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USACE / NAVFAC / AFCESA / NASA | **NASA-05510S (December 2005)**

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UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are NOT in agreement with UMRL
References will be in agreement at next scheduled update of UMRL
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DIVISION 05 - METALS

SECTION 05510S

METAL STAIRS

12/05

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SECTION 05510S

METAL STAIRS
12/05

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NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.

This section covers steel stair systems which are not a part of any other metals system of the specification.

Only steel pan stairs are included in this section. Other types of steel stair treads and riser systems must be specified to suit the project requirements.

Associated work found in Division 5, "Metals," includes:

Structural steel

Miscellaneous metal

Handrails and railings

Ornamental railings

Installation of inserts and anchorage devices

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR)**.**

Use of electronic communication is encouraged.
****

PART 1 GENERAL

1.1 REFERENCES

****
NOTE: This paragraph is used to list the publications cited in the text of the guide

specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 314	(1990; R 2000) Steel Anchor Bolts

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 317	(1992) Manual of Steel Construction, Volume II, Connections

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B18.22.1	(1975; R 2003) Plain Washers
ANSI B18.22M	(1981; R 2000) Metric Plain Washers

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2004) Structural Welding Code-Steel

ASME INTERNATIONAL (ASME)

ASME B18.2.1	(1996) Square and Hex Bolts and Screws, Including Hex Cap and Lag Screws (Inch Series)
ASME B18.2.3.8M	(1981; R 1999) Metric Hex Lag Screws
ASME B18.6.1	(1981; R 1997) Wood Screws (Inch Series)
ASME B18.6.3	(1998) Machine Screws and Machine Screw Nuts
ASME B18.6.7M	(2000) Metric Machine Screws

ASTM INTERNATIONAL (ASTM)

ASTM A 1011/A 1011M	(2004a) Standard Specification for Steel, Sheet, and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
ASTM A 108	(2003) Standard Specification for Steel, Carbon and Alloy, Cold-Finished
ASTM A 123/A 123M	(2002) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153/A 153M	(2005) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 27/A 27M	(2003) Standard Specification for Steel Castings, Carbon, for General Application
ASTM A 283/A 283M	(2003) Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A 29/A 29M	(2003) Standard Specification for Steel Bars, Carbon and Alloy, Hot-Wrought and Cold Finished, General Requirements
ASTM A 307	(2004) Standard Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength
ASTM A 325	(2004b) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 325M	(2004b) Standard Specification for Structural Steel Bolts, Steel, Heat Treated 830 Mpa Minimum Tensile Strength (Metric)
ASTM A 36/A 36M	(2004) Standard Specification for Carbon Structural Steel
ASTM A 366/A 366M	(1997e1) Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality
ASTM A 446/A 446M	(2003) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality
ASTM A 449	(2004) Standard Specification for Quenched and Tempered Steel Bolts and Studs
ASTM A 47/A 47M	(1999) Standard Specification for Ferritic

	Malleable Iron Castings
ASTM A 48/A 48M	(2003) Standard Specification for Gray Iron Castings
ASTM A 500	(2003a) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 512	(1996; R 2001) Cold-Drawn Buttweld Carbon Steel Mechanical Tubing
ASTM A 525	(1993) Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
ASTM A 525M	(1991; Rev A) Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process (Metric)
ASTM A 526/A 526M	(1990) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality
ASTM A 53/A 53M	(2004a) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 568/A 568M	(2004) Standard Specifications for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for
ASTM A 570/A 570M	(1998) Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality
ASTM A 575	(2002) Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades
ASTM A 6/A 6M	(2004a) Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
ASTM C 514	(2001) Standard Specification for Nails for the Application of Gypsum Board
ASTM C 636	(2004) Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
ASTM E 488	(1996; R 2003) Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements
ASTM F 568M	(2004) Standard Specification for Carbon and Alloy Steel Externally Threaded Metric

Fasteners

INDUSTRIAL FASTENERS INSTITUTE (IFI)

IFI 502	(1982) Metric Tapping Screws

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM MBG 531	(1988; MBG 531S-89) Metal Bar Grating Manual

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC Paint 25	(1997; 2004e1) Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel Type I and Type II

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910	(2001) Occupational Safety and Health Standards

1.2 SUBMITTALS

****

NOTE: Review Submittal Description (SD) definitions in Section 01330 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" designation;

submittals not having a "G" designation are [for Contractor Quality Control approval.][for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication drawings for the following items shall be in accordance with the paragraph entitled, "General Requirements," of this section.

