

SECTION 6000 – STORM SEWERS

6001 SCOPE. This section covers storm sewer pipe embedment, pipe installation, and other appurtenant work.

6002 REFERENCES: See Section 1100 for trenching, backfill and flowable fill specifications.

6003 MATERIALS

A. BEDDING. Granular bedding material shall conform to SB-2 aggregate as listed in Division 1107 of the 2007 KDOT specifications.

B. REINFORCED CONCRETE PIPE.

1. Reinforced concrete pipe shall conform to the following ASTM Standards and be of the minimum strength designated herein or such higher strength as may be required by the Contract Drawings or Special Provisions:

- a. Round Pipe: ASTM C 76, Class III, Wall B.
- b. Elliptical Pipe: ASTM C 507, Class HE-III.
- c. Arch Culvert Pipe: ASTM C 506, Class A-III.

2. Joints

- a. Flexible Gasket: Flexible gaskets may be either flat gaskets cemented to the pipe tongue or spigot, O-ring gaskets, or roll-on gaskets. All gaskets shall conform to ASTM C 443.
- b. Cement Mortar: Cement mortar shall consist of one part Type 1 Portland cement by volume to three parts sand conforming to ASTM C 144 by volume mixed with sufficient water to form a workable stiff mortar paste.
- c. Plastic Compound: This compounds hall be a homogeneous blend of bituminous material, inert filler and suitable solvents or plasticizing compounds roughly mixed at the factory to a uniform consistency suitable for sealing joints of concrete pipe. The compound shah conform to the following requirements:

Bitumen, soluble in CS,, percent	
by weight, minimum	45%
Ash, percent by weight	15-50%
Penetration, standard cone, 15Og, 5 seconds, 2 5" C	
Trowel grade, bulk type	11 O-250mm
Extruded rope or flat tape type	50-120mm

The above penetration ranges include test tolerances.

- d. **Preformed Plastic Compound:** This compound shall be either rope form or flat tape form conforming to ASTM C 990. Primer, as recommended by the manufacturer, shall be used to maintain the material in position while pipe sections are being joined.

C. **CORRUGATED STEEL PIPE.** Pipe and coupling bands shall conform to the requirements of ASTM A 760/A 760M. Bituminous and/or other coatings shall be provided when required by the Special Provisions. All helical pipe shall have circumferential re-corrugated ends with a minimum of 4 re-corrugations on each pipe. Bituminous coating shall conform to AASHTO M-190. Minimum thickness of the metal after galvanizing shall be as follows:

Circular Culvert Pipe (2-2/3" x 1/2" corrugations)								
Under Roadways or In Street Right-of-Way			Under Railroads			NOT Under Roadways		
Diameter (in.)	Minimum Thickness (in.)	Gauge	Diameter (in.)	Minimum Thickness (in.)	Gauge	Diameter (in.)	Minimum Thickness (in.)	Gauge
12-21"	0.079	14	12-18"	0.079	14	12-30"	0.079	14
24-30"	0.079	14	21-24"	0.109	12	36-54"	0.079	14
36-54"	0.109	12	30-36"	0.138	10	60-84"	0.109	12
60-72"	0.138	10	42-84"	0.168	8			
84"	0.168	8						

Circular Culvert Pipe (3" x 1" and 5" x 1" corrugations)					
Under Roadways or In Street Right-of-Way			NOT Under Roadways		
Diameter (in.)	Minimum Thickness (in.)	Gauge	Diameter (in.)	Minimum Thickness (in.)	Gauge
36-54"	0.079	14	36-54"	0.064	16
60-84"	0.109	12	60-84"	0.079	14

Arch Culvert Pipe (2-2/3" x 1/2" corrugations)				
Equivalent Diameter (in.)	Minimum Thickness (in.)	Gauge	Span* (in.)	Rise* (in.)
15"	0.064	16	17"	13"
18"	0.064	16	21"	15"
21"	0.064	16	24"	18"
24"	0.079	14	28"	20"
30"	0.079	14	35"	24"
36"	0.109	121	42"	29"
42"	0.109	12	49"	33"
48"	0.109	12	57"	38"
54"	0.109	12	64"	43"
60"	0.138	10	71"	47"

* Subject to manufacturing tolerances

6004 INSTALLATION

- A. TRENCHING. Excavation, grading, trenching, backfilling, compaction and density testing shall conform to requirements of Section 1100 of these Specifications.
- B. ALIGNMENT AND GRADE. The alignment and grade or elevation of each pipe and appurtenant structures shall be maintained as shown on the contract drawings.
- C. PIPE BEDDING. Granular embedment material shall be spread and the surface graded to provide a uniform and continuous support beneath the pipe at all points between bell holes or pipe joints.

After each pipe has been graded, aligned, and placed in final position on the bedding material and shoved home, sufficient pipe embedment material shall be deposited and compacted under and around each side of the pipe and back of the bell or end thereof to hold the pipe in proper position and alignment during subsequent pipe jointing and embedment operations. Embedment material shall be deposited and compacted uniformly and simultaneously on each side of the pipe to prevent lateral displacement.

D. REINFORCED CONCRETE PIPE.

Core holes and handling holes in concrete pipe shall be repaired by cementing a properly-shaped concrete plug in place with epoxy cement or by other methods acceptable to the Engineer.

- E. CORRUGATED STEEL PIPE. Corrugated metal storm sewer pipe shall be laid with the separate sections joined firmly together, with the outside laps of the circumferential joints pointed upstream, and with the longitudinal laps on the side.

Lateral displacement of the pipe shall be prevented during embedment operations. Pipe shall not be laid in water, nor under unsuitable weather or trench conditions.

All joint preparation and jointing operations shall comply with the instructions and recommendations of the pipe manufacturer.

Before installing corrugated metal pipe, repair any damage to the metallic coating on the pipe. Clean the damaged area to bright metal by blast cleaning, power disk sanding or wire brushing. Apply zinc-rich paint over the cleaned area. Use zinc-rich paint to repair both aluminized and galvanized coatings.

Hooks shall not be permitted to contact joint surfaces. Care shall be exercised in handling all pipes to prevent damage to pipe ends. Damaged pipe or pipe damaged in laying shall be replaced by and at the expense of the Contractor.

- F. DRAINAGE MAINTENANCE. Trenches across roadways, driveways, walks, or other traffic ways adjacent to drainage ditches or water courses shall not be backfilled prior to completion of backfilling the trench on the upstream side of the traffic way, to prevent impounding water after the pipe has been laid. Bridges and other temporary structures required to maintain traffic across such unfilled trenches shall be constructed and maintained by the Contractor. Backfilling shall be done so that water will not accumulate in unfilled or partially filled trenches. All material deposited in roadway ditches or other water courses crossed by the line of trench shall be removed immediately after backfilling is completed and the original section, grades, and contours of ditches or water courses shall be restored. Surface drainage shall not be obstructed longer than necessary.

G. PROTECTION OF TRENCH BACKFILL. Where trenches are constructed in ditches or other water courses, backfill shall be protected from surface erosion. When the grade of the ditch exceeds one (1%) percent, ditch checks shall be installed. Unless otherwise shown on the drawings or directed by the Engineer, ditch checks shall be concrete. Ditch checks shall extend not less than two (2) feet below the original ditch or water course bottom for the full bottom width and at least eighteen (18) inches into the side slopes and shall be at least twelve (12) inches thick.