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USACE / NAVFAC / AFCESA / NASA | **UFGS-05 51 00 (April 2008)**

Preparing Activity: NASA | **Superseding UFGS-05 51 00.00 40 (July 2007)**

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated March 2008
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DIVISION 05 - METALS

SECTION 05 51 00

METAL STAIRS

04/08

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SECTION 05 51 00

METAL STAIRS
04/08

****
NOTE: This specification covers the requirements for steel stair systems which are not a part of any other metals system of the specification.

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

Structural steel

Miscellaneous metal

Handrails and railings

Ornamental railings

Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

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

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 2004) Standard Specification for Steel Anchor Bolts

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 350	(2005) Load and Resistance Factor Design (LRFD)Specification for Structural Steel Buildings
AISC 360	(2005) Specification for Structural Steel Buildings, with Commentary

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISC/AISI 121	(2004) Standard Definitions for Use in the Design of Steel Structures

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B18.22.1	(1965; R 2003) Plain Washers
ANSI B18.22M	(1981; R 2005) Metric Plain Washers

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2006; Errata 2006) Structural Welding Code - Steel

ASME INTERNATIONAL (ASME)

ASME B18.2.1	(1996; Addenda A 1999; Errata 2003; R 2005) Square and Hex Bolts and Screws (Inch Series)

ASME B18.2.3.8M	(1981; R 2005) Metric Hex Lag Screws
ASME B18.6.1	(1981; R 1997) Wood Screws (Inch Series)
ASME B18.6.3	(2003) Machine Screws and Machine Screw Nuts
ASME B18.6.7M	(1999; R 2005) Metric Machine Screws

ASTM INTERNATIONAL (ASTM)

ASTM A 1008/A 1008M	(2007a) Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened
ASTM A 1011/A 1011M	(2007) 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	(2007) Standard Specification for Steel Bar, 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	(2005) Standard Specification for Steel Castings, Carbon, for General Application
ASTM A 283/A 283M	(2003; R 2007) Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A 29/A 29M	(2005) Standard Specification for Steel Bars, Carbon and Alloy, Hot-Wrought General Requirements for
ASTM A 307	(2007b) Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
ASTM A 325	(2007a) Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
ASTM A 325M	(2007) Standard Specification for Structural Bolts, Steel, Heat Treated, 830 Mpa Minimum Tensile Strength (Metric)
ASTM A 36/A 36M	(2005) Standard Specification for Carbon Structural Steel

ASTM A 449	(2007b) Specification for Hex Cap Screws, Bolts, and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use
ASTM A 47/A 47M	(1999; R 2004) Standard Specification for Steel Sheet, Aluminum-Coated, by the Hot-Dip Process
ASTM A 48/A 48M	(2003) Standard Specification for Gray Iron Castings
ASTM A 500/A 500M	(2007) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 512	(2006) Standard Specification for Cold-Drawn Buttweld Carbon Steel Mechanical Tubing
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	(2007) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 568/A 568M	(2007) Standard Specifications for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for
ASTM A 575	(1996; R 2002) Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades
ASTM A 6/A 6M	(2007) Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling
ASTM A 653/A 653M	(2007) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 924/A 924M	(2007) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B 209	(2007) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 209M	(2007) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM C 514	(2004) Standard Specification for Nails

	for the Application of Gypsum Board
ASTM C 636/C 636M	(2006) 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 1679	(2004e1) Standard Test Method for Using a Variable Incidence Tribometer
ASTM F 568M	(2007) 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	(2000) Metal Bar Grating Manual

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101	(2005; Errata 2006; TIA 2006; TIA 2006) Life Safety Code, 2006 Edition

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC Paint 25	(1997; E 2004) Paint Specification No. 25Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel Type I and Type II

1.2 SUBMITTALS

****

NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 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 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Submit fabrication drawings for the following items 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

Submit manufacturer's catalog data including 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
Steel Stairs
Steel Stairs, Circular

SD-07 Certificates

Submit Welding Procedures in accordance with AWS D1.1/D1.1M.

Submit certificates for Welder Qualification in accordance with

the paragraph entitled, "Qualifications for Welding Work," of this section.

SD-08 Manufacturer's Instructions

Submit manufacturer's installation instructions 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

****
NOTE: If Section 05 05 23 WELDING, STRUCTURAL is not included in the project specification, applicable requirements therefrom should be inserted and the following paragraph deleted.
****

[Section 05 05 23 WELDING, STRUCTURAL applies to work specified in this section.]

[Submit Welding Procedures in accordance with AWS D1.1/D1.1M. Make test specimens in the presence of the Contracting Officer and test by an approved testing laboratory at the Contractor's expense.

