STANDARD SPECIFICATION

SECTION 15065 PLASTIC (PVC) GRAVITY SEWER PIPE

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section includes materials, installation, and testing of PVC gravity sewer pipe conforming to ASTM D3034 or ASTM F789. Size range is 4 through 12 inches.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Standard Drawings

B. Trenching, Backfilling, and Compacting: STD SPEC 02223

C. Precast Circular Concrete Manholes: STD SPEC 03461

1.03 SUBMITTALS

A. Submit submittal packages in accordance with Standard Specification Section 01300

B. Submit reports on testing per ASTM D3034 or ASTM F789 (pipes 4 inches through 12 inches).

C. Submit cut sheets showing invert elevations, ground elevations, and cuts every 25 feet. Show lateral locations.

PART 2 - MATERIALS

2.01 PVC MATERIAL

Additives and fillers, including stabilizers, antioxidants, lubricants, colorants, etc., shall not exceed 10 parts by weight per 100 of PVC resin in the compound.

2.02 PIPE

Pipe 4 through 12 inches shall conform to ASTM D3034, SDR 35, or ASTM F789.

2.03 JOINTS

Provide elastomeric gasket joints of the push-on type, conforming to ASTM D3212.

2.04 GASKETS

Gaskets for push-on joints shall conform to ASTM F477.

2.05 FITTINGS

Fittings for pipe 4 through 12 inches shall conform to ASTM D3034, SDR 35, or ASTM F789.

2.06 MANDREL FOR FIELD TESTING OF PIPE DEFLECTION

A. Be a rigid, nonadjustable, odd-numbering-leg (nine legs minimum) mandrel having an effective length not less than its nominal diameter.

B. Have a minimum diameter at any point along the full length as follows:

Pipe Material	**Nominal Pipe Size (inches)**	**Minimum Mandrel Diameter (inches)**
PVC-ASTM D3034 (SDR 35)	6	5.619
	8	7.524
	10	9.405
	12	11.191

C. Be fabricated of steel; be fitted with pulling rings at each end; be stamped or engraved on some segment other than a runner indicating the pipe material specification, nominal size, and mandrel outside diameter (e.g., PVC, D 3034-8”-7.524”); and be furnished in a carrying case labeled with the same data as stamped or engraved on the mandrel.

D. All costs incurred by the Contractor attributable to mandrel and deflection testing, including any delays, shall be borne by the Contractor at no cost to the District.

PART 3 - EXECUTION

3.01 INSTALLING PVC SEWER PIPE

A. Install in accordance with Section 02223, ASTM D2321

B. Lay pipe without break, upgrade from structure to structure, with the socket ends of the pipe upgrade.

C. Do not use the pipe as a drain for removing water that has infiltrated into the trench.

D. After joint assembly, bring the bedding material up to pipe spring line. Bedding material shall be imported sand per Section 02223 Place the bedding material on each side of the pipe. Tamp the bedding material into final position at pipe spring line and continue to the top of the pipe. Relative compaction shall be in conformance with Section 02223

E. Then place bedding material to 1 foot above the top of the pipe and compact to the same relative compaction as in the pipe zone per Section 02223. The remainder of the trench backfill shall be native material, installed per Section 02223.

F. Do not use hydro-hammers to compact bedding or backfill.

3.02 INSTALLING LATERALS

A. A. Each wye branch fitting shall have its barrel diameter equal to the diameter of the sanitary sewer main and the spur (or branch) diameter as indicated in the drawings. Do not place wye branches within 5 feet of any structure.

B. Install wye fittings so that the outlet branch is inclined upward at an angle of 45 degrees. Plug wye branch fittings that are to be left unconnected with a stopper or plug. Join laterals to wye branch fittings at the sanitary sewer main by eighth bends. Eighth bends and quarter bends are a part of lateral sewer line.

C. End of the lateral shall be at least 3 feet below the existing or proposed grade of the ground at existing structure to be served or as called for in the drawings.

D. Where possible, laterals shall run perpendicular to the sewer main at a minimum grade of 1%. Bed laterals the same as the sewer main into which they connect.

E. Plug laterals with stopper in the socket of the last joint. Seal stopper in place so that it will withstand the internal pressure during the test for leakage and so that it may be removed without damage to the socket.

