

## SECTION 32 9443 - TREE GRATES

### 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. Cast metal tree grates.
2. Metal frames and accessories.

##### B. Related Requirements:

1. Section 05 5000 - Metal Fabrications: Miscellaneous metal components.
2. Section 26 0533 - Raceways and Boxes for Electrical Systems: Power junction boxes.
3. Section 26 5600 - Exterior Lighting: In-ground lighting.
4. Section 32 8400 - Planting Irrigation.
5. Section 32 9300 - Plants: Trees and other plant accessories.
6. Section 32 <\_\_\_\_ - \_\_\_\_\_>.

#### 1.2 DEFINITIONS

Insert Section above for paving type(s) in which tree grates 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. 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

##### C. 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.

D. California Department of Health Services:

1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

E. SSPC: The Society for Protective Coatings:

1. SSPC - Steel Structures Painting Manual.
2. SSPC SP 10 - Near-White Blast Cleaning.

Above and below applicable only for coated materials. See recommendations in Part 2 Finishes.

F. Military Standardization Documents:

1. MIL A-8625 - Anodic Coatings for Aluminum and Aluminum Alloys.
2. MIL PRF-24712A - Coatings, Powder.

#### 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. Placement of in-ground light fixtures.
4. Plant irrigation systems and controls.

#### 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.

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

Engineering design not required on pedestrian-rated tree grates

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

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

- E. Manufacturer's Instructions: Submit special requirements of [openings for non-standard tree sizes,] [ground lighting,] [irrigation access,] [and] <\_\_\_\_ \_\_\_\_>.

#### 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 existing trees or obstructions affecting tree 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.
  - 1. Except where required by Authority Having Jurisdiction (AHJ), provide tree grates for pedestrian live load only, 100 lbs./sq. ft.

For vehicular loads, provide specific uniform and concentrated loads with deflection criteria below.
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- B. Design Live Load: Uniform load of <\_\_\_\_\_> lb./sq. ft. minimum; concentrated load of force <\_\_\_\_\_> lb.
- C. Maximum Allowable Deflection under Live Load: <\_\_\_\_\_> of span.

2.2 TREE GRATES

- A. Manufacturers:
  1. Iron Age Designs; [www.ironagegrates.com](http://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. <\_\_\_\_\_>.

- B. Indoor Environmental Quality Characteristics:

Below may be applicable if painted grates are specified in indoor spaces.

1. Paints and Coatings: Maximum volatile organic compound content according to product and testing requirements of CA/DHS/EHLB/R-174.

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, include location in Schedule at end of Section.

2.5 TREE GRATES

- A. Size: [Rectangular, <\_\_\_\_\_> x <\_\_\_\_\_>-inches.] [Round, <\_\_\_\_\_>-inch diameter] [As indicated on Drawings.]
- B. Basis of Design Pattern: <\_\_\_\_\_> by [Iron Age Designs] [<\_\_\_\_\_>].
- C. Number of Sections per Set: [As indicated on Drawings].

D. Tree Opening: [Square, <\_\_\_\_>-inches.] [Round, <\_\_\_\_>-inches] [As indicated on Drawings.]

1. [Expanded Tree Opening: Fabricate round openings with break-out rings to allow tree growth up to <\_\_\_\_>-inches.]

E. Accessory Openings: Number and locations as indicated on Drawings.

F. Frames:

Select one of below. Aluminum frames are not recommended in concrete pavements.

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.

## 2.6 FABRICATION

A. Fabricate tree grates to accommodate design loads and to sizes indicated.

B. Fabricate support framing for [openings] [and] <\_\_\_\_> as required. Coordinate locations with fixtures, controls, and penetrations as indicated on Drawings.

C. 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.]

D. Removable Panels: With vandal-resistant fastening hardware, recessed [finger lift rings] [handles], [and] <\_\_\_\_>.

## 2.7 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] [Powder coat; MIL PRF-24712A; one of manufacturer's standard colors as selected by Architect].

D. Bronze:

1. [As cast, no finish] [Applied Antique Brown Patina].

Painted finish above is not recommended on exterior tree grates, due to decreased slip resistance and abrasion concerns. Consider powder coating only for interior use.

## 2.8 ACCESSORIES

- A. Vandal Resistant Bolts: Stainless steel, 1/4 x 20 fasteners; minimum 2 per casting. Prefabricate frames with fasteners where shown on Shop Drawings.
- 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 planting and irrigation work is complete, including removal of excess soil material and trash from tree grate opening.

### 3.2 INSTALLATION

- A. For cast-in-place frames, furnish to entity responsible for adjacent curbs or pavements.
- B. Ensure trees are planted with top of root ball <\_\_\_\_\_> inches below bottom of support framing to mitigate root ball heaving of grate as tree grows.
- C. For field-anchored frames, anchor by expansion bolts to prepared openings using anchors of type and number recommended by manufacturer.
- D. Ensure that top of [frame] [and] [tree grate] is no greater than 1/8-inch higher or lower than adjacent pavement surfaces.
- E. Place tree grates securely in prepared openings, with no warping or slippage.
- F. 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 tree grates until time of Substantial Completion.
- B. Clean damaged coatings according to manufacturer recommendations.

- C. After frames are installed, but prior to grate installation, keep soil around trees clear from debris, runoff, or anything that will inhibit proper development and growth of the tree.

3.5 SCHEDULE

- A. Tree Grates - Interior:
- B. Tree Grates - Exterior:

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

END OF SECTION 32 9443