

SECTION 910

STORM SEWER PIPE INSTALLATIONS

910.1 GENERAL

910.1.1 The construction items, specified in this section, are common to storm sewer pipe installation and pipe type culverts.

910.1.2 Reinforced concrete pipe shall be used for storm sewer pipe installations or pipe type culverts. Corrugated metal pipe may be used for pond outfall structures/risers and for stormwater infiltration. Polypropylene may be used under certain conditions; see Specification 912.

910.2 REFERENCES

910.2.1 ASTM

C361 Standard Specification for Reinforced Concrete Low Head Pressure Pipe

C443 Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets

C478 Standard Specification for Precast Reinforced Concrete Manhole Sections

- F2764 Polypropylene Pipe 6 to 60 inches
- D3212 ASTM D3212 Plastic Pipe Joints
- D2321 Underground Installation of Thermoplastic Pipe
- F2881 Polypropylene Pipe 12 to 60 inches
- F477 Elastomeric Seals of Joining Plastic Pipe

910.2.2 This publication per SECTIONS:

- 101 Portland Cement Concrete
- 102 Steel Reinforcement
- 105 Concrete Curing Compound
- 106 Cement Mortar and Grout
- 108 Brick
- 123 Reinforced Concrete Pipe
- 124 Reinforced Concrete Pressure Pipe
- 135 Corrugated Metal Pipe and Arches (Steel)
- 161 Gray Iron Castings

910.3 MATERIALS

910.3.1 Pipe: Storm sewer line pipe and fittings shall be as specified in other sections as follows:

- Section 123 Reinforced Concrete Pipe
- Section 124 Reinforced Concrete Pressure Pipe
- Section 135 Corrugated Metal Pipe and Arches

Arches, and Pipe Arches

910.4 CERTIFICATION

The OWNER/ENGINEER will be supplied with a certification on each item or type of material required in the storm sewer line, as to that item meeting the specifications and/or the reference specifications before that item is installed.

910.5 INSTALLATION

910.5.1 GENERAL:

910.5.1.1 Pipe and appurtenances shall be new and unused. The type of pipe to be installed shall be as approved by these specifications or unless otherwise shown on the drawings. Pipe and appurtenances shall be handled in such a manner as to insure delivery to the trench in sound, undamaged condition. Particular care shall be taken to prevent damage to any pipe coating.

910.5.1.2 The interior of the pipe shall be thoroughly cleaned of foreign material before being lowered into the trench and shall be kept clean during construction operations. When work is not in progress, the open ends of pipe shall be securely closed so that no foreign materials will enter the pipe. Any section of pipe found to be defective before or after laying shall be replaced with sound pipe, or repaired in a manner satisfactory to the ENGINEER, without additional expense to the owner.

910.5.1.3 Pipe shall be laid to line and grade as shown on the plans and as staked in the field. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing and bedding throughout the entire length of the pipe barrel. Suitable excavation shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustment to the line and grade shall be made by scraping or filling in with pipe zone material under the body of the pipe, and not by wedging or blocking. When connections are to be made to any existing manhole, pipe, or other improvement, the actual elevation or position of which cannot be determined without excavation, the CONTRACTOR shall excavate for and expose the existing improvement before laying the connecting pipe or conduit. When existing underground improvements may reasonably be expected to conflict with the line or grade established for the new sewer line, the ENGINEER shall request and the

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CONTRACTOR shall excavate as necessary to expose and locate such potentially conflicting underground improvements prior to laying the new pipe. Any adjustment in line or grade which may be necessary to accomplish the intent of the plans will be made, and the CONTRACTOR will be paid for any additional work resulting from such change in line or grade in the manner provided for in the General Conditions.

910.5.1.4 CONTRACTOR shall submit to the ENGINEER the proposed method for making connections to existing manholes. Connection methods will be dependent upon manhole size and pipe sizes. Unnecessary damage to the existing manhole should be avoided.

910.5.1.5 Pipe shall be laid upgrade in a continuous operation from structure to structure, with the socket or collar ends of the pipe upgrade unless otherwise permitted by the ENGINEER. Concrete pipe with elliptical reinforcement shall be laid with the minor axis of the reinforcement cage in a vertical position. Corrugated metal pipe shall be laid with the external laps of the circumferential seams toward the inlet end.

910.5.1.6 Pipe penetrations into manholes shall not extend more than 2" into the manhole. The penetration hole shall be cleaned. There shall be a concrete collar on the exterior side of the penetration, and the interior side shall be grouted around the pipe.

910.6 JOINTS FOR PIPE

910.6.1 JOINTS FOR CONCRETE PIPE:

910.6.1.1 The type of joint to be used shall be O-ring rubber gasket joints conforming to ASTM C 361 and C 443.

910.6.1.2 Gasketed Type of Joints for Reinforced Concrete Pipe

910.6.1.2.1 General – The ends of the pipe shall be so formed that when the pipes are laid together and joined, they shall make a continuous and uniform line of pipe with a smooth and regular surface. The maximum joint gap width shall conform to manufacturer's specifications.