Iron and Steel Hardware
Steel Shapes, Plates, Bars and Strips
Metal Stairs

SD-03 Product Data

Manufacturer's catalog data shall include two copies of manufacturers specifications, load tables, dimension diagrams, and anchor details for the following items:

Structural Steel Plates, Shapes, and Bars
Structural Steel Tubing
Hot-Rolled Carbon Steel Sheets and Strips
Cold Finished Steel Bars
Hot-Rolled Carbon Steel Bars
Cold-Rolled Carbon Steel Sheets
Galvanized Carbon Steel Sheets
Cold-Drawn Steel Tubing
Gray Iron Castings
Malleable Iron Castings
Concrete Inserts
Masonry Anchorage Devices
Protective Coating
Steel Pan Stairs

SD-07 Certificates

Welding Procedures shall be in accordance with AWS D1.1/D1.1M.

Certificates for Welder Qualification shall be in accordance with the paragraph entitled, "Qualifications for Welding Work," of this section.

SD-08 Manufacturer's Instructions

Manufacturer's installation instructions shall be submitted for the following products to be used in the fabrication of steel stair work.

Structural Steel Plates, Shapes, and Bars
Structural Steel Tubing
Hot-Rolled Carbon Steel Sheets and Strips
Cold Finished Steel Bars
Hot-Rolled Carbon Steel Bars
Cold-Rolled Carbon Steel Sheets
Galvanized Carbon Steel Sheets
Cold-Drawn Steel Tubing

Gray Iron Castings
Malleable Iron Castings
Protective Coating
Masonry Anchorage Devices

1.3 QUALIFICATIONS FOR WELDING WORK

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NOTE: If Section 05090S WELDING, STRUCTURAL is not included in the project specification, applicable requirements therefrom should be inserted and the following paragraph deleted.
****

[Section 05090S WELDING, STRUCTURAL applies to work specified in this section.]

[Welding Procedures shall be in accordance with AWS D1.1/D1.1M. Test specimens shall be made in the presence of the Contracting Officer and shall be tested by an approved testing laboratory at the Contractor's expense.

Welder Qualification shall be certified by tests in accordance with AWS D1.1/D1.1M, or under an equivalent approved qualification test. In addition, tests shall be performed on test pieces in positions and with clearances equivalent to those actually encountered. If a test weld fails to meet requirements, an immediate retest of two test welds shall be made and each test weld shall pass. Failure in the immediate retest will require that the welder be retested after further practice or training and a complete set of test welds shall be made.]

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

Complete and detailed fabrication drawings for all Iron and Steel Hardware, and for all Steel Shapes, Plates, Bars and Strips used shall be provided by the Contractor in accordance with the design specifications referenced in this seciton.

Items shall be preassembled in the shop to the greatest extent possible. Units shall be disassembled only to the extent necessary for shipping and handling. Units shall be clearly marked for reassembly and coordinated installation.

For the fabrication of work exposed to view, only materials that are smooth and free of surface blemishes, including pitting, seam marks, roller marks, rolled trade names, and roughness, shall be used. Blemishes shall be removed by grinding, or by welding and grinding, prior to cleaning, treating, and application of surface finishes, including zinc coatings.

2.2 STRUCTURAL STEEL PLATES, SHAPES AND BARS

Structural-size shapes and plates, except plates to be bent or cold-formed, shall conform to ASTM A 36/A 36M, unless otherwise noted.

Steel plates to be bent or cold-formed shall conform to ASTM A 283/A 283M, Grade C.

Steel bars and bar-size shapes shall conform to ASTM A 36/A 36M, unless otherwise noted.

