

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 Designation C76, Class III, for circular pipe, ASTM Designation C506 for arch pipe or ASTM Designation 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, titled "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 Specification 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 Specification for each type of pipe as referred to herein.

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

1. The class.
2. The date of manufacture.
3. The name or trademark of the manufacturer.
4. 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. The identification mark of the firm providing inspection services shall be clearly identified on the pipe.

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

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

Where Ramnek, Omni-flex Rubber Gaskets or approved equals are allowed, they shall be of tubular cross-section manufactured from extruded closed cellular rubber, the base polymer being a blend of nitrile and vinyl meeting the physical requirements of ASTM D1056, Class 2CL and meeting the chemical resistance requirements of AASHTO M198.

460.4 Construction Methods for Jointing Pipe

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. Properly lubricate groove end of pipe and rubber gasket with specified lubricants, then stretch gasket over spigot end of pipe and carefully seat in groove. 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.

Where Ramnek, Omni-Flex Rubber Gaskets or approved equals are allowed, the following method shall govern:

Before laying the pipe in the trench, the sealant shall be attached around the tongue or groove near shoulder or hub of each joint in accordance with the sealant manufacturer's recommendations. The protective wrapper shall be removed and the sealant pressed firmly to the clean, dry surface of the pipe, as recommended by the manufacturer. The joint sealer must be placed in such a manner that no dirt or other deleterious materials will come in contact with the joint sealing material.

After the tongue is correctly aligned with the flare of the groove, the wrapper(s) on the sealant shall be removed and the pipe shall be pulled or pushed home with sufficient force to properly seal the joint. Any joint material pushed out into the interior of the pipe that would tend to obstruct the flow shall be removed. Pipe shall be pulled home in a straight line with all parts of the pipe on line and grade at all times.

- 460.5 Quality Assurance. Concrete pipe 54-inches and smaller in diameter shall be tested in accordance with ASTM Designation C497 using the method outlined by part 4., titled "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 Designation C497 using the method outlined by Part 6., titled "Core Strength Test". However, where the manufacture of the pipe is witnessed by the Engineer, tests using concrete cylinders in accordance with ASTM Designation C39, titled "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 will be accepted by all laboratories and by Harris County.

- 460.6 Measurement & Payment. Measurement and payment shall be made in accordance with the Item, "Construction of Underground Utilities".

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

END OF ITEM 460

SUMMARY SHEET

ITEM 460 - REINFORCED CONCRETE PIPE

Other Specifications Required

1. Item 430, "Construction of Underground Utilities"

Reference Standards

1. ASTM C76
C506
C507
C443
2. Federal Specification SS-S-210A-7

Description:

Specification covers piping material but not bedding.

Payment:

None

DO NOT INCLUDE THIS SHEET IN CONTRACT SPECIFICATIONS.