

SECTION 02612

REINFORCED CONCRETE PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope

1. Furnish and install reinforced concrete storm sewer pipe
2. Provide all required jointing materials, fittings, and other appurtenances indicated, specified, or required for a complete installation

B. Additional Requirements Specified Elsewhere

1. Section 01340: Shop Drawings, Product Data, and Samples
2. Section 01400: Quality Control
3. Section 01600: Materials and Equipment

C. Related Requirements Specified Elsewhere

1. Section 02200: Earthwork
2. Section 02709: Gravity Pipelines and Appurtenances
3. Section 03200: Concrete Reinforcement
4. Section 03300: Cast-in-Place Concrete

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies: Section 01060

B. Source Quality Control

1. Identification marks: Clearly and permanently mark each length of pipe, including couplings and short lengths, with pipe size, class, type, test pressure, and manufacturer's name and date of manufacture
2. Testing
 - a. Sample and test all materials in accordance with ASTM C497 for
 - 1) External load crushing strength
 - 2) Core strength
 - 3) Absorption
 - 4) Hydrostatic pressure
 - 5) Permeability
 - b. Pipe not manufactured in the United States shall be tested by an approved laboratory within the United States
3. Allowable tolerances
 - a. Horizontal alignment: $\pm 0.2'$
 - b. Vertical alignment: $\pm 0.1'$
 - c. Maintain inverts as indicated on the Drawings at all structures and utility crossings

1.3 SUBMITTALS

- A. Shop Drawings and Product Data in accordance with Section 01340
 - 1. Pipe laying schedule
 - 2. Complete details of design, fabrication, and construction of pipe and fittings
 - 3. Complete data covering materials proposed including liner material
 - 4. Include reinforcement data and joint details
 - 5. Test results from paragraph 1.2.B.2
- B. Certification of Compliance
 - 1. Manufacturer's affidavit of compliance certifying
 - a. All tests have been conducted
 - b. All materials comply with applicable standards
 - c. All materials comply with these specifications

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Do not deliver until concrete control cylinders representing pipe have attained a compressive strength of at least 80% of the specified minimum 28 day strength
- B. Handling
 - 1. Handle so as to insure installation in sound, undamaged condition
 - 2. Use equipment, tools, and methods for unloading, reloading, hauling and laying that do not damage pipe
 - 3. Use hooks with broad, well-padded contact surfaces for insertion into pipe ends
 - 4. Weather limitations: Do not store piping in standing water

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Pipe
 - 1. Non-pressure pipe: ASTM C76, "B" wall not less than 7'6" long, except for fittings and closure pieces, Type II cement
 - a. Class as indicated on the Drawings or Schedule
 - b. Steam-cured in accordance with ASTM C76, paragraph 10.2.1
 - 2. Absorption shall not exceed 5.5%
 - 3. Internal diameter shall not vary any more than $\pm 1\%$
 - 4. Lifting holes through wall of pipe are not permitted
- B. Joints
 - 1. Non-pressure pipe
 - a. Bell and spigot, single step
 - b. Rubber gasket sealing

- 1) Noncircular cross-section profile gaskets specifically designed for watertight seal of specified joint
- 2) Circular cross-section O-ring gaskets not acceptable
- c. Meet or exceed requirements of joint and gaskets to ASTM C443

C. Lubricant: Per manufacturer's recommendation

D. Flared End Sections

1. Reinforcement and concrete shall be equal to requirements of ASTM C-76
2. Design material: Flared end section by Rinker Materials, Concrete Pipe Division
3. Joint: Tongue and groove or bell and spigot with flexible sealing rope gasket
 - a. Joint gasket: 1-inch Conseal or approved equivalent

2.2 FABRICATION AND MANUFACTURE

A. Joints: Designed to withstand gasket compression without cracking plus a differential load of 600 lbs/ft of internal diameter

B. Reinforcement

1. Design and placement shall conform to the requirements of ASTM C76
2. Refer to ASTM A15, A82, and A185 for additional requirements

