

SECTION 05 12 10 HANDRAILS AND GUARDRAILS

PART 1 GENERAL

1.01 SUMMARY

- A. Inclusions:
 - 1. Provisions set forth in Divisions 0 and 1;
 - 2. Pipe handrails;
 - 3. Hot dip galvanizing, exterior railings;
 - 4. Cast handrail wall brackets;
 - 5. Submittal preparation;
 - 6. Clean up.
- B. Related Sections:
 - 1. Section 03 21 00: Reinforcing Steel
 - 2. Section 09 91 13: Exterior Painting

1.02 SUBMITTALS

- A. Shop Drawings or Layout Drawings:
 - 1. Submit shop drawings to Architect for review and approval prior to starting work.

1.03 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Workmen shall be skilled in this type of steel fabrication and erection.
 - 2. Welders shall be qualified by tests prescribed in the "Standards Qualification Procedure" of the AWS.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Pipe rails shall be Schedule 40 standard steel pipe.
 - 1. Size per drawings.
 - 2. Hot Dip Galvanize after fabrication per ASTM A123, Grade 75.
 - 3. Shop priming shall meet Fed Spec TT-P-86, Type II; Sherwin-Williams Kromik Metal Primer or equal.
 - a. Exterior pipe rails shall not be shop primed.
 - 4. Galvanized finish repair.
 - a. Repair compound: ASTM D520, Type III high purity grade zinc dust. 24 lbs/gallon minimum weight per gallon. 52% by volume minimum solids content. 94% by weight in dry film minimum metallic zinc content. Galviline Galvanizing Repair, ZRC Worldwide. (800) 831-3275.

- B. Cast Handrail Wall Brackets:
 - 1. Malleable Iron:
 - a. Quality Standard: Style RB 14125 by R&B Wagner, Inc or approved equal.
 - 2. Hot Dip Galvanize after fabrication per ASTM A-123, Grade 75.
 - 3. Shop priming shall meet Fed Spec TT-P-86, Type II; Sherwin-Williams Kromik Metal Primer or equal.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify all required backing and blocking prior to enclosing framing.
- B. Verify framing or surfaces are acceptable prior to installing finish materials.
- C. Verify all dimensions, including grade elevations.
- D. Verify detail of existing field conditions.
 - 1. Coordinate adjustments for existing conditions with Architect prior to performing work.

3.02 FABRICATION

- A. Layout:
 - 1. Fabrication shall be of welded construction in the largest assemblies feasible to fit into the hot dip tanks. Minimize number of field welds after the hot dip process.
 - a. Re-entrant corners shall be shaped to a notch-free radius of at least one-half inch (1/2").
- B. Railings and Handrails:
 - 1. Handrails for stairs and ramps shall be 1-1/4" to 1-1/2" diameter (1-1/2" nominal) and mounted 1-1/2" clear from side walls. CBC Section 1133B.4.2.5 and 1133B.5.5.1.
 - 2. All welded joints and surfaces shall be ground smooth, no sharp or abrasive corners, edges, or surfaces. Wall surfaces adjacent to handrail shall be smooth. CBC Section 1133B.4.2.6 and 1133B.5.5.1.
- C. Welding:
 - 1. Welding shall be done by the electric shielded arc process.
 - 2. Conform to the requirements of the latest edition of the AISC "Specification for the Design, Fabrication and Erection of Structural Steel Buildings".
 - 3. Conform to Sections 3 and 4 of the AWS "Structural Welding Code D1.1".
 - 4. Electrodes shall be E-70 AWS.

D. Cutting:

1. Gas cutting shall be done by machine wherever possible.

E. Bolted Connections:

1. Bolt holes shall be one-sixteenth inch (1/16") larger than the nominal diameter of the bolt.
 - a. Holes may be punched if the thickness of the material is less than the nominal diameter plus one-eighth inch (1/8").
 - b. Holes shall be drilled or sub-punched and reamed if the thickness of the material is greater than the nominal diameter plus one-eighth inch (1/8").

F. Painting:

1. Refer to Section 09 91 13 "Exterior Painting."

3.03 INSTALLATION OR APPLICATION

A. Connections:

1. Bolts shall be zinc-plated machine bolts, unless otherwise noted.
2. Field welding shall meet all fabrication requirements listed above.
 - a. Grind off zinc plating at point of connections prior to welding where required.
 - b. After welding, all joints shall be ground smooth, degreased, and touch up galvanized with a 100% zinc compound.
3. Cast Handrail Brackets:
 - a. Attach to structure with lag bolts as detailed on Drawings.
 - b. Use lag-screw expansion shields when attaching brackets to concrete/masonry.

3.04 QUALITY CONTROL

A. Tolerances:

1. Tolerances shall be as set forth in the latest edition of the AISC "Specification for the Design, Fabrication, and Erection of Structural Steel Buildings."
2. Handrails shall be set true-to-line and parallel to the slope of the walk or tops of nosing within 1/4" of dimensions indicated on the plans.

3.05 CLEANING OR REPAIR

A. Clean and straighten material before fabrication.

1. Remove scale and rust.

B. Correct deformations resulting from fabrication processes.

1. Heat shrinkage of low alloy structural steels will not be permitted.

3.06 CONDITION OF FINISHED WORK

- A. Handrails shall have returns to within 1/2" of the adjacent wall or closed returns to supporting pipes.
- B. Handrails shall have welded end closures.
- C. Edges shall be ground smooth and free of sharp edges.
- D. Pipe splicing and butt joints shall be welded using beveled end welds.
 - 1. Grind smooth top to totally conceal weld.
- E. No sandpaper marks, hammer marks, or blemishes will be allowed.

END OF SECTION 05 12 00