

ITEM 460

REINFORCED CONCRETE PIPE

460.1 Description. This Item shall govern for the furnishing of reinforced concrete pipe.

460.2 Materials.

- A. Except as modified herein, materials, manufacture and design of pipe shall conform to ASTM C76, Class III, for circular pipe, ASTM C506 for arch pipe or ASTM C507 for elliptical pipe. All pipe shall be machine made or cast by a process which will provide for uniform placement of the concrete in the form and compaction by mechanical devices which will assure a dense concrete. Concrete shall be mixed in a central batch plant or other approved batching facility from which the quality and uniformity of the concrete can be assured. Transit mixed concrete will not be acceptable for use in precast concrete pipe.

In the manufacture of concrete pipe, the supplier has the option of using Portland cement or Portland cement plus fly ash, as defined herein. Cement plus fly ash shall be composed of Portland cement and 20-30 percent fly ash, by absolute volume. Fly ash shall be Class C, conforming to the requirements of ASTM C618 "Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete". Fly ash shall have a minimum CaO content of 20 percent.

Pipe Wye and Tee fittings shall be of the same class as the adjacent joint of pipe. Use the bell end of branch openings on Wye and Tee fittings.

Unless otherwise shown on the plans, not more than two holes may be placed in the top section of the pipe for lifting and placing. The holes may be cast, cut, or drilled in the wall of the pipe. The holes shall not exceed 3 inches in diameter at the inside surface of the pipe wall. Not more than one longitudinal wire or two circumferential wires may be cut per layer of reinforcing steel when locating lift holes in the pipe wall.

All lifting holes shall be sealed to the satisfaction of the Engineer. Tapered lifting plugs shall be used, and sealed externally and internally with an acceptable cement grout. Additionally, lifting plugs shall not protrude from the pipe greater than one-half of an inch.

Variations in diameter, size, shape, wall thickness, reinforcement placing, laying length, and permissible underrun of length shall be

in accordance with the applicable ASTM Standard for each type of pipe as referred to previously.

Pipe shall be free from fractures, all cracks and surface roughness. The ends of the pipe shall be normal to the walls and centerline of the pipe. Pipe shall be cured in accordance with the applicable ASTM Standard for each type of pipe as referred to herein.

The following information shall be clearly marked on each section of pipe:

1. The class and ASTM or D-Load of Pipe.
2. The date of manufacture.
3. The name or trademark of the manufacturer and plant location.
4. Designated Manufacturer's Certifying Stamp.
5. One end of each elliptical section of pipe shall be clearly marked on the inside and outside to show the location of the top and bottom of pipe.
5. Clearly mark Pipe to be used for jacking and boring (when applicable).
6. Pipe meeting sulfate-resistant concrete plan requirements (when applicable).

Marking shall be indented on the pipe section or painted thereon with waterproof paint.

Pipe shall be subject to rejection for failure to conform to any of the specification requirements. Individual sections of the pipe may be rejected because of any of the following:

1. Fractures or cracks passing through the shell/wall of pipe with exception of a single crack that does not exceed the depth of the joint.
2. Defects that indicate imperfect proportioning, mixing and molding.
3. Surface defects indicating honeycombed or open texture.
4. Damaged ends, when such damage would prevent making a satisfactory joint.
5. Any continuous crack having a surface width of 0.01 inch or more and extending for a length of 12 inches or more.

6. The painting of pipe shall not be allowed prior to delivery on the project.

460.3 Submittals. Submit certification from the manufacturer that the pipe has been tested and meets the requirements of this Item. The joint material data sheets shall be submitted for approval, by the Design Engineer.

460.4 Joint Material. Unless otherwise specified, the Contractor shall supply the joints using the Rubber Gaskets. Joints using Rubber Gaskets shall conform to ASTM C443. This type of joint shall be applied using lubricants of flax soap or equal. Mineral lubricants are not permitted.

The design engineer shall approve a substitution or equal for the rubber gasket joint.

