



<http://kanab.utah.gov>
kanabc@kanab.net

Design Standards

Section 9

Sewer Pipe and Fittings

SECTION IX

SEWER PIPE AND FITTINGS

9-1 GENERAL

This section specifies acceptable sewer pipe and accessories.

9-2 CONCRETE PIPE

9-2.1 Concrete sewer pipe may be used for all sanitary sewers and storm drains up to and including eighteen inch size, unless specifically designated in these specifications or on the approved drawings. Pipe shall be extra strength pipe manufactured to comply with the requirements as set forth in ASTM Designation C-14, Class 3 unless otherwise noted on the plans or in the proposal. Joints shall be of the bell and spigot rubber gasket design with joints and gaskets conforming to the requirements of ASTM Designation C-443. Pipe joints shall be so designed as to provide for self-centering, and when assembled, to compress the gasket to form a water tight seal. The gasket shall be confined in a groove on the spigot, so that pipe movement or hydrostatic pressure cannot displace the gasket.

9-2.2 Reinforced concrete pipe shall be used for all sanitary sewers and storm drains of size larger than eighteen inches, and for all sewers and drains of smaller size where installation does not provide a cover of at least three feet over the top of the pipe. Reinforced concrete pipe shall comply with requirements of ASTM C-76 (class II) unless otherwise noted on the plans or in the proposal, with bell and spigot rubber gasket-type joints for sanitary sewers and the alternate option of tongue and groove mortar joints for storm drain lines.

9-3 PLASTIC SEWER PIPE

This specification covers rigid polyvinyl chloride pipe and fittings, hereinafter called PVC pipe and PVC fittings. The pipe and fittings shall meet or exceed all of the requirements of ASTM Specification D-3034. PVC pipe may be used for gravity sanitary sewers four inches through twelve inches in diameter.

Samples of pipe and physical and chemical data sheets shall be submitted to the Engineer for approval, and his approval shall be obtained before pipe is purchased. This pipe shall be homogenous throughout and free from cracks, holes, foreign inclusions or other defects. The pipe shall be as uniform as commercially practical in color.

All PVC sewer pipe shall be made from clean, virgin, Type I grade I PVC conforming to ASTM Resin Specification D-1784. All pipe joints shall be bell and spigot type with rubber ring gasket to permit expansion and contraction. Pipe and fittings must be assembled with a nontoxic lubricant. Four inch and six inch diameter pipe may be the solvent weld type provided an expansion joint is provided if the length of run exceeds 100 lineal feet. All pipe shall be less than twenty feet in length. Pipe shall have the following minimum dimensions:

<u>NOMINAL PIPE SIZE INCHES</u>	<u>OUTSIDE DIAMETER INCHES</u>	<u>MINIMUM WALL THICKNESS INCHES</u>
4	4.250	0.125
6	6.275	0.180
8	8.400	0.240
10	10.500	0.300

12

12.500

0.360

Spigot ends will have 15 degree tapered end with a memory mark around the diameter of the pipe to indicate proper insertion depth.

Wyes shall be of the same material as the pipe, and in no case shall have thinner walls than that of the pipe furnished. Sample wyes must be submitted for the Engineer's approval before purchase of wyes.

9-4 CLAY SEWER PIPE

All clay sewer pipe, specials, and fittings shall be of the best quality extra strength vitrified clay pipe conforming to the latest revision of ASTM Designation 278. All pipe shall be of the bell and spigot type.

Fittings and specials shall be manufactured in conformance with the ASTM Designation shown above. Specials shall be provided where shown on the drawings or specified herein.

Plastic joints equal to but not restricted to Wedge-Lock Joints as manufactured by Utah Fire Clay shall be used where shown on the plans or specified herein. For plastic compression joints the entire bell and the barrel of pipe one inch behind the bell shall conform to extra strength clay pipe ASTM designation 278. Joint materials shall be polyvinyl chloride bonded to pipe by the manufacturer with a special adhesive. The plastic shall neither distort or flow in the hot sun nor become brittle at 0 degrees F. It shall have the following properties:

Water Absorption	1% maximum
Tensile Strength	700 psi minimum
Elongation	100% minimum
Flammability	Self-extinguishing
Durometer Hardness	Scale A
<u>80 degrees F-40 to 50</u>	<u>~0 degrees F-40 to 50</u>

32 degrees F-40 to 60

9-5 CAST IRON PIPE

Cast iron pipe shall be of 18/40 iron or thickness Class 22 (for pipe sizes four inches through twelve inches), meeting the requirements of ASA Specifications 21.6 and shall have joints conforming to ASA A-21 .11 of the push-on rubber gasket type or the mechanical type with plain rubber gaskets.

Fittings shall be of the short body design and shall meet ASA Specifications A21 .10 and shall have mechanical or push-on rubber gasket-type joints.