Certify Welder Qualification by tests in accordance with AWS D1.1/D1.1M, or under an equivalent approved qualification test. In addition, perform tests on test pieces in positions and with clearances equivalent to those actually encountered. If a test weld fails to meet requirements, make an immediate retest of two test welds and each test weld must 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 made.]

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

Provide complete and detailed fabrication drawings for all Iron and Steel Hardware, and for all Steel Shapes, Plates, Bars and Strips used in accordance with the design specifications referenced in this seciton.

Preassemble items in the shop to the greatest extent possible. Units shall be disassembled only to the extent necessary for shipping and handling. Clearly mark units for reassembly and coordinated installation.

For the fabrication of work exposed to view, use only materials that are smooth and free of surface blemishes, including pitting, seam marks, roller

marks, rolled trade names, and roughness. Remove blemishes 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

Conform to ASTM A 36/A 36M, unless otherwise noted for structural-size shapes and plates, except plates to be bent or cold-formed.

Conform to ASTM A 283/A 283M, Grade C for steel plates to be bent or cold-formed.

Conform to ASTM A 36/A 36M, unless otherwise noted for steel bars and bar-size shapes.

2.3 STRUCTURAL STEEL TUBING

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

Conform to ASTM A 500/A 500M, Grade B, unless otherwise noted for structural steel tubing, hot-formed, welded or seamless.

2.4 HOT-ROLLED CARBON STEEL BARS

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

2.5 COLD-FINISHED STEEL BARS

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

2.6 HOT-ROLLED CARBON STEEL SHEETS AND STRIPS

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

2.7 COLD-ROLLED CARBON STEEL SHEETS

Sheets must conform to ASTM A 1008/A 1008M.

2.8 GALVANIZED CARBON STEEL SHEETS

Sheets must conform to ASTM A 526/A 526M, with galvanizing conforming to ASTM A 653/A 653M and ASTM A 924/A 924M.

2.9 COLD-DRAWN STEEL TUBING

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

2.10 GRAY IRON CASTINGS

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

2.11 MALLEABLE IRON CASTINGS

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

2.12 STEEL PIPE

Pipe must 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.
****

[Provide threaded-type concrete inserts consisting 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.]

[Provide wedge-type concrete inserts consisting of galvanized box-type ferrous castings designed to accept M20 3/4-inch diameter bolts having special wedge-shaped heads; 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.]

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

2.14 MASONRY ANCHORAGE DEVICES

****
NOTE: Only use masonry anchorage devices for fastening steel stair items to solid masonry and concrete when the anchor is not subjected to pullout loads or vibration in shear loads.
****

Provide masonry anchorage devices consisting of expansion shields complying with AASHTO M 314, ASTM E 488 and ASTM C 514 as follows:

[Provide lead expansion shields 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.]

[Provide lead expansion shields 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.]

[Provide bolt anchor expansion shields for lag bolts; zinc-alloy, long shield anchors class, Group II, Type 1, Class 1.]

[Provide bolt anchor expansion shields 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 must be tumble-wing type, conforming to ASTM A 325M ASTM A 325, ASTM A 449 and ASTM C 636/C 636M, type, class, and style as required.

2.15 FASTENERS

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

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

Lag bolts must 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 must be flat-head carbon steel conforming to IFI 502, ASME B18.6.1.

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

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

2.16 GENERAL FABRICATION

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

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. Work materials to dimensions indicated on approved detail drawings, using proven details of fabrication and support. Use type of materials indicated or specified for the various components of work.

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

Continuously weld corners and seams in accordance with the recommendations of AWS D1.1/D1.1M. Grid smooth exposed welds and flush to match and blend with adjoining surfaces.

Form exposed connections with hairline joints that are flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of the type indicated or, if not indicated, use Phillips flathead (countersunk) screws or bolts.

Provide and coordinate anchorage of the type indicated with the supporting structure. Anchoring devices must be fabricated and spaced as indicated and as required to provide adequate support for the intended use of the work.

Use hot-rolled steel bars 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 must be shop primed with red oxide primer in accordance with SSPC Paint 25.]

[Steelwork must be shop primed as indicated in accordance with [AISC/AISI 121] [Section 09 97 13.00 40 STEEL COATINGS] 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 must be hot dipped galvanized as indicated in accordance with ASTM A 123/A 123M. Touch up abraded surfaces and cut ends of galvanized members with zinc-dust, zinc-oxide primer, or an approved galvanizing repair compound.]

2.18 STEEL PAN STAIRS

2.18.1 General

Use welding for joining pieces together. Fabricate units so that bolts and other fastenings do not appear on finish surfaces. Make joints true and tight, and connections between parts lightproof tight. Grid smooth continuous welds where exposed.