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspection

1. Examine pipe, fittings, and lining for damage or defects
2. Remove pipe and fittings which cannot be repaired to original condition
3. Rejection through inspection may be made on account of but not limited to any of the following:
 - a. Fractures or cracks passing through the shell, except for a single crack that does not exceed the depth of the joint
 - b. Defects that indicate imperfect proportioning, mixing or molding
 - c. Damaged ends where damage would prevent the making of a satisfactory watertight joint
 - d. Surface defects indicating honeycomb or open texture
 - e. Failure to give a clear ringing sound when tapped with a light hammer
 - f. Exposure of the reinforcement when such exposure indicates that the reinforcement was misplaced
 - g. Irregularities in liner which cannot be field repaired
 - h. Pipe damaged during shipment or handling may be rejected even if previously approved

B. Shape Trench Foundation or Bedding as Required

1. Dig bell or coupling holes
2. Do not support pipe on blocks or mounds of earth

C. Alignment

1. To grades and lines indicated on Drawings
2. Erect pipe alignment control devices at not more than 25' intervals
3. Use pipe alignment control devices to determine and check subgrades
4. Use of surveying instruments with approval of Engineer. At least one elevation shot on each length of pipe
5. Laser alignment is acceptable alternative

D. Cleaning: Thoroughly clean the interior of pipe and fittings of all foreign matter before installation

3.2 INSTALLATION

A. Install as Indicated on Drawings or Specified

B. Cleaning

1. Keep pipe and fitting interior clean until accepted
2. Keep joint contact surfaces clean until the joint is completed
3. Take every precaution to prevent foreign matter from entering the pipe during installation
4. Allow no debris, clothing, tools, or other materials to be placed in the pipe

C. Alignment and Grade

1. Except as indicated on the Drawings, lay all pipe
 - a. Straight between changes in alignment
 - b. At a uniform grade between changes in grade
2. Use pipe alignment control devices to determine and check pipe subgrades
3. Other methods of maintaining alignment and grade may be acceptable
 - a. Submit complete information describing the proposed method to the Engineer for review before pipe laying is started

D. Pipe Laying

1. Inspect pipe, lining, and accessories for defects before lowering into trench
2. Repair or replace any defective, damaged, or unsound pipe and accessories
3. Carefully lower pipe, fittings, and accessories into the trench with suitable equipment to prevent damage to pipe and lining
4. Do not dump or drop pipe or accessories into trench
5. Pipe embedment shall be as specified in Section 02200
6. Protect from lateral displacement by placing specified pipe embedment material
7. Do not lay pipe
 - a. In water
 - b. Under unsuitable weather conditions
 - c. Under unsuitable trench conditions
8. Joint to form true and smooth line
9. Trim pipe only for closures
 - a. Do not disturb integrity of lining system

- b. Provide field installed turnbacks per manufacturer's recommendations
- 10. Remove any pipe and accessories not making a good fit
- 11. Place permissible pipe defects at the top of the pipe
- 12. Begin pipe laying at the lowest point
 - a. Install spigots into bell ends with bell ends up grade
 - b. Provide specials as required at wall pipes to maintain pipe laying direction
 - c. Reverse laying is not acceptable
- 13. Utilize implements, tools, and facilities as recommended by the manufacturer
- 14. Keep pipe clean during and after laying
- 15. Close all open ends with watertight expandable type sewer plugs
 - a. At the end of each day's operations
 - b. Whenever pipe ends are left unattended
 - c. Deposit adequate backfill on pipe to prevent floatation
 - d. Do not use wood, burlap, or other similar temporary plugs
- 16. Remove and re-lay any pipe which has floated

E. Jointing

- 1. Per manufacturer's recommendations for watertight seal
- 2. Thoroughly clean and lubricate inside of receiving bell and outside of spigot and gasket immediately before jointing

3.3 FIELD QUALITY CONTROL

A. Refer to Section 01400 - Quality Control for responsibilities

B. Infiltration Test

- 1. If at any time prior to expiration of correction period infiltration exceeds 100 gal per inch of nominal diameter per mile per day, locate the leaks and make repairs

C. Lamp Test

- 1. Each section between manholes and grade breaks will be lamped by Engineer
- 2. Contractor shall furnish suitable assistants to help Engineer
- 3. A minimum of 95% of a true circle will be required in the lamp tests to indicate a properly constructed pipeline
- 4. Repair any sections not passing the lamp test

D. Refer to Section 02709 for additional storm sewer testing requirements

END OF SECTION