**SECTION 05 53 14**

 **STEEL BAR GRATINGS**

**\*\*\*\*\* Ametco® Manufacturing Corporation manufacturers several basic construction materials including perforated metal and plastic panels, expanded metal panels, wire cloth, steel and aluminum bar gratings, safety gratings, stair treads, and ladder rungs. Ametco® Manufacturing Corporation also manufactures several types of ornamental metal fencing.**

**This guide specification can be used to specify various welded steel bar gratings and stair treads. These can be used for platforms, stairs, trench covers, and many other applications. Steel bar gratings can be specified as a separate section or as part of another building element. For the later, paragraphs from this guide specification would need to be inserted into the section specifying the element constructed with steel gratings. \*\*\*\*\***

**The specifier will need to edit this guide specification to reflect the options and applications being used. Most editing can be accomplished by deleting unnecessary requirements. Options are indicated by [ ]. Notes to assist the specifier in selecting options and editing the guide specification are printed in bold and indicated with \*\*\*\*\*. For final editing, all brackets and notes will need to be deleted from the guide.**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**PART 1 - GENERAL**

**1.1 SUMMARY**

 A. Section includes: Welded steel bar [gratings] [stair treads] used to fabricate [elevated platforms] [catwalks] [stairs] [\_\_\_\_\_] [specified in Section [\_\_\_\_\_] - [\_\_\_\_\_]].

**1.2 REFERENCES**

**\*\*\*\* List by number and full title reference standards referred to in remainder of the specification section. Delete non-applicable references. \*\*\*\*\***

 A. ASTM International (ASTM):

 1. ASTM A36 - Carbon Structural Steel.

 2. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

 3. ASTM A276 - Stainless Steel Bars and Shapes.

 4. ASTM A510 - General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel.

 5. ASTM A1011 - Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

**1.3 PERFORMANCE REQUIREMENTS**

**\*\*\*\*\* Edit the following to reflect project structural design requirements. \*\*\*\*\***

 A. [Gratings] [stair treads] shall be provided in accordance with manufacturer's standard load tables to withstand design loads [as required by applicable codes.] [as follows:]

 1. Minimum uniform load: [\_\_\_\_\_] [pounds per square foot] [kilograms per square meter].

 2. Minimum concentrated load: [\_\_\_\_\_] [pounds per linear foot] [kilograms per linear meter] of grating width.

 3. Maximum deflection: [\_\_\_\_\_] [inches] [mm].

**1.4 SUBMITTALS**

 A. Provide in accordance with Section 01 33 00 - Submittal Procedures:

 1. Product data for steel bar [gratings] [stair treads] [perimeter frames] [fasteners] and finish.

 2. Manufacturer's standard load tables annotated to identify project selections and conditions. Indicate type, size, and span of grating being provided to accommodate performance requirements specified in Paragraph 1.3.

 3. Shop drawings: Indicate layout, dimensions, fastener locations, and fabrication and installation details.

**PART 2 - PRODUCTS**

**2.1 ACCEPTABLE MANUFACTURERS**

 A. Ametco Manufacturing Corporation, 4326 Hamann Parkway, P.O. Box 1210, Willoughby, Ohio 44096; 800-362-1360.

 B. Requests to use equivalent products of other manufacturers shall be submitted in accordance with Section 01 25 13 - Product Substitution Procedures.

**2.2 MATERIAL**

 A. Fabricate [bar gratings] [stair treads] [perimeter frames] from:

**\*\*\*\*\* Steel bar gratings are fabricated from either stainless steel or carbon steel and provided with a galvanized finish. Edit the following to reflect type of grating required. \*\*\*\***