Construct metal stair units to sizes and arrangements indicated to support a minimum live load of 500 kilogram per square meter 100 pounds per square foot. Provide framing, hangers, columns, struts, clips, brackets, bearing plates, and other components as required for the support of stairs and platforms.

2.18.2 Stair Framing

Fabricate stringers of structural steel channels, or plates, or a combination thereof as indicated. Provide closures for exposed ends of strings.

Construct platforms of structural steel channel headers and miscellaneous framing members as indicated. Bolt headers to stringers and newels and framing members to stringers and headers.

2.18.3 Riser, Subtread, And Subplatform Metal Pans

[Form metal pans of 2.8 millimeter 0.1084-inch (12-gage) thick structural steel sheets, conforming to ASTM A 1011/A 1011M, Grade 36. Shape pans to configuration indicated.]

[Form metal pans of 2.8 millimeter 0.1084-inch (12-gage) thick galvanized structural steel sheets, conforming to ASTM A 653/A 653M, Grade A, with zinc coating conforming to ASTM A 653/A 653M and ASTM A 924/A 924M. Shape of pans to configuration indicated.]

Construct riser and subtread metal pans with steel angle supporting brackets, of size indicated, welded to stringers. Secure metal pans to brackets with rivets or welds.

Secure subplatform metal pans to platform frames with welds.

2.18.4 Metal Safety Nosings

Cast metal abrasive, nonskid type, must be 100 millimeter 4 inches wide by full length of step between strings. Fabricate to thickness, profile, and surface pattern as indicated. Equip each nosing with integral anchors for embedding in pan fill material, and 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 must be steel floor plate fabricated from steel complying with ASTM A 36/A 36M. Provide pattern as indicated or, if not indicated, as selected from manufacturer's standard patterns.

Form treads of 6 millimeter 1/4-inch thick steel floor plate with integral nosing and back edge stiffener. Weld steel supporting brackets to strings and treads to brackets.

[Fabricate platforms of steel floor plate to thickness indicated. Provide nosing that match treads at landings. Secure floor plates 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 must comply with ASTM A 6/A 6M, ASTM A 29/A 29M and NAAMM MBG 531, "Metal Bar Grating Manual." Provide pattern, spacing, and bar sizes as indicated:

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

Provide manufacturer's baked-on primer for painted finishes.

Fabricate grating treads with steel plate nosing on one edge and with steel angle or steel plate carrier at each end for string connections. Secure treads to strings with bolts.

Fabricate grating platforms with nosing that matches on grating treads at

landings. Provide toe-plates at open-sided edges of floor grating to platform framing members.

2.18.7 Safety Nosings For Concrete Treads

****
NOTE: Cast iron nosings may be specified where heavy use is anticipated. They should not be used where appearance is important since they tend to discolor or rust. Check for availability. Cast aluminum nosings may cost more than cast iron nosings, but may be more available. Specify where appearance is important.
****

[Provide safety nosings of [cast aluminum] [cast iron] with [cross-hatched] [plain] abrasive-surfaces, or extruded aluminum with abrasive inserts. Nosing to be at least 100 mm 4 inches wide and 6 mm 1/4 inch thick [and terminating at not more than 150 mm 6 inches from the ends of treads] [for metal-pan cement-filled treads extending the full length of the tread] for stairs and [as indicated] for platforms and landings. Provide safety nosings with anchors embedded a minimum of 20 mm 3/4 inch in the concrete and with tops flush with the top of the traffic surface.]

2.18.8 Safety Treads

****
NOTE: Tread type must be selected and indicated. Delete remaining tread types.

NAAMM MBG 531:

W - welded (steel)
P - pressure locked (steel or aluminum)
R - riveted (steel or aluminum)

ASTM A 653/A 653M W welded (steel) or
ASTM B 209M ASTM B 209 B bolted (steel or aluminum)

or for concrete filled metal pan treads
ASTM A 1011/A 1011M, ASTM A 568/A 568M, steel.
****

****
NOTE: Each tread and the top landing of a stairway where vertical risers are used should have a nose which extends 12 to 25 mm 1/2 to one inch beyond the face of the lower riser. Large scale details of stairs and safety nosings must be included on the drawings.
****

[NAAMM MBG 531 [aluminum] [steel], Type [_____]] [Plank grating ASTM A 653/A 653M, Z275 G-90] [aluminum ASTM B 209M, ASTM B 209] [ASTM A 1011/A 1011M, steel pan for concrete tread.]

