

"EXHIBIT B"

CITY OF HOUSTON  
STANDARD SPECIFICATION

FRAMES, GRATES, RINGS &  
COVERS

SECTION 02084

Section 02084

**FRAMES, GRATES, RINGS, AND COVERS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Iron castings for manhole frames and covers, inlet frames and grates, catch basin frames and grates, meter vault frames and covers, adjustment rings, and extensions.
- B. Ring grates.
- C. Trench Drainage
- D. Tree Grates

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.
  - 1. No payment will be made for frames, grates, rings, covers, and seals under this Section. Include payment in unit price for related item.
  - 2. Payment to rack over existing manhole is on a unit price basis for each manhole.
  - 3. Refer to Section 01270 - Measurement and Payment for unit price procedures
- B. Stipulated Price (Lump Sum). If Contract is Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.03 REFERENCES

- A. AASHTO - American Association of State Highway and Transportation Officials
  - 1. Standard Specification for Highway Bridges
  - 2. M306: Drainage, Sewer, Utility, and Related Castings
  - 3. M105: Gray Iron Castings
- B. ASTM A 48 - Standard Specification for Gray Iron Castings

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- C. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
  - D. AWS - D 12.1 Welding Reinforcing Steel.
- 1.04 SUBMITTALS
- A. Conform to requirements of Section 01330 - Submittal Procedures.
  - B. Submit copies of manufacturer's specifications, load tables, dimension diagrams, anchor details, and installation instructions.
  - C. Submit shop drawings for fabrication and installation of casting assemblies that are not included in Drawings or standard City of Houston details. Include plans, elevations, sections and connection details. Show anchorage and accessory items. Include setting drawings for location and installation of castings and anchorage devices.

## PART 2 PRODUCTS

### 2.01 CASTINGS

- A. All castings shall be made from gray cast iron conforming to the requirements of AASHTO M105 class 35b.
- B. Castings intended for traffic service shall be clean castings capable of withstanding an application of 40,000 pound proof load as described in Section 5 of AASHTO M306 (includes items such as frames, grates, rings, covers, trench drainage, etc.)
- C. Fabricate castings to conform to shapes, dimensions, and with wording or logos shown on Drawings.
- D. All castings shall be manufactured in accordance with the requirement of Section 4 of AASHTO M306.
- E. Unless otherwise indicated, all castings shall be provided uncoated.
- F. Each individual casting shall include all markings as shown on the specification drawings and shall be identified by the producing foundry showing the following: Name of producing foundry; country of manufacturer preceded by the words "Made in," such as "Made in USA"; material designation, heat identification and cast date (MM/DD/YY), casting lettering as required by the purchaser. If a casting is melted and poured at one foundry and labeled with the name of another organization, manufacturer, or foundry the casting shall include the name of the producing foundry and the organization the casting is produced for. The name of the producing foundry and the organization the product is made for shall have lettering of

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equal size, be in close proximity to each other, and be easily identified from the same side of the casting. The casting shall also include any additional markings as required in Section 9 of AASHTO M306 and Section 17 of AASHTO M105.

### 2.02 TESTING REQUIREMENTS

- A. Testing shall be performed in accordance with the following inspection criteria unless otherwise specified in the contract or purchase order. The manufacturer/supplier shall be responsible for carrying out all of the required tests and inspections. All testing shall be conducted in the United States using purchaser approved reliable facilities. The manufacturer/supplier shall maintain complete records of all such tests and inspections. All testing shall be paid for by the manufacturer/supplier. If the producing foundry is located within the United States and operates in accordance with an approved Quality System they shall conduct testing in accordance with Subsection B. All others shall conduct testing in accordance with subsection C.
- B. The manufacturer shall report and certify material information obtained from separately cast test bars. If there are more than three test bar failures in a calendar year the manufacturer shall report this to the purchaser and shall discontinue supplying product. In order to resume supplying product, documentation that a new Quality System is in place to ensure material compliance must be submitted to and accepted by the purchaser. The manufacturer may also supply under subsection C.
- C. A test bar for determining the class of iron shall be cast on each casting in a place where it can be easily broken off with a breakage pattern remaining on the member. Test bars shall be of sufficient size in order to produce a machined test specimen complying with the dimension requirement for a Type B test bar as shown in AASHTO M105. For lots of 15 castings or less 30% of test bars shall be tested. For lot sizes between 16 to 100, 10% or a minimum of 5 test bars shall be tested. For lots greater than 100, 10% of all bars shall be tested. All castings for testing shall be selected at random. All castings that have a test bar removed shall also be inspected for dimensional and mass requirements. If any casting fails the material, dimension, or mass inspection that casting will be rejected and destroyed. In order for the remaining castings in the lot to be accepted, all castings in the lot shall be tested and need to meet the material, dimensional, and mass requirements. If any additional casting fails, the entire lot shall be rejected and destroyed. If the purchaser elects to select a casting for verification of test results, the member shall be furnished by the supplier at no cost to the purchaser.

### 2.03 SPECIAL FRAMES AND COVERS

- A. Where indicated on Drawings, provide watertight manhole frames and covers with minimum of four bolts and gasket designed to seal cover to frame. Supply approved watertight manhole covers and frames.

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- B. Where shown on Drawing, provide manhole frames and covers with 48 inch diameter clear opening, with inner cover for 22 inch diameter clear opening. Provide approved inner cover with pattern shown on Drawings.

2.04 FABRICATED RING GRATES

- A. Fabricate ring grates from reinforcing steel conforming to ASTM A 615.
- B. Conform to welds connecting bars to AWS D 12.1.

2.05 ADJUSTMENT RINGS FOR ASPHALT OVERLAYS

- A. Use castings conforming Section 2.01.
- B. One piece casting with dimensions to fit frame and cover.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install castings according to approved shop drawings, instructions in related specifications, and applicable directions from manufacturer's printed materials.
- B. Set castings accurately at required locations to proper alignment and elevation. Keep castings plumb, level, true, and free of rack. Measure location accurately from established lines and grades. Brace or anchor frames temporarily in form work until permanently set.
- C. Fabricate ring grates in accordance with City of Houston standard detail, "Ring Grate for Open End of 18 Inch to 72 Inch Stubs to Ditch". Set in mortar in mouth of pipe bell.
- D. Install adjustment rings in existing frames with clean bearing surfaces that are free from rocking.

END OF SECTION