

## SECTION 05 5200 - HANDRAILS AND RAILINGS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to work of this Section

#### 1.2 SUMMARY

1. Extent of railings work is indicated on the Drawings, steel railings interior.

#### 1.3 SYSTEMS PERFORMANCES

- A. Structural Performances Provide railing and handrail assemblies which, when installed, comply with the following minimum requirements for structural performance, unless otherwise indicated.
- B. Handrails and Toprails: Capable of withstanding the following loads applied as indicated, but no less than as required by ICC 2009:
  - 1.. Concentrated Load of 200 lbf applied at any point in any direction.
  2. Uniform load of 50 lbf per linear ft. applied in any direction.
  - 3.. Concentrated and uniform loads above need not to be assumed to act concurrently.
- C. Guards: Concentrated load of 50 lb per sq. ft. of gross area of guard, applied horizontally, including any open areas, of which they are a part, but no less than as required by ICC 2009.
  1. Infill load and other loads need not to be assumed to act concurrently.
- D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

#### 1.4 QUALITY ASSURANCE

- A. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.

#### 1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product specifications and installation instructions

for products and processes used in handrails and railings, including finishes and grout.

B. Shop Drawings: Submit Shop Drawings for fabrication and erection of handrails and railings. Include plans, elevations, and details of fittings, connections, and anchorages to other work. Provide templates for anchor and bolt installation by others.

1. Where materials of fabrications are indicated to comply with certain requirements for design loadings, include structural computations, material properties and other information needed for Structural analysis.

C. Samples: Submit samples for each type of metal finish indicated. Prepare samples on metal on same gauge and alloy to be used in the Work. Where normal color and texture variations are to be expected, provide "range" samples showing limits of such variations.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Metal: Comply with standards indicated for forms and types of metals indicated or required for handrail and railing components.

B. Steel:

1. Pipe: ASTM A 53/A 53M, Type F or Type S, Grade A, Standard Weight (Schedule 40), unless another grade and weight are required by structural loads.
2. Steel Plates, Shapes, and Bars: ASTM A 36

C. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded, and as required for color match, strength and compatibility in fabricated items.

D. Fasteners: Use fasteners of same basic metal as the fastened metal, unless otherwise indicated. Do not use metals which are corrosive or incompatible with materials joined.

1. Provide concealed fasteners for interconnection of handrail and railing components and for their attachment to other work except where exposed fasteners are unavoidable or are the standard fastening method for handrail and railing system indicated.

E. Anchors and Inserts: Provide anchors of proper type, size and material for type of loading and installation condition shown, as recommended by manufacturer, unless otherwise indicated. Use exterior locations and elsewhere as required for corrosion resistance. Use together steel or lead expansion bolt devices for drilled in place anchors. Furnish inserts, as required to be set into concrete or masonry work.

F. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

- G. Non-shrink, Non-metallic Grout: Factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

## 2.2 FABRICATION

- A. General: Fabricate handrails and railings to design, dimensions and details shown. Provide handrail and railing members in sizes and profiles indicated, with supporting posts and brackets of size and spacing shown, but not less than required to support the design loading indicated.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Bend members in jigs to produce uniform curvature without buckling or otherwise deforming exposed surfaces.
- D. Clean exposed ends of railing members with prefabricated end fittings.
- E. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers to transfer loads through wall finishes
- F. Welded Connections: Fabricate handrails and railings of materials indicated below for interconnections of members by welding. Pre-assemble railing units ship into maximum extent practicable and consistent with shipping and handling limitations. Perform welding to comply with applicable AWS specifications, using method appropriate for metal and finish indicated. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.
1. Provide welded connections for handrail and railings.
- G. Provide returns as indicated on the Drawings.
- H. Provide sizes as follows unless otherwise indicated on the drawings:
1. Guardrails: 1 1/2" diameter steel pipe (galvanized).
  2. Handrails: 1 1/4" diameter steel pipe (galvanized).
  3. Bar Pickets: 5/8" diameter steel bar (galvanized).

## 2.3 METAL FINISHES

- A. General: Comply with NAAMM "Metal Finishes Manual" for recommendations and designations of finishes, except as otherwise indicated.

B. Ferrous Metal Paint Finish: Electrostatic Finish, as specified in Section "09 9123 Painting."

a. Color as selected by Architect.

## PART 3 - EXECUTION

### 3.1 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorage's, such as sleeves, concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete as masonry construction. Coordinate delivery of such items to project site.

B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for adjustments during installation where taking field measurements before fabrication might delay work.

### 3.2 INSTALLATION

A. General: Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

B. Fit exposed connections accurately together to form tight, hairline joints.

C. Perform cutting, drilling, and fitting required for installation of handrails and railings. Do not weld, cut or abrade surfaces of handrails and railing components which have been coated or finished after fabrication, and are intended for field connection by mechanical means without further cutting or fitting.

D. Field Welding: Comply with applicable AWS Specification for procedures of manual shielded metal-arc welding, for appearance and quality of welds made, and for methods used in correcting welding work. Weld connections, which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up paint coat.

E. Adjust handrails and railings prior to anchoring to ensure matching alignment at abutting joints. Secure wall brackets and railing end flanges to building construction as indicated. Attach handrails to wall with wall brackets. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.

F. Anchoring Posts: As detailed on Drawings. Set posts plumb within a tolerance of 1/16 inch in 3 feet. Space posts at interval indicated, or if not indicated as required by design loadings.

G. Provide "inserts" prior to concrete placement. Set posts in grout after concrete curing.

### 3.3 RAILING CONNECTIONS:

A. Permanently connect railing components together using manufacturer's standard mechanical method and fittings, unless otherwise indicated. Use wood blocks and

padding to prevent damage to railing members and fittings. Seal recessed holes of exposed locking screws using plastic filler cement colored to match finish of handrails and railings.

- B. Connect posts to stair framing by direct welding. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 1 welds: no evidence of a welded joint.
- C. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, to transfer wall bracket loads through wall finishes. Size fillers to suit wall finish thicknesses.

### 3.5. ADJUST AND CLEAN

- A. Protect finishes of railings and handrails from damage during construction period by use of temporary protective coverings approved by railing manufacturer. Remove protective covering at project completion or when directed by Architect. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items, which cannot be refinished in the field, to the shop; make required alterations and refinish entire unit, or provide new units as required.
- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

END OF SECTION 05 5200