

SECTION 33 4241 - GRATINGS AND FRAMES FOR STORMWATER DRAINAGE

PART 1 - GENERAL

Review available choices in this Section with manufacturer(s) selected, and add additional requirements as needed. Delete paragraphs that do not apply.

1.1 SUMMARY

A. Section Includes:

1. Decorative cast metal trench drain grates.
2. Decorative cast metal area drain grates
3. Metal frames and accessories.

B. Related Requirements:

1. Section 05 5313 - Bar Gratings: Standard building bar or plank trench drain covers.
2. Section 22 1400 - Facility Storm Drainage: Standard site drainage gratings.
3. Section 22 4000 - Plumbing Fixtures: Premanufactured drainage bodies for installation of gratings under this Section.
4. Section 32 <____ - _____>.

1.2 DEFINITIONS

Insert Section above for paving type(s) in which gratings are installed, if desired.

A. ADA: Americans with Disabilities Act.

1.3 REFERENCE STANDARDS

A. General: Use most current standard, unless otherwise indicated by specific date.

B. American Association of State Highway and Transportation Officials (AASHTO):

1. AASHTO M 306 - Standard Specification for Drainage, Sewer, Utility, and Related Castings.

C. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A48 - Standard Specification for Grey Iron Castings.
3. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
4. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
5. ASTM A536 - Standard Specification for Ductile Iron Castings
6. ASTM B26 - Standard Specification for Aluminum-Alloy Sand Castings.
7. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
8. ASTM E303 - Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester

D. American Welding Society:

1. AWS D1.1 - Structural Welding Code - Steel.
2. AWS D1.2 - Structural Welding Code - Aluminum.
3. AWS D1.6 - Structural Welding Code - Stainless Steel.

E. Military Standardization Documents:

1. MIL A-8625 - Anodic Coatings for Aluminum and Aluminum Alloys.

1.4 COORDINATION

A. Coordinate Work of this Section with:

1. Placement of frames.
2. Size of cast-in-place curb and pavement openings.
3. Premanufactured drainage assemblies provided under other Sections.

1.5 SUBMITTALS

A. Product Data: Indicate compliance with applicable Reference Standards.

B. Shop Drawings: Indicate details of each type and size of grate, component supports, anchorages, openings, perimeter construction details, and tolerances.

1. Where custom design or layout has been furnished by the Design Professional, submit CAD file, in addition to other Drawings, to indicate compliance with design intent.
2. Where intent of Design Professional cannot be met due to size, material, or casting limitations, clearly indicate exceptions on Submittal documents.
3. Submit grating Shop Drawings in coordination with submittals for drainage assemblies furnished under other Sections.

C. Samples: Submit [two] <____> cast metal samples, <____> by <____> inch in size, illustrating finish, color, and texture.

D. Delegated Design Submittals: Submit certified AASHTO ratings or signed and sealed Shop Drawings with design calculations for gratings subjected to vehicular loads.

1. Licensed Professional: Engineer experienced in design and anchorage of load-bearing trench grates and licensed at Project location.

1.6 SUSTAINABLE DESIGN SUBMITTALS

A. Manufacturer's Certificate: Certify that products meet or exceed specified sustainable design requirements.

B. Product Cost Data: Submit cost of products to verify compliance with Project sustainable design requirements. Exclude cost of labor and equipment to install products.

1. Provide cost data for the following products:
 - a. Salvaged, refurbished, and reused products.
 - b. Products with recycled material content.
 - c. Regional products.
 - d. <_____>.

1.7 QUALIFICATIONS

- A. Welders and Welding Procedures: AWS D.1 qualified within previous 12 months for employed weld types.

1.8 WARRANTY

- A. Provide manufacturer's standard [one-year] [<_____> year] warranty on products and assemblies.

1.9 EXISTING CONDITIONS

- A. Field Measurements: Verify field measurements of conditions affecting drainage grates prior to fabrication. Indicate field measurements provided by General Contractor or other parties on Shop Drawings

PART 2 - PRODUCTS

2.1 PERFORMANCE AND DESIGN CRITERIA

- A. General: Conform to local code(s) as indicated on Drawings for applicable loads.

- B. Load Designation Required; AASHTO M 306.

1. Non-traffic.
2. Light Duty
3. Medium Duty
4. Heavy Duty
5. Extra Heavy Duty
6. Airport Extra Heavy Duty.

Select load designation, if applicable. AASHTO ratings are based on load capacity over a 9x9-inch area.

Consider Live Load and Deflection ratings below for custom shapes and sizes. Pedestrian-rated gratings are typically 100 lb./sq. ft. live load.

- C. Design Live Load: Uniform load of <_____> lb./sq. ft. minimum; concentrated load of force <_____> lb.

- D. Maximum Allowable Deflection under Live Load: [<_____> of span] [<_____>-inch].

2.2 DRAIN GRATINGS

A. Manufacturers:

1. Iron Age Designs; www.ironagegrates.com; 877-418-3568.
2. <_____>.
3. Substitutions: [Section 016000 - Product Requirements] [Not permitted].