 1. Rectangular steel bars, angles, and other shapes: [ASTM A36 or ASTM A1011] [ASTM A276 stainless steel].

 2. Round steel cross rods: [ASTM A510 carbon steel] [ASTM A276 stainless steel].

**2.3 STEEL BAR GRATINGS**

**\*\*\*\*\* Ametco® Manufacturing Corporation fabricates welded steel bar gratings consisting of bearing bars connected by cross bars. Load capacity is determined by size and spacing of bars, assembly method, and grating span. Numerous types of steel bar gratings are available. Refer to Ametco® product literature for types, bar sizes, bar spacing, configurations, assemble method, and load capacity. Select required grating type from the following paragraphs and edit to indicate bar sizes. \*\*\*\*\***

**\*\*\*\*\* Include the following paragraph for Type 19-W-4 general flooring grating. \*\*\*\*\***

 A. Type: General flooring grating; Type 19-W-4 as manufactured by Ametco Manufacturing Corporation.

 1. Bearing bars: [\_\_\_\_\_] by [\_\_\_\_\_] [inches] [mm] spaced at [1-3/16 inches] [30 mm].

 2. Cross bars: Steel rods spaced at [4 inches] [102 mm].

**\*\*\*\*\* Include the following paragraph for Type 15-W-4 heavy load grating. \*\*\*\*\***

 B. Type: Heavy load grating; Type 15-W-4 as manufactured by Ametco Manufacturing Corporation.

 1. Bearing bars: [\_\_\_\_\_] by [\_\_\_\_\_] [inches] [mm] spaced at [15/16 inch] [24 mm].

 2. Cross bars: Steel rods spaced at [4 inches] [102 mm].

**\*\*\*\*\* Include the following paragraph for Type 30-W-4 large opening grating. \*\*\*\*\***

 C. Type: Large opening grating; Type 15-W-4 as manufactured by Ametco Manufacturing Corporation.

 1. Bearing bars: [\_\_\_\_\_] by [\_\_\_\_\_] [inches] [mm] spaced at [1-7/8 inches] [48 mm].

 2. Cross bars: Steel rods spaced at [4 inches] [102 mm].

**\*\*\*\*\* Include the following paragraph for Type 19-W-2 small opening grating. \*\*\*\*\***

 D. Type: Small opening grating; Type 19-W-2 as manufactured by Ametco Manufacturing Corporation.

 1. Bearing bars: [\_\_\_\_\_] by [\_\_\_\_\_] [inches] [mm] spaced at [1-3/16 inches] [30 mm].

 2. Cross bars: Steel rods spaced at [2 inches] [51 mm].

**\*\*\*\*\* Include the following paragraph for Type 15-W-2 heavy load and small opening grating. \*\*\*\*\***

 E. Type: Heavy load, small opening grating; Type 15-W-2 as manufactured by Ametco Manufacturing Corporation.

 1. Bearing bars: [\_\_\_\_\_] by [\_\_\_\_\_] [inches] [mm] spaced at [15/16 inches] [24 mm].

 2. Cross bars: Steel rods spaced at [2 inches] [51 mm].

**\*\*\*\*\* Include the following paragraph for Close Mesh Grating with electro-forge welded cross bars. \*\*\*\*\***

 F. Type: Close mesh electro-forged welded grating; Close Mesh Grating as manufactured by Ametco Manufacturing Corporation.

 1. Bearing bars: [3/4 by 0.079 inch] [19 by 2 mm] spaced at [5/8 inch] [16 mm].

 2. Cross bars: Steel rods spaced at [3 inches] [76 mm].

**\*\*\*\*\* Include the following paragraph for Square Mesh Grating with electro-forge welded cross bars. \*\*\*\*\***

 G. Type: Square mesh electro-forged welded grating; Square Mesh Grating as manufactured by Ametco Manufacturing Corporation.