2.3 STRUCTURAL STEEL TUBING

****
NOTE: Includes square, rectangular, round, and specially shaped structural steel tubing.
****

Structural steel tubing, hot-formed, welded or seamless, shall conform to ASTM A 500, Grade B, unless otherwise noted.

2.4 HOT-ROLLED CARBON STEEL BARS

Bars and bar-size shapes shall conform to ASTM A 575, grade as selected by the fabricator.

2.5 COLD-FINISHED STEEL BARS

Bars shall conform to ASTM A 108, grade as selected by the fabricator.

2.6 HOT-ROLLED CARBON STEEL SHEETS AND STRIPS

Sheets and strips shall conform to ASTM A 568/A 568M and ASTM A 1011/A 1011M, pickled and oiled.

2.7 COLD-ROLLED CARBON STEEL SHEETS

Sheets shall conform to ASTM A 366/A 366M.

2.8 GALVANIZED CARBON STEEL SHEETS

Sheets shall conform to ASTM A 526/A 526M, with galvanizing conforming to ASTM A 525M, Z275 ASTM A 525, G90.

2.9 COLD-DRAWN STEEL TUBING

Tubing shall conform to ASTM A 512, sunk drawn, butt-welded, cold-finished, and stress-relieved.

2.10 GRAY IRON CASTINGS

Castings shall conform to ASTM A 48/A 48M, Class 30.

2.11 MALLEABLE IRON CASTINGS

Castings shall conform to ASTM A 47/A 47M, grade as selected.

2.12 STEEL PIPE

Pipe shall conform to ASTM A 53/A 53M, type as selected, Grade B; primed finish, unless galvanizing is required; standard weight (Schedule 40).

2.13 CONCRETE INSERTS

****
NOTE: Inserts must be used for fastening steel stair items to cast-in-place concrete construction

subjected to direct pullout loadings such as shelf angles and supports attached to concrete slab ceilings. Locations of inserts must be indicated.

****

[Threaded-type concrete inserts shall consist of galvanized ferrous castings, internally threaded to receive M20 3/4-inch diameter machine bolts; either malleable iron conforming to ASTM A 47/A 47M or cast steel conforming to ASTM A 27/A 27M, hot-dip galvanized in accordance with ASTM A 153/A 153M.]

[Wedge-type concrete inserts shall consist of galvanized box-type ferrous castings designed to accept M20 3/4-inch diameter bolts having special wedge-shaped heads; they shall be either malleable iron conforming to ASTM A 47/A 47M or cast steel conforming to ASTM A 27/A 27M and hot-dip galvanized in accordance with ASTM A 153/A 153M.]

[Carbon steel bolts having special wedge-shaped heads, nuts, washers, and shims shall be provided and galvanized in accordance with ASTM A 153/A 153M. Slotted-type concrete inserts shall consist of galvanized3 millimeter 1/8-inch thick pressed steel plate conforming to ASTM A 283/A 283M; they shall be of box-type welded construction with slot designed to receive M20 3/4-inch diameter square-head bolt with knockout cover; and shall be hot-dip galvanized in accordance with ASTM A 123/A 123M.]

2.14 MASONRY ANCHORAGE DEVICES

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NOTE: Masonry anchorage devices shall only be used for fastening steel stair items to solid masonry and concrete when the anchor is not subjected to pullout loads or vibration in shear loads.

****

Masonry anchorage devices shall consist of expansion shields complying with AASHTO M 314, ASTM E 488 and ASTM C 514 as follows:

[Lead expansion shields shall be provided for machine screws and bolts 6 millimeter 1/4 inch and smaller; head-out embedded nut type, single unit class, Group I, Type 1, Class 1.]

[Lead expansion shields shall be provided for machine screws and bolts larger than 6 millimeter 1/4 inch in size; head-out embedded nut type, multiple unit class, Group I, Type 1, Class 2.]

[Bolt anchor expansion shields shall be provided for lag bolts; zinc-alloy, long shield anchors class, Group II, Type 1, Class 1.]

[Bolt anchor expansion shields shall be provided for bolts; closed-end bottom bearing class, Group II, Type 2, Class 1.]