460.5 Construction Methods

Unless otherwise specified, the following method shall govern:

Jointing Rubber Gasket Pipe:

Lay pipe section in trench to true alignment and grade. Exceptional care shall be taken in placing pipe and making field joints. Avoid bumping the pipe in the trench. Place rubber gasket on dry spigot end of pipe. Properly lubricate spigot, with rubber gasket in place, with specified lubricants. Do not twist, roll, cut, crimp or otherwise injure gaskets or force them out of position during closure of joints. Pull or push the pipe home for closure of the joint. Correct joint rebound before backfilling the pipe. Remove foreign matter or dirt from pipe and keep clean during and after laying.

Install R.C.P. in accordance with Item 430 "Construction of Underground Utilities", and all related drawings/plans.

460.6 Quality Assurance. Concrete pipe 54 inches and smaller in diameter shall be tested in accordance with ASTM C497 using the method outlined by part 4. "External Load Crushing Strength Test by the Three-Edge Bearing Method". The pipe shall be tested at a frequency of three pipe joints for each 100 joints cast, for each pipe size.

Concrete pipe 60 inches and larger shall also be tested in accordance with ASTM C497 using the method outlined by Part 6. "Core Strength Test". However, where the manufacture of the pipe is witnessed by the Engineer, tests using concrete cylinders in accordance with ASTM C39 "Test Method for Compressive Strength of Cylindrical Concrete Specimens", shall be acceptable. All test specimens and testing shall be done by the producer of the concrete pipe.

Pipe previously approved and stamped by the Texas Department of Transportation (TxDOT) or by the designated fabricator/manufacturer certifying stamp of the reinforced concrete pipe fabrication plant that has been approved by TxDOT in accordance with DMS-7310 "Reinforced Concrete Pipe Fabrication and Plant Qualification" stating: **Certifies Specification Compliance**" will be accepted by all laboratories and by Harris County. For pipes that are stamped by the manufacturer as stated above, copies of test results (D-loads and compressive strengths) shall be submitted to the Engineer.

1. **Random Inspection and Testing.** Harris County reserves the right to inspect, sample, and test reinforced concrete pipe at any time to ensure compliance with this Item. The pipe manufacturing plant shall provide facilities, equipment, and access to allow for inspection regarding: the quality of materials, the process for manufacturing, and the finished pipe at the plant; in addition to the inspection that is done of the finished pipe at the site before and during the installation.

460.7 Measurement & Payment. Gravity pipelines (R.C.P.) shall be measured by the linear foot of pipe actually laid, at finished grade, along pipe of size and at depth installed, in accordance with Item 430 "Construction of Underground Utilities". Measure depth at manholes, at intervals not to exceed 50 feet between manholes, and at breaks in profile of natural ground from flow line of pipe to natural ground surface over center of pipe. Payment for gravity pipeline, furnished, installed and measured as stated shall be at the contract unit price bid for the size, type, (and depth, if shown on the proposal) measured under their respective bid line codes.

If the depth of cut is not shown on the proposal, no consideration shall be made for depth at which the pipe is installed.

Pipe installed by tunneling shall be paid for in accordance with Item 431 "Jacking, Boring and Tunneling Pipe" or Item 432 "Tunnel Construction".

No separate payment shall be made for ordinary bedding and select backfill, unless so indicated on the bid form.

No separate payment shall be made for hauling and storing suitable excavated trench material for other uses or for disposal of excess or unsuitable materials.

No separate payment shall be made for any bedding and backfill installed in accordance with these Standard Specifications and the drawings.

Well Pointing shall be measured and paid for in accordance with the Item 436 "Well Pointing."

There are line code(s), description(s), and unit(s) for this Item.

NOTE: This Item requires other Standard Specifications

Item 430 "Construction of Underground Utilities"  
Item 431 "Jacking, Boring or Tunneling Pipe"  
Item 432 "Tunnel Construction"  
Item 436 "Well Pointing"

END OF ITEM 460