 1. Bearing bars: [3/4 by 0.079 inch] [19 by 2 mm] spaced at [1 inch] [25 mm].

 2. Cross bars: Steel rods spaced at [1 inch] [25 mm].

**\*\*\*\*\* Ametco® Manufacturing Corporation provides two types of heavy-weld steel gratings capable of handling vehicular and other heavy loads. The two basic types are Standard with rectangular cross bars and Special with round cross bars. Various sizes and configurations are available to meet specific loadings. Main bar depth ranges from 1-1/2 to 7 inches (38 to 178 mm) with thickness of 1/4, 5/16, and 1/2 inch (6, 8, and 13 mm). Typical cross bar spacing is 4 inches (102 mm). Contact Ametco® manufacturing Corporation for available types and load capacities for heavy-weld steel gratings.**

**Include the following paragraph for Standard Heavy-Weld Grating with rectangular cross bars designed for vehicle and other heavy loads. \*\*\*\*\***

 H. Type: Heavy load grating with welded rectangular cross bars; Standard Heavy-Weld Grating as manufactured by Ametco Manufacturing Corporation.

 1. Bearing bars: [\_\_\_\_\_] by [\_\_\_\_\_] [inches] [mm] spaced at [\_\_\_\_\_] [inches] [mm].

 2. Cross bars: [\_\_\_\_\_] by [\_\_\_\_\_] [inches] [mm] spaced at [\_\_\_\_\_] [inches] [mm].

**\*\*\*\*\* Include the following paragraph for Special Heavy-Weld Grating with round cross bars placed in holes drilled below top surface of bearing bars and designed for vehicle and other heavy loads. \*\*\*\*\***

 I. Type: Heavy load grating with welded round cross bars placed in holes drilled below top surface of bearing bars; Special Heavy-Weld Grating as manufactured by Ametco Manufacturing Corporation.

 1. Bearing bars: [\_\_\_\_\_] by [\_\_\_\_\_] [inches] [mm] spaced at [\_\_\_\_\_] [inches] [mm].

 2. Cross bars: [\_\_\_\_\_] [inch] [mm] diameter rod spaced at [\_\_\_\_\_] [inches] [mm].

**\*\*\*\*\* End banding is recommended for gratings carrying vehicular loads. Include the following paragraph to specify this option. \*\*\*\*\***

 J. End banding: At grating perimeter, weld flat bars to exposed ends of bearing bars.

**\*\*\*\*\* Typically bar gratings are fabricated with smooth surface bearing bars. For added slip resistance, bearing bars can be furnished with serrated top profile. Include the following paragraph for serrated grating. \*\*\*\*\***

 K. Serrated grating: Where indicated, provide top surface of bearing bars with [1/8 inch] [3 mm] serrated profile.

**\*\*\*\*\* Ametco® Manufacturing Corporation inventories steel bar gratings in standard panel sizes of 24 by 288 and 36 by 288 inches (610 by 7,315 and 914 by 7,315 mm). Special sized panels can be custom cut. \*\*\*\*\***

 L. Grating panel size: [Factory cut grating into] [\_\_\_\_\_] by [\_\_\_\_\_] [inches] [mm] panels.

**\*\*\*\*\* Openings can be factory cut in grating panels to accommodate structural members, pipes, conduit, ductwork, and other items penetrating grating. It is recommended that openings less than 4 inches (102 mm) be field cut to ensure proper alignment. \*\*\*\*\***

 M. Penetrations: Factory cut openings for structural members, pipes, conduit, ductwork, and other penetrations. Allow sufficient tolerances for installation of penetrating items. Weld flat bars to form flush perimeter frame around openings.

**2.4 ACCESSORIES**

**\*\*\*\*\* Various types of fastening hardware can be provided for attachment of grating panels to support framing. Gratings can also be permanently attached to steel framing by tack welding in the field. \*\*\*\*\***

 A. Fastening hardware: Provide [stainless steel] [galvanized steel] [bolt and clamping bracket for attachment to structural metal flanges of support members; Model GG as manufactured by Ametco Manufacturing Corporation.] [saddle shaped clip to attach to stud or bolt on support and to allow for removal of grating panels; Model DF-2 as manufactured by Ametco Manufacturing Corporation.] [type as recommended by manufacturer for secure attachment of grating panels to support framing.]