****

NOTE: Toggle bolts must be used for anchoring steel stair items to hollow masonry and stud partitions.

****

Toggle bolts shall be tumble-wing type, conforming to ASTM A 325M ASTM A 325, ASTM A 449 and ASTM C 636, type, class, and style as required.

2.15 FASTENERS

Zinc-coated fasteners shall be galvanized in accordance with ASTM A 153/A 153M and shall be used for exterior applications or where built into exterior walls or floor systems. Fasteners shall be selected for the type, grade, and class required for the installation of steel stair items.

Standard bolts and nuts shall be regular hexagon-head conforming to ASTM F 568M ASTM A 307, Grade A.

Lag bolts shall be square-head conforming to ASME B18.2.3.8M ASME B18.2.1.

Machine screws cadmium-plated steel conforming to ASME B18.6.7M ASME B18.6.3.

Wood screws shall be flat-head carbon steel conforming to IFI 502 ASME B18.6.1.

Plain washers shall be round, general-assembly-grade, carbon steel conforming to ANSI B18.22M ANSI B18.22.1.

Lockwashers shall be helical spring, carbon steel conforming to ASME B18.2.1 ASME B18.2.3.8M.

2.16 GENERAL FABRICATION

Metal Stairs shall detail plans and elevations at not less than 1 to 12 scale 1 inch to 1 foot. Drawings shall also provide details of sections and connections at not less than 1 to 4 scale 3 inches to 1 foot. They shall also detail setting drawings, diagrams, templates for installation of anchorages, including concrete inserts, anchor bolts, and miscellaneous metal items having integral anchors.

Contractor shall use materials of size and thicknesses indicated or, if not indicated, of required size and thickness to produce adequate strength and durability in finished product for intended use. Materials shall be worked to dimensions indicated on approved detail drawings, using proven details of fabrication and support. Type of materials indicated or specified shall be used for the various components of work.

Exposed work shall be formed true to line and level with accurate angles and surfaces and straight sharp edges. Exposed edges shall be eased to a radius of approximately 0.8 millimeter 1/32 inch. Metal corners shall be bent to smallest radius possible without causing grain separation or otherwise impairing the work.

Corners and seams shall be welded continuously and in accordance with the recommendations of AWS D1.1/D1.1M. Exposed welds shall be ground smooth and flush to match and blend with adjoining surfaces.

Exposed connections shall be formed with hairline joints that are flush and smooth, using concealed fasteners wherever possible. Exposed fasteners of the type indicated shall be used or, if not indicated, Phillips flathead (countersunk) screws or bolts shall be used.

Anchorage of the type indicated shall be provided and coordinated with the supporting structure. Anchoring devices shall be fabricated and spaced as indicated and as required to provide adequate support for the intended use of the work.

Hot-rolled steel bars shall be used for work fabricated from bar stock unless work is indicated or specified to be fabricated from cold-finished or cold-rolled stock.

2.17 PROTECTIVE COATING

[Steelwork shall be shop primed with red oxide primer in accordance with SSPC Paint 25.]

[Steelwork shall be shop primed as indicated in accordance with [AISC 317] [Section 09970S, "Coatings for Steel,"] except surfaces of steel to be encased in concrete, surfaces to be welded, contact surfaces to be high-strength bolt connected, and surfaces of crane rails.]

[Steelwork shall be hot dipped galvanized as indicated in accordance with ASTM A 123/A 123M. Abraded surfaces and cut ends of galvanized members shall be touched up with zinc-dust, zinc-oxide primer, or an approved galvanizing repair compound.]

2.18 STEEL PAN STAIRS

2.18.1 General

Welding shall be used for joining pieces together. Units shall be fabricated so that bolts and other fastenings do not appear on finish surfaces. Joints shall be made true and tight, and connections between parts shall be lightproof tight. Continuous welds shall be ground smooth where exposed.

Metal Stairs units shall be constructed to sizes and arrangements indicated. Entire assembly shall be constructed to support a minimum live load of 500 kilogram per square meter 100 pounds per square foot. Framing, hangers, columns, struts, clips, brackets, bearing plates, and other components shall be provided as required for the support of stairs and platforms.