910.6.1.2.2 Rubber gaskets for making compression-type joints for concrete pipe shall be factory fabricated in accordance with ASTM C 443; for pipes

12 inches in diameter and larger shall be O-ring and shall be handled, primed, installed, etc. in strict accordance with the manufacturer's recommendations.

910.6.1.2.3 The CONTRACTOR'S attention is particularly called to ASTM C 443, regarding storage of gaskets.

910.6.1.2.4 The CONTRACTOR shall furnish the ENGINEER complete information concerning the type and make of all joint material which he intends to use under the contract, including certification that the joint material meets the requirements of the specifications.

910.6.2 JOINTS FOR CORRUGATED METAL PIPE:

910.6.2.1 The seams of the pipe are to be placed at the sides, not on the bottom. The inside circumferential seams should be placed pointing downstream. Care should be taken to insure that dirt or other particles do not get between the outside of the pipe and the pipe coupling. Paved inverts should be placed and centered on the bottom of the trench. Any damage to the protective lining and coating shall be repaired prior to the backfilling around the pipe.

910.6.2.2 If waterproof joints are called for on the plans or specified in the Supplementary Specifications, the caulking compound or other waterproofing material used shall be subjected to the approval of the ENGINEER.

910.6.3 POLYPROPYLENE PIPE

910.6.3.1 Pipe shall be joined using a bell and spigot joint meeting the requirements of ASTM F2881 or ASTM F27674. The joint shall be watertight according to the requirements of ASTM D3212. Gaskets shall meet the requirements of ASTM F477. The gasket shall be installed by the pipe manufacturer and covered with a removable, protective wrap to ensure the gasket is free from debris. A joint lubricant available from the manufacturer shall be used on the gasket and bell during assembly. 12 through 60 inch (300 to 1500 mm) diameters shall have an exterior bell wrap installed by the manufacturer.

910.7 TESTING FOR LEAKAGE

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Normally storm sewer lines need not be tested, but if in the opinion of the ENGINEER, the workmanship or materials do not appear to be satisfactory, the ENGINEER may require that a section of the storm sewer line be tested.

910.8 CLEANING AND INSPECTION

910.8.1 CLEANING: No pipe spalls, rocks, dirt, joint compounds, cement mortar and other trash or obstructions shall be left in a storm sewer pipe of any size or type. During flushing operations the manhole outlet shall be bagged or plugged so that the debris will not be carried into an existing active line.

910.8.2 INSPECTION: Before lines become operational or final acceptance of the installation. Lines larger than 18" in diameter and longer than 30 feet in length shall be inspected using Closed Circuit Television Camera (CCTV). Joint gaps or cracks that are larger than the Manufacturer's tolerances will not be accepted. Water ponding in the pipe deeper than 1" will not be accepted, nor will pipes with insufficient slope.

910.8.3 CLOSED CIRCUIT TELEVISION (CCTV): After the CONTRACTOR has cleaned and flushed the line, the CONTRACTOR will notify the ENGINEER that the line is ready for television inspection. The video is to be submitted to the City Storm Drain Inspector for review. If corrections are necessary, a new television inspection is to be submitted for review after the corrections are made. The cost of the inspection is included in the price of the storm drain.

910.9 MEASUREMENT AND PAYMENT

910.9.1 STORM SEWER PIPE: Installed pipe shall be measured and paid for as follows:

910.9.1.1 For straight lines the pipe length shall be the intervening distance between the centers of manholes along a line parallel to the pipe invert.

910.9.1.2 For curvilinear lines the pipe length shall be the intervening arc distance between the centers of manholes along a line parallel to the pipe invert.

910.9.1.3 For lateral lines, such as from main or manhole to a storm inlet, the pipe length shall be the distance between the center of a manhole or centerline of the main to the interior wall face of the storm inlet along a line parallel to the pipe invert.

910.9.1.4 Payment for pipe will be in accordance with the unit price per linear foot per size and material as defined in the Bid Proposal, and shall include pipe installed in the trench, jointing and coupling materials, and other materials necessary to connect to other sections of pipe, manholes, and other appurtenances.

910.9.2 REMOVAL AND DISPOSAL OF SEWER PIPE: Removal and disposal of storm sewer pipe shall be measured by the linear foot within the specified pipe size increments. Payment will be made on the unit price per linear foot of specified pipe size in the Bid Proposal. Trenching, backfilling, and pavement removal and replacement will be paid for based on the unit prices for each appropriate bid item in the Bid Proposal. If new pipe is to be installed in the same trench as the removed pipe, only one payment will be made for trenching, backfilling, and pavement removal and replacement.

910.9.3 TESTING OF PIPE: No payment will be made for required initial or subsequent tests on sections of the storm sewer line.