related Sections:
  - 1. Section 088000 "Glazing" for glass installed in bronze frames.

##### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, ratings and finishes.
- B. Shop Drawings: Include the following:
  - 1. Elevations of frames.
  - 2. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
  - 3. Locations of reinforcement.
  - 4. Details of anchorages, joints, field splices, and connections.
- C. Samples for Verification:
  - 1. Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches (75 by 125 mm).

##### 1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design framing systems, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. General: In engineering framing systems to withstand structural loads indicated, determine allowable design working stresses of framing system materials based on the following:

1. Aluminum: 75 percent of minimum yield strength.
2. Steel: 72 percent of minimum yield strength.
3. Bronze: 75 percent of minimum yield strength.

C. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Mullions:
  - a. Uniform load of 50 lbf/ft. (0.73 kN/m) applied in any direction.
  - b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
  - c. Uniform and concentrated loads need not be assumed to act concurrently.
2. Infill Glazed Panels:
  - a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. in.).
  - b. Infill load and other loads need not be assumed to act concurrently.

#### 1.5 QUALITY CONTROL

- A. Source Limitations: Obtain bronze, clad-metal work from single source from single manufacturer.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
- B. Store frames inside at Project site. Place units in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (100-mm-) high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber.

#### 1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

#### 1.8 COORDINATION

- A. Coordinate installation of anchorages for stainless-steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

## PART 2 - PRODUCTS

### 2.1 BRONZE CLAD FRAMES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. CR Laurence.
  2. Forms+Surfaces.
  3. Gamco Corp.
  4. PRL Glass Systems.
  5. Or equal manufacturer as approved by the Professional.

### 2.2 BRONZE CLAD FRAMES

- A. Description: Fabricate bronze clad frames of construction indicated, with faces of corners cut sharp and square and contact edges closed tight.
1. Storefront Frames: Machine or saw cut for tight hairline mechanical joints.
  2. Frames: Fabricate from 0.109-inch- (2.78-mm-) thick, bronze sheet.
  3. Glazing and Panel Stops: Formed integral with aluminum extrusions, minimum 1 inch deep, unless otherwise indicated.
  4. Loose Stops for Glazed Lites and Panels: 0.125-inch-thick bronze.
  5. Reinforcement: Fabricate with internal reinforcing plates from steel.
  6. Floor Anchors: Not less than 0.078-inch- (1.98-mm-) thick steel, and as follows:
    - a. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

### 2.3 MATERIALS

- A. Bronze Sheet:
1. Thickness: 0.032 inches C385 architectural bronze, consisting of 38% Zn (Zinc), 3% Pb (lead), 58.6% Cu (copper), 0.35% Fe (iron) and 0.05% residual.
- B. Finish:
1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
  2. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
    - a. Dull Satin Finish: No. 6.
- C. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
  2. Extruded Bars, Rods, Profiles and Tubes: ASTM B 221 (ASTM B 221M).
  3. Welding Rods and Bare Electrodes: ASW A5.10/A5.10M.

- D. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer, complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
  - 1. Structural Shapes, Plates and Bars: ASTM A 36/A 36M.
  - 2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
  - 3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

## 2.4 FABRICATION OF ALUMINUM SUBSTRATES

- A. Form or extrude aluminum shapes before cladding with bronze.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:
  - 1. Profiles that are sharp, straight, and free of defects or deformations.
  - 2. Accurately fitted joints with ends coped or mitered.
  - 3. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
  - 4. Provisions for field replacement of glazing from exterior.
  - 5. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- F. Storefront Framing: Fabricate components for assembly using shear-block system, screw-spline system or head-and-sill-receptor system with shear blocks at intermediate horizontal members as standard with manufacturer.
- G. After fabrication of aluminum subframes, apply bronze cladding by manufacturer's standard cladding process.
  - 1. At exterior doors, provide compression weather stripping at fixed stops.
- H. Reinforcement: Provide internal steel reinforcement as required by delegated design calculations.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of bronze frames.

- B. Examine roughing-in for embedded and built-in anchors to verify actual locations of bronze frame connections before frame installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Prior to installation and with installation spreaders in place, adjust and securely brace bronze frames for squareness, alignment, twist, and plumb to the following tolerances:
  - 1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at frame rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - 2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
  - 3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - 4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.

### 3.3 INSTALLATION

- A. General: Install bronze frames plumb, rigid, properly aligned, and securely fastened in place; comply with manufacturer's written instructions.
- B. Bronze Frames: Install bronze frames of size and profile indicated.
  - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
    - a. Install frames with removable glazing stops located on secure side of opening.
    - b. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    - c. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
    - d. Apply corrosion-resistant coating to backs of grout-filled frames.
- C. Glazing: Install glazing in sidelights, transoms, and borrowed lights to comply with installation requirements in Section 088000 "Glazing."
  - 1. Secure stops with countersunk, flat-, or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c., and not more than 2 inches (50 mm) o.c. from each corner.

### 3.4 ADJUSTING AND CLEANING

- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work including bronze frames that are warped, bowed, or otherwise unacceptable.
- B. Bronze Touchup: Immediately after erection, smooth any abraded areas of bronze and polish to match undamaged finish.

END OF SECTION 081117