2.3 SUSTAINABILITY CHARACTERISTICS

A. Material and Resource Characteristics:

1. Recycled Content Materials: Furnish materials with minimum of 80 percent recycled metal content.
2. Regional Materials: Furnish materials extracted, processed, and manufactured within 500 miles of Project Site.
3. Cradle to Cradle Certified: [v2 Basic] [v3 Bronze] [v3 Silver] [<_____>].
4. <_____>.

2.4 GRATE MATERIALS

- A. Cast Iron: ASTM A48, CL 30 or better.
- B. Cast Ductile Iron: ASTM A536; alloy 65-45-12
- C. Cast Aluminum: ASTM B26; alloy #535, marine grade.
- D. Cast Bronze: ASTM B584 [silicone bronze alloy C87500] [nickel bronze alloy C99700].

Select desired material. If more than one type or size, include location in Schedule at end of Section.

2.5 TRENCH DRAIN GRATINGS

- A. Width: [<_____> inches.] [As indicated on Drawings.]
- B. Length per Section: [<_____> inches, maximum.] [As indicated on Drawings.]
- C. Basis of Design Pattern: <_____> by [Iron Age Designs] [<_____>].
- D. Number of Sections per Set: [As indicated on Drawings].

E. Frames:

1. Mild Steel: ASTM A36, raw/unfinished.
2. Galvanized Steel: ASTM A123.
3. Stainless Steel, Type [304] [316], raw /unfinished.
4. Welding Materials: [AWS D1.1] [AWS D1.6], type as required for materials being welded.
5. Not required.

Select one of below, if applicable. Aluminum frames not recommended in concrete pavements.

2.6 AREA DRAIN GRATINGS

- A. Size: [Rectangular, <____> x <____>-inches.] [Round, <____>-inch diameter] [As indicated on Drawings.]
- B. Basis of Design Pattern: <_____> by [Iron Age Designs] [<_____>].
- C. Frames:
1. Mild Steel: ASTM A36, raw/unfinished.
 2. Galvanized Steel: ASTM A123.
 3. Stainless Steel, Type [304] [316], raw /unfinished.
 4. Welding Materials: [AWS D1.1] [AWS D1.6], type as required for materials being welded.
 5. Cast iron.
 6. Not required.
- Select one of below, if applicable.
Aluminum frames not recommended in concrete pavements.
- Cast iron for round catch basin grates only.

2.7 FABRICATION

- A. Fabricate drainage gratings to accommodate design loads and to sizes indicated.
- B. Fabricate grates to comply with ADA for maximum opening size, offset of surfaces, and slip resistance. Grates shall have a minimum slip resistance (Pendulum Test Value) of 5.5 or better, per ASTM E303.
1. [Provide grates with enhanced heel-proof design, with no opening wider than 1/4-inch.]

2.8 GRATE FINISHES

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Cast Iron:
1. [As cast, no finish] [Baked-on oil finish].
- Baked-on oil coating may be used on cast iron to bypass the natural orange oxidation phase. Verify if available from manufacturers.
- C. Aluminum:
1. [As cast, no finish] [Clear anodized; MIL A8625, Type 2, Class 1].
- D. Bronze:
1. [As cast, no finish] [Applied Antique Brown Patina].

2.9 ACCESSORIES

- A. Vandal Resistant Bolts: Stainless steel, 1/4 x 20 fasteners. Prefabricate frames with fasteners where shown on Shop Drawings.

1. Fasteners to attach drainage grates in this Section to drain bodies specified under other Sections must be provided by manufacturers of those products.

B. <_____>.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that overall opening sizes and dimensional tolerances are acceptable.
- B. Verify that fixtures placed by other trades are completed, and that openings and penetrations are accurately positioned.
- C. Verify that preparation work is complete, including removal of soil material and trash from trench and area drain assemblies.

3.2 INSTALLATION

- A. For cast-in-place frames, furnish to entity responsible for adjacent curbs or pavements.
- B. For field-anchored frames, anchor by expansion bolts to prepared openings using anchors of type and number recommended by manufacturer.
- C. Ensure that top of [frame] [and] [grating] is flush with, or no greater than 1/8-inch lower than, adjacent pavement surfaces.
- D. Place gratings securely in prepared openings, with no warping or slippage.
- E. Secure where indicated, or as needed to prevent movement. Allow for maintenance removal.

3.3 TOLERANCES

- A. Maximum Space Between Adjacent Sections: 1/4-inch.
- B. Maximum Variation from Top Surface Plane of Adjacent Sections: 1/8-inch.

3.4 PROTECTION AND CLEANING

- A. Protect completed gratings until time of Substantial Completion.
- B. Clean damaged coatings according to manufacturer recommendations.

3.5 SCHEDULE

- A. Trench Drain Gratings:

Use Schedule to supplement Drawings, if needed, to differentiate between grating types or applications of more than one material, finish, or other characteristics.

B. Area Drain Gratings:

END OF SECTION 32 9443