SECTION 33 05 45
REINFORCED CONCRETE PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

A Scope:

1. This section specifies reinforced concrete pipe. This section contains specifications for manholes and appurtenances.

B Pipe Designations:

1. Reinforced concrete pipe designations shall be as follows:

Designation	Definition
RCP	Reinforced Concrete Pipe

C Definitions:

1. Pipe Joint: The area approximately 12 inches each way from the centerline of the visible gap between pipe lengths.
2. Pipe Length: The pipe between two joints; part of a pipe section.
3. Pipe Section: The reach of pipeline between two successive manholes.

1.2 QUALITY ASSURANCE

A References:

1. This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.
2. Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

Reference	Title
ASTM C76	Reinforced Concrete Culvert, Storm Drain and Sewer Pipe
ASTM C139	Concrete Masonry Units for Construction of Catch Basins and Manholes
ASTM C150	Portland Cement
ASTM C443	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C478	Precast Reinforced Concrete Manhole Sections
ASTM C497	Testing Concrete Pipe, Sections, or Tile

Reference	Title
AWWA C600	Installation of Ductile-Iron Water Mains and Their Appurtenances
ASTM E329	Standard Specification for Agencies Engaged in Construction

B Testing:
1. The Contractor shall provide the services of an independent testing laboratory which complies with ASTM E329 and is a member of the American Council of Independent Laboratories.
2. General: The Owner shall be notified of the place and time of testing 1 week prior to the commencement of testing.
3. Concrete Compression Tests: Compression tests shall be as specified in ASTM C76, Section 11.4.1.
4. D-LOAD tests: Pipe shall be tested in accordance with ASTM C76, Section 11.3 and ASTM C497. Loads used for testing shall be the load to produce the 0.01-inch crack or the design test load, whichever is less.
    a. One percent of the total number of pipes, with a minimum of three pipe lengths, of each class, size and wall type shall be tested.

C The following information shall be provided in accordance with Section 01 33 00 - Submittal Procedures.
1. Product data: Submit data for
2. Manufacturer's installation instructions: Submit special procedures required to install products specified
3. Manufacturer's certificate: certify products meet or exceed specified requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A Pipe:
1. Unless otherwise specified, pipe shall conform to the following specifications:
    a. RCP: ASTM C76, Class III.
2. Cement shall be ASTM C150, Type II.

B Gaskets:
1. Gaskets shall conform to the following specifications:
    a. RCP:ASTM C443, Section 5.

2.2 MANUFACTURE

A Pipe:
1. General: Unless otherwise specified, all pipe used for services other than storm drains shall be manufactured by centrifugally spun or vertically wet cast method. Pipe manufactured by the vertically wet cast method shall be cast with the spigot end down. Reinforcing steel for each length of pipe shall be held in place throughout the casting operation. Lift holes are not acceptable.
2. RCP: Pipe shall be manufactured in conformance with ASTM C76. Joints shall be mortared tongue and groove, unless otherwise specified.

B Rubber Gasket Joints:
1. Joints shall use either concrete bell and spigot.

C Length and Bevels:
1. Pipe shall be fabricated in nominal lengths of at least 8 feet except where shorter lengths are required to meet special conditions. Pipe ends may be beveled a maximum of 5 degrees to accommodate changes in alignment or curved alignments of the pipeline.

D Where specified, the upper 270 degrees of the interior of reinforced concrete pipe and surfaces of appurtenant structures except inverts, shall be lined. Joints between individual sheets or sections of the lining shall be continuously heat-welded using welding strips of similar type and equivalent thickness of material as the liner. Installation of the lining in concrete pipe and the field sealing and welding of joints shall be done in accordance with the lining manufacturer's instructions.

PART 3 - EXECUTION

3.1 PIPE LAYING

A RCP:
1. Preparation of bedding and backfill shall be as specified in Section 31 23 00 and the drawing details. Pipe shall be laid with uniform bearing under the full length of the barrel of the pipe.
2. The interior of the pipeline shall be cleaned as the work progresses.
3. The line and grade of any one pipe shall not deviate more than that specified in the following table. The allowable deviation is not cumulative.

Pipe length, feet	**Maximum deviation per pipe length, feet**
8	0.06
10	0.09
12	0.11
16	0.14

4. Assembled pipe joints shall be kept in compression until the placement of the initial backfill is complete.

B Jointing:
1. During jointing, neither mortar nor buttering compound is acceptable on either the exterior or interior of the joints. After jointing, joints over 3/4 inch shall be mortared.

3.2 STRUCTURES

A Structures shall be as specified. Openings for future connections shall be sealed with a precast concrete plug made watertight with mastic compound or rubber gaskets. Concrete mortar shaping within any structure shall be as specified in Division 3.

3.3 PIPELINE ACCEPTANCE

A RCP:
1. After backfilling and restoration of surfaces, pipelines shall be cleaned. Pipelines 21 inches or less in diameter shall be cleaned by the sewer ball method unless the pipeline can be shown to be clean by visual inspection.

END OF SECTION