2.18.2 Stair Framing

Stringers of structural steel channels, or plates, or a combination thereof shall be fabricated as indicated. Closures for exposed ends of strings shall be provided.

Platforms of structural steel channel headers and miscellaneous framing members shall be constructed as indicated. Headers shall be bolted to stringers and newels. Framing members shall be bolted to stringers and headers.

2.18.3 Riser, Subtread, and Subplatform Metal Pans

[Metal pans shall be formed of 2.8 millimeter 0.1084-inch (12-gage) thick structural steel sheets, conforming to ASTM A 570/A 570M, Grade 36. Pans shall be shaped to configuration indicated.]

[Metal pans shall be formed of 2.8 millimeter 0.1084-inch (12-gage) thick galvanized structural steel sheets, conforming to ASTM A 446/A 446M, Grade A, with zinc coating conforming to ASTM A 525M, Z275 ASTM A 525, G90. Shape of pans shall conform to configuration indicated.]

Riser and subtread metal pans shall be constructed with steel angle

supporting brackets, of size indicated, welded to stringers. Metal pans shall be secured to brackets with rivets or welds.

Subplatform metal pans shall be secured to platform frames with welds.

2.18.4 Metal Safety Nosings

Cast metal abrasive, nonskid type, shall be 100 millimeter 4 inches wide by full length of step between strings. Contractor shall fabricate to thickness, profile, and surface pattern as indicated. Each nosing shall be equipped with integral anchors for embedding in pan fill material, and shall be spaced not more than 100 millimeter 4 inches from each end and not more than 380 millimeter 15 inches on center.

2.18.5 Steel Floor Plate Treads and Platforms

Raised pattern shall be steel floor plate fabricated from steel complying with ASTM A 36/A 36M. Pattern shall be provided as indicated or, if not indicated, as selected from manufacturer's standard patterns.

Treads shall be formed of 6 millimeter 1/4-inch thick steel floor plate with integral nosing and back edge stiffener. Steel supporting brackets shall be welded to strings and treads to brackets.

[Platforms of steel floor plate shall be fabricated to thickness indicated. Nosing matching that on treads at landings shall be provided. Floor plates shall be secured to platform framing members with welds.]

2.18.6 Floor Grating Treads and Platforms

****
NOTE: Use galvanized treads and platforms for exterior.
****

Floor grating treads and platforms shall comply with ASTM A 6/A 6M, ASTM A 29/A 29M and NAAMM MBG 531, "Metal Bar Grating Manual." Pattern, spacing, and bar sizes shall be as indicated:

Galvanized finish shall conform to ASTM A 123/A 123M.

Painted finish shall be manufacturer's baked-on primer.

Grating treads shall be fabricated with steel plate nosing on one edge and with steel angle or steel plate carrier at each end for string connections. Treads shall be secured to strings with bolts.

Grating platforms shall be fabricated with nosing matching that on grating treads at landings. Toe-plates shall be provided at open-sided edges of floor grating to platform framing members.

2.18.7 Stair Railings and Handrails

Newels shall be fabricated from steel tubing. Newel caps shall be gray iron castings as indicated.

Steel pipe railings, consisting of top rail, intermediate rail, posts and handrails, shall be provided at walls. Unless otherwise indicated, DN40 1-1/2-inch nominal size, standard weight, carbon steel pipe shall be

provided and shall conform to ASTM A 53/A 53M, Type E or Type S, Grade B. Railings shall conform to requirements of 29 CFR 1910, Section 23.

Posts, rails, and corners shall be joined by one of the following methods:

Flush-type steel railing fittings, welded and ground smooth, with railing splice locks secured with M10 3/8-inch hexagonal recessed-head setscrews

Mitered and welded joints made by fitting post to top rail and intermediate rail to post, mitering corners, groove welding joints, and grinding smooth, butt railing splices, reinforced by a tight-fitting interior sleeve not less than 150 millimeter 6 inches long.

Railings may be bent at corners instead of joining, provided the bends are uniformly formed in jigs with cylindrical cross section of pipe maintained throughout the entire bend.