All exterior surfaces of pipe and fittings shall be coated with hot coal tar as specified in the Proposed American Standard Specifications for Coal Tar Dip Coating for Cast Iron Pipe Fittings.

All interior surfaces of pipe and fittings shall be coated with the standard thickness of cement mortar lining in conformity with the requirements of ASA Standard A-21 .4.

Pipe and fittings shall be handled in such a manner as to insure installation in sound, undamaged condition. Particular care shall be taken not to injure the pipe coating and lining. Cement lining in pipe and fittings which is broken or loosened shall be cause for rejection of the pipe or fittings. All damaged pipe coating shall be repaired prior to laying the pipe or placing the backfill. Repair shall be accomplished by removing all damaged coating, wire-brush to exposed metal, and applying two coats of coal tar coating of a type and quality equal to that used originally in coating the pipe.

Cutting of pipe for closure pieces or for other reasons shall be done in a neat and workmanlike manner and by a method which will not damage the pipe. Before installation, each pipe shall be inspected for defects and rung with a light hammer to detect cracks. All defective, damaged or unsound pipe shall be rejected.

9-6 MANHOLES

The Contractor shall furnish and install watertight precast concrete manholes at the

locations shown on the drawings approved by the Engineer. Manholes shall be furnished complete with cast iron rings and covers.

9-6.1 CONCRETE BASES. Manhole bases shall be of cast-in-place concrete conforming to the requirements of Section IV of these specification. Where sewer lines pass through or enter manholes, the invert channels shall be smooth and semi-circular in cross section. Changes of direction of flow within the manholes shall be made with a smooth curve with as long a radius as possible. The floor of the manhole outside the flow channels shall be smooth and slope toward the channel at not less than 1/2 inch per foot.

9-6.2 WALL AND CONE SECTIONS. All manholes shall have a minimum of forty-eight inches I.D. precast, sectional, reinforced concrete pipe. Both cylindrical and taper sections shall conform to all requirements of ASTM Designation C-76 for Reinforced Concrete Culvert Pipe with the following exceptions:

(1) The throat section of the manhole shall be adjustable, by use of pipe sections up to eighteen inches in height.

(2) The taper section shall be a maximum of three feet in height, shall be of concentric conical design, and shall taper uniformly from forty-eight inches to thirty inches inside diameter.

(3) The forty inch inside diameter pipe used in the base section shall be furnished in section lengths of one, two, three, and four feet as required.

(4) Reinforcing steel shall consist of a circular cage with a minimum cross-sectional area of 3/10 square inch of steel per foot in both directions.

All joint surfaces of precast sections and the face of the manhole base shall be thoroughly cleaned and wet prior to setting precast sections. Joints shall be sealed with one inch flexible joint sealant equal to or exceeding AASHTO M-1 98.

9-6.3 WATER TIGHTNESS. Watertight concrete is required in all concrete manholes. Any cracks or imperfections developing at any point in the work shall be satisfactorily repaired. Materials and methods used shall be subject to approval by the Engineer.

9-6.4 IRON CASTINGS. All iron castings shall conform to the requirements of ASTM A-48 (class 30) for grey iron castings.

Frames and covers shall be minimum combined weight of 402 pounds.

The cover and ring seat shall be machined so that the entire area of the seat will be contact with the cover, in any position of the cover on the seat. Frames and covers shall be so constructed and machined that the parts are interchangeable

The tops of the cover and frames shall be flush, and there shall be a 1/8-inch clearance all around between the frames and cover.

The top surface of each cover shall be cast with a studded pattern including the word "sewer." Letters and studs shall be raised 3/8 inch. The letters shall be not less than 2 1/2 inches high. Each cover shall be provided with not less than twelve each 3/4-Inch diameter ventilating holes.

All manhole rings shall be carefully set to the grade shown on the approved drawings or as directed by the Engineer.

Manhole frames shall be set in place on the shaft and shall be sealed with an approved flexible joint sealant equal to Federal Specification SS-S00210. Frames, covers, and dust pans shall be protected during the backfill and compaction of trenches and during the replacing of road surfaces. Any frames, covers, or dust pans loosened from the shaft shall be reset and any frames, covers and dust pans damaged or broken shall be replaced by the Contractor at his expense.

9-6.5 MANHOLE LEAKAGE TEST. Manholes will be tested for leakage. Allowable leakage shall be 1.0 gallons per hour manhole. At least two manholes shall be tested and based on these tests a visual inspection of all manholes shall be performed. Any manhole whose test is unsatisfactory shall be repaired and retested until satisfactory results are obtained.

[Top of Page](#)

[Utah Website Design](#) by Evangelista [Small Business Web Design](#), [Kanab, Utah](#),
Utah • Photography by [Terry Alderman](#), Kanab, Utah
All content © 2006 City of Kanab, Utah • (435) 644-2534