F. Mark the location of each lateral by chiseling a letter "S" 1-1/2 inches high on the top of the curb. If the terminal point of the lateral is more than 8 feet beyond the curb line or curb improvements do not exist, provide and install a 4-inch by 4-inch by 3-foot 0-inch stake extending 2 inches above the ground and placed at the end of the connection.

3.03 INSTALLING PIPE AT MANHOLES AND STRUCTURES

A. Place a 2-foot PVC length of pipe of the same inside diameter as the adjoining pipe at the inlet and outlet to each manhole or structure. Use one of the following methods:

1. Directly cast a manhole coupling into the manhole base. Provide rubber-ring gasket in the coupling.

2. Stretch a rubber-ring gasket around the pipe to serve as a water stop when cast into the structure wall.

B. Do not cast pipe bells into manholes or structures. Cut off the bell so that no recess or offset appears on the exposed face from the inside wall of the pipe to the outside wall of the pipe. The pipe shall have a plain end, flush with the inside wall of the manhole or structure, or as shown in the drawings.

3.04 TESTING FOR DEFECTS OF INSTALLED PIPE

Following placement and compaction of backfill and prior to placing permanent

pavement, ball and mandrel the pipe to measure for obstructions (excessive deflections, joint offsets, and lateral pipe intrusions).

3.05 FIELD TESTING FOR PIPE DEFLECTION

A. Test installed pipe to ensure that vertical deflections for plastic pipe do not exceed the maximum allowable deflection. Maximum allowable deflections shall be governed by the mandrel requirements stated herein and shall nominally be:

Nominal Pipe Size	**Percentage**
Up to and including 12 inches	5.0

B. The maximum average inside diameter shall be equal to the average outside diameter per applicable ASTM standard minus two minimum wall thicknesses per applicable ASTM standards. Manufacturing and other tolerances shall not be considered for determining maximum allowable deflections.

C. Perform deflection tests not sooner than 30 days after completion of placement and compaction of backfill. Clean and inspect the pipe for offsets and obstructions prior to testing.

D. Pull a mandrel through the pipe by hand to verify that maximum allowable deflections have not been exceeded. Prior to use, the mandrel shall be certified by an independent testing laboratory. Use of an uncertified mandrel or a mandrel altered or modified after certification will invalidate test. If the mandrel fails to pass, the pipe will be deemed to be overdeflected.

E. Uncover any overdeflected pipe and, if not damaged, reinstall. Remove damaged pipe from the site. Any pipe subjected to any method or process other than removal, which attempts, even successfully, to reduce or cure any overdeflection, shall be uncovered, removed from the site, and replaced with new pipe.

3.06 LEAKAGE TEST

A. Test for leakage by means of an air test. Conduct air tests per F1417, Table 1. Test each section of pipe between manholes, along with the manholes.

B. Test each section of pipe between two successive manholes by plugging pipe outlets with test plugs. Add air slowly until the internal pressure is raised to 4.0 psig. The compressor used to add air to the pipe shall have a blowoff valve set at 5 psig so that the internal pressure in the pipe never exceeds 5 psig. Maintain the internal pressure of 4 psig for at least two minutes to allow the air temperature to stabilize, then disconnect the air supply and allow the pressure to decrease to 3.5 psig. Measure the time in minutes that is required for the internal air pressure to drop from 3.5 psig to 2.5 psig. If the pressure drop from 3.5 psig to 2.5 psig occurs in less time than the specified values, overhaul the pipe and, if necessary, replace and re-lay the pipe until the joints and pipe hold satisfactorily under this test.

C. Guard against the sudden expulsion of a poorly installed plug or a plug that is partially deflated.

3.07 TESTING FOR ALIGNMENT AND GRADE

A. After the pipe has been installed, tested for leakage, backfilled to existing grade, and manholes raised to grade and resurfaced, "ball" the pipe from manhole to manhole with a sewer scrubbing ball.

B. Request television inspection by the District's Representative. If deficiencies are observed, the District's Representative will make a videotape and defects requiring correction will be noted. Upon completing the corrective work, notify the District's Representative; the affected portion of the pipeline system will be retelevised. Costs for re-television inspection will be billed to the Contractor

END OF SECTION