



**SPECIAL PROVISIONS
FOR
STEEL RAILINGS**

**Des Moines County
EDP-0977(653)--7Y-29**

**Effective Date
June 15, 2021**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

155063.01 DESCRIPTION.

A. Definitions.

1. Railings: a narrow rail for grasping with the hand as a support
2. Guardrail: Guards used for protection of park users where vertical drops from walking surfaces and pedestrian zones and pavements require fall protection.

B. Coordination.

1. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
2. Coordinate installation of anchorages for railings. Furnish setting plans, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
3. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

C. Action Submittals.

1. Product Data: For all products.
2. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

D. Informational Submittals

Delegated-Design Submittal: For railings, including comprehensive engineering analysis signed and sealed by the qualified professional engineer responsible for their preparation.

E. Quality Assurance.

1. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."
2. Provide the following upon request:
 - a. Qualification Data: For testing agency.
 - b. Welding certificates.
 - c. Mill Certificates: Signed by manufacturers of stainless-steel products certifying that products furnished comply with requirements.
 - d. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

F. Delivery, Storage, and Handling.

Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

G. Field Conditions.

Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

155063.02 MATERIALS.

A. Performance Requirements.

1. Delegated Design: Engage a qualified Professional Engineer to design railings, including attachments to adjacent construction.
2. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - a. Handrails and Top Rails of Guards:
 - 1) Uniform load of 50 pounds per foot applied in any direction.
 - 2) Concentrated load of 200 pounds applied in any direction.
 - 3) Uniform and concentrated loads need not be assumed to act concurrently.
 - b. Infill of Guards:
 - 1) Concentrated load of 50 pounds applied horizontally on an area of 1 square foot.
 - 2) Infill load and other loads need not be assumed to act concurrently.
3. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Temperature Change: 120°F, ambient; 180°F, surface.

B. Metals, General.

1. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
2. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

C. Steel and Iron.

Plates, Shapes, and Bars: ASTM A 36.

D. Fasteners.

1. General: Provide Type 316 stainless-steel fasteners and anchors for all mechanical connections.
2. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.
3. Fasteners for Interconnecting Railing Components: Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.
4. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
5. Alloy Group 2 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

E. Miscellaneous Materials.

1. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

F. Fabrication.

1. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
2. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
3. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
4. Form work true to line and level with accurate angles and surfaces.
5. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.
6. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
7. Connections: Fabricate railings with welded connections unless otherwise indicated.
8. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 - a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - b. Obtain fusion without undercut or overlap.
 - c. Remove flux immediately.

- d. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces, and finished welded connections meet National Ornamental and Miscellaneous Metals Association (NOMMA) Joint Finishes Guideline 1 - Finish #1.

G. Steel and Iron Finishes.

1. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces, to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

155063.03 CONSTRUCTION.

A. Installation, General.

1. Fit exposed connections together to form tight, hairline joints.
2. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
3. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
4. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
5. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
6. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials. Coat, with a heavy coat of bituminous paint, concealed surfaces of aluminum that are in contact with grout, concrete, masonry, wood, or dissimilar metals.
7. Adjust railings before anchoring to ensure matching alignment at abutting joints.
8. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

B. Railing Connections.

1. Nonwelded Connections: Use mechanical fasteners for connecting railing panels to posts.
2. Welded Connections: Use fully welded joints for permanently connecting components of each railing panel. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

C. Anchoring Posts.

Drill holes as required to accommodate Post-Installed Anchors (Torque-controlled expansion anchors or chemical anchors). Clean holes of loose material and dust prior to anchoring and comply with anchor manufacturer's written instructions.

D. Attaching Railings.

Anchor railing panels to posts using specified fasteners.

E. Adjusting and Cleaning.

1. Clean by washing thoroughly with clean water and soap and rinsing with clean water.

2. Touchup Painting: Immediately after erection, 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 requirements for touching up shop-painted surfaces. Apply by brush or spray to provide a minimum 2.0 mil dry film thickness.

F. Protection.

Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

155063.04 METHOD OF MEASUREMENT.

Steel Pipe Pedestrian Hand Railing and Ornamental Metal Railing, of the types specified will be measured in linear feet, for complete fabricated, finished and installed units.

155063.05 BASIS OF PAYMENT.

- A. Payment will be for the measured quantity at the contract unit price per linear feet for the following bid items:
 1. Steel Pipe Pedestrian Hand Railing
 2. Ornamental Metal Railing, Pedestrian Guardrail
 3. Ornamental Metal Railing, Pedestrian Guardrail with Integral Handrail
- B. This payment shall be full compensation for, fabrication, delivery to site, furnishing material, labor, tools necessary, and installation of items.