2.18.9 Steel Stairs

****
NOTE: Design fire escapes of the type and arrangement to conform to Fire Escape Stairs, Section 5, of NFPA 101, Code for Safety to Life.
****

****
NOTE: Consider footwear worn by personnel using grating treads and landings with openings thru the surface.
****

Provide steel stairs complete with stringers, [steel-plate treads and risers,] [metal-pan concrete-filled treads,] [grating treads,] [nonskid metallic treads,] [precast concrete treads,] landings, columns, handrails, and necessary bolts and other fastenings. Steel stairs and accessories to be [hot-dip galvanized] [shop painted].

2.18.9.1 Design Loads

****
NOTE: For industrial or heavy duty stairs use live load = 5 times the expected load and a concentrated load of 2 kN 1000 lbs. For standard applications, use a live load of 500 kg per square m 100 psf and a concentrated load of 1.3 kN 300 lbs.
****

Design stairs to sustain a live load of not less than [_____] kg per square meter pounds per square foot, or a concentrated load of [_____] applied where it is most critical. Conform to AISC 360 or AISC 350 with the design and fabrication of steel stairs, other than a commercial product. [Design fire stairs to conform to NFPA 101.]

2.18.9.2 Materials

****
NOTE: Provide each tread, and the top landing of a stairway where vertical risers are used, with a nose which extends 12 to 25 mm 1/2 to one inch beyond the face of the lower riser. Large scale details of stairs and safety nosings must be included on the drawings.
****

****
NOTE: Tread types must be selected and indicated.
****

Provide steel stairs of welded construction except that bolts may be used where welding is not practicable. Screw or screw-type connections are not permitted.

a. Structural Steel: ASTM A 36/A 36M.

b. Gratings for Treads and Landings: [NAAMM MBG 531] [or] [Plank grating; ASTM A 653/A 653M, Z275 G-90 for steel; ASTM B 209M

ASTM B 209 for aluminum.] [Provide gratings with nonslip nosings.] [Slip resistance must exceed a static coefficient of friction, both wet and dry, of 0.5[0.6] as tested in accordance with ASTM F 1679.]

c. Support [steel floor plate] [metal pan for concrete fill] [steel grating] on angle cleats welded to stringers or treads with integral cleats, welded or bolted to the stringer. [Provide sheet-steel landings with angle stiffeners welded on.] Close exposed ends. [Exterior stairs must have all exposed joints formed to exclude water.]

[d. Precast Concrete treads are factory built as specified in Section 03 45 33 PRECAST[PRESTRESSED] STRUCTURAL CONCRETE.]

e. Before fabrication, obtain necessary field measurements and verify drawing dimensions.

f. Clean metal surfaces free from mill scale, flake rust and rust pitting prior to shop finishing. Weld permanent connections. Finish welds flush and smooth on surfaces that will be exposed after installation.

2.18.10 Steel Stairs, Circular

Provide standard open riser design in steel, minimum of 1800 mm 6 feet in outside diameter with 12 treads to the circle. Construct center pole from 90 mm 3 1/2 inch minimum outside diameter circular cold drawn seamless tube, in one continuous length, with cap at top and base plate having countersunk machine screws and expansion shields for fastening to concrete floor slab. Construct treads and platforms from steel grating conforming to NAAMM MBG 531. [Provide nonslip nosings for gratings.] [Slip resistant gratings must exceed a static coefficient of friction of 0.5[0.6] as tested in accordance with ASTM F 1679.].

2.18.11 Soffit Clips

Provide clips with holes for attaching metal furring for plastered soffits. Space clips not more than 300 millimeter 12 inches on center and be welded to stair treads and platforms as required.

2.18.12 Steel Framing For Concrete Stairs

Customize fabricated units to the dimensions and details indicated, and modified as required to fit actual dimensions of the supporting structure. Use welded construction for fabrication of steel components. Provide 2 millimeter 14-gage steel risers Unless otherwise indicated. Arrange components to receive finish materials as indicated.

PART 3 EXECUTION

3.1 STEEL STAIRS

Provide anchor bolts, grating fasteners, washers, and all parts or devices necessary for proper installation. Provide lock washers under nuts.

3.2 INSTALLATION OF SAFETY NOSINGS

Completely embed nosing in concrete before the initial set of the concrete

occurs and finish flush with the top of the concrete surface.

3.3 FIELD WELDING

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

3.4 TOUCHUP PAINTING

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NOTE: Delete the paragraph and heading if touchup painting is to be excluded from the steel stair erector's work.
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Immediately after installation, field welds, bolted connections, and abraded areas of the shop paint must be cleaned, and exposed areas painted with the paint used for shop painting. Apply paint by brush or spray to provide a minimum dry-film thickness of 0.051 millimeter 2 mils.

-- End of Section --