**\*\*\*\*\* Grating panels used for trench drains and pit covers can be provided with welded steel angle frames to embed in concrete and retain grating sections. Include the following paragraph if angle frames are required. \*\*\*\*\***

 B. Perimeter frame: Provide steel angle perimeter frame with mitered corners and welded joints to embed in concrete support and retain grating sections. Weld steel anchors to frame at [18 inches] [457 mm] [\_\_\_\_\_] as detailed on shop drawings. Frame depth shall match grating depth and allow flush installation.

**2.5 STAIR TREADS**

**\*\*\*\*\* Individual stair treads fabricated from steel bar gratings with integral nosing are available in several standard lengths and widths. Lengths vary from 16 to 55 inches (660 to 1397 mm) and widths from 5 to 12-1/8 inches (127 to 308 mm). Special tread sizes can be custom fabricated. Include this article to specify steel grating stair treads. \*\*\*\*\***

 A. Type: Welded steel grating stair tread with integral nosing; Bar Grating Stair Tread as manufactured by Ametco Manufacturing Corporation.

 B. Size: [[5] [6-3/16] [7-3/8] [8-9/16] [9-3/4] [10-15/16] [12-1/8] inches] [[127] [ 173] [187] [217] [248] [278] [308] mm] wide by [[26] [33] [39] [55] inches] [[660] [838] [990] [1397] mm] long.

**\*\*\*\*\* Bearing bar size is determined by tread length. Refer to Ametco® product literature for appropriate dimensions. \*\*\*\*\***

 C. Bearing bar: [\_\_\_\_\_] by [\_\_\_\_\_] [inches] [mm] spaced at [1-3/16 inches] [30 mm].

 D. Cross bars: Steel rods spaced at [4 inches] [102 mm].

**\*\*\*\*\* Standard nosing for steel grating stair tread is checkered plate. As an option, an abrasive coated tread can be provided. \*\*\*\*\***

 E. Nosing: [1-3/4 inches] [44 mm] deep formed from [checkered steel plate] [abrasive coated steel].

 F. Provide treads with holes and slots for attachment to stair stringers.

**2.6 FACTORY FINISH**

**\*\*\*\*\* Steel bar gratings can be supplied as stainless steel or plain steel with either light oil, galvanized, or paint finish. \*\*\*\*\***

 A. Provide steel bar [gratings] [stair treads] [perimeter angle frames] with [stainless steel finish] [light oil coating] [hot-dip galvanized zinc coating in accordance with ASTM A123] [thermoset enamel coating].

**PART 3 - EXECUTION**

**\*\*\*\*\* Steel bar gratings manufactured by Ametco® Manufacturing Corporation have many uses and applications. Gratings can be specified separately in this section. As an alternative, the material requirements in this section can be inserted into the section specifying the application of the steel bar grating. \*\*\*\*\***

**3.1 INSTALLATION**

 A. Preparation: Prior to grating fabrication, field verify required dimensions.

 B. Provide steel bar [gratings] [stair treads] specified in this Section for fabrication of [elevated platforms] [catwalks] [steel stairs] [\_\_\_\_\_] as specified in Section [05 50 00 [\_\_\_\_\_] - [Metal Fabrications] [\_\_\_\_\_].

**\*\*\*\*\* Include the following paragraph if steel angle frames are required for grating installation. \*\*\*\*\***

 C. Perimeter steel angle frames: Coordinate installation with casting or concrete [trenches] [slabs] [\_\_\_\_\_]. Provide frames in time for embedment in concrete. Install with upper frame edge flush with finished floor. Accurately position frame. Ensure corners are square and sides straight.

 D. Install gratings in accordance with manufacturer's installation instructions and approved shop drawings.

 E. Attach gratings [to allow for future removal] [permanently] with [bolt and clamping bracket] [saddle clips and [welded studs] [bolts]] [tack welds].

 F. Position gratings such that cross bars align.

 G. After installation, touch-up damaged finish with paint supplied by manufacturer and matching original coating.

 **END OF SECTION**