Removable railing sections shall be provided as indicated.

Kickplates shall be provided between railing posts where indicated, and shall consist of 4 millimeter 1/8-inch steel flat bars not less than 150 millimeter 6 inches high. Kickplates shall be secured as indicated.

[Exterior railings, including pipe, fittings, brackets, fasteners, and other ferrous metal components, shall be galvanized. Black steel pipe shall be provided for interior railings.]

[Exterior railings shall be provided and interior railings shall be galvanized where indicated, including pipe, fittings, brackets, fasteners, and other ferrous metal components. Black steel pipe shall be provided for interior railings not indicated as galvanized.]

[Railings, including pipe, fittings, brackets, fasteners, and other ferrous metal components, shall be galvanized.]

2.18.8 Soffit Clips

Clips shall be provided with holes for attaching metal furring for plastered soffits. Clips shall be spaced not more than 300 millimeter 12 inches on center and be welded to stair treads and platforms as required.

2.18.9 Steel Framing for Concrete Stairs

Fabricated units shall be customized to the dimensions and details indicated, and modified as required to fit actual dimensions of the supporting structure. Welded construction shall be used for fabrication of steel components. Unless otherwise indicated, 2 millimeter 14-gage steel risers shall be provided. Components shall be arranged to receive finish materials as indicated.

PART 3 EXECUTION

3.1 STAIR RAILINGS AND HANDRAILS

Railings shall be adjusted prior to securing in place to ensure proper matching at butting joints and correct alignment throughout their length. Posts shall be spaced not more than 2440 millimeter 8 feet on center. Posts shall be plumbed in each direction. Posts and rail ends shall be

secured to building construction as follows:

Posts shall be anchored in concrete by means of pipe sleeves set and anchored into concrete. Sleeves of galvanized, standard weight, steel pipe, not less than 150 millimeter 6 inches long, and having an inside diameter not less than 13 millimeter 1/2-inch greater than the outside diameter of the inserted pipe post shall be provided. Steel plate closure secured to the bottom of the sleeve shall be provided; closure shall be of width and length not less than 25 millimeter 1-inch greater than the outside diameter of the sleeve. After posts have been inserted into sleeves, the annular space between post and sleeve shall be filled with molten lead, sulfur, or a quick-setting hydraulic cement. Anchorage joint shall be covered with a round steel flange welded to the post.

Posts shall be anchored to steel with steel oval flanges, angle type or floor type as required by conditions, welded to posts and bolted to the steel supporting members.

Rail ends shall be anchored into concrete and masonry with steel round flanges welded to rail ends and anchored into the wall construction with lead expansion shields and bolts.

Rail ends shall be anchored to steel with steel oval or round flanges welded to tail ends and bolted to the structural steel members.

Handrails shall be secured to walls by means of wall brackets and wall return fitting at handrail ends. Brackets of malleable iron castings shall be provided, with not less than 75 millimeter 3-inch projection from the finish wall surface to the center of the pipe drilled to receive one M10 3/8-inch bolt. Brackets shall be located not more than 1525 millimeter 60 inches on center. Wall return fittings of cast iron castings, flush-type, with the same projection as that specified for wall brackets shall be provided. Wall brackets and wall return fittings shall be secured to building construction as follows:

For concrete and solid masonry anchorage, bolt anchor expansion shields and lag bolts shall be used.

For hollow masonry and stud partition anchorage, toggle bolts having square heads shall be used.

3.2 FIELD WELDING

Procedures of manual shielded metal arc welding, appearance and quality of welds made, and methods used in correcting welding work shall comply with AWS D1.1/D1.1M.

3.3 TOUCHUP PAINTING

****

NOTE: Delete the paragraph and heading if touchup painting is to be excluded from the steel stair erector's work.

****

Immediately after installation, field welds, bolted connections, and abraded areas of the shop paint shall be cleaned, and exposed areas shall be painted with the paint used for shop painting. Paint shall be applied

by brush or spray to provide a minimum dry-film thickness of 0.051 millimeter 2 mils.

-- End of Section --