



**DEVELOPMENTAL SPECIFICATIONS
FOR
SLIPLINING EXISTING PIPE CULVERTS**

**Effective Date
October 20, 2009**

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

09021.01 DESCRIPTION.

Furnish and install liner pipe at locations specified in the contract documents.

09021.02 MATERIALS.

- A.** Furnish liner pipe meeting the material requirements for the type of pipe specified.
- 1. Solid Wall HDPE Pipe with Integral Joint.**
 - a. ASTM F 714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter. O.D. tolerances are +/- 0.60%.
 - b. ASTM D 3350 Polyethylene Plastics Pipe and Fittings Materials. PE cell classification 334433C or higher or Type III, Class C, Category 5, grade PE 34 will both assure pipe grade, UV protection Class C-2% minimum carbon black.
 - 2. Profile Wall HDPE Pipe with Integral Joint.**
 - a. ASTM F 894, Polyethylene (PE) Plastic Pipe. Based on Outside Diameter. O.D. tolerances should be +/- 0.60%.
 - b. ASTM D 3350, Polyethylene Plastics Pipe and Fittings Materials. PE cell classification 334433C or higher or Type III, Class C, Category 5, grade PE 34 will both assure pipe grade, UV protection Class C-2% minimum carbon black.
 - c. Minimum pipe stiffness according to ASTM D 2412 is 46 psi (317 kPa).
 - 3. Profile Wall Spirally Wound PVC Pipe with Integral Joint.**

Comply with ASTM F 949, minimum pipe stiffness, 46 psi (317 kPa).
 - 4. Profile Wall PVC Pipe with Integral Joint.**
 - a. ASTM F 949, PVC Corrugated Sewer Pipe with A Smooth Interior and Fittings.
 - b. ASTM D 1784, Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds. PVC minimum cell classification 12454 B.
 - 5. Corrugated Steel Pipe.**
 - a. ASTM A 760, Corrugated Steel Pipe, Metallic-Coated, For Sewers and Drains.
 - b. Corrugated Steel Pipe meeting the requirements of Article 4141.02 of the Standard Specifications.

- c. Corrugated Steel Pipe gauges meeting the requirements of Standard Road Plan RF-32 or RF-33.

6. Flowable Mortar.

Apply Section 2506 of the Standard Specifications.

B. Pipe Connections.

Use liner pipe capable of being joined into a continuous length. Ensure joints are adequate for pushing or pulling the liner pipe through the host culvert.

C. Pipe Dimension Table.

Table DS-09021.02-1: Pipe Dimension.

Nominal Pipe Size, inches (mm)	Profile Wall HDPE O.D., inches (mm)	Profile Wall HDPE I.D., inches (mm)	Solid Wall HDPE O.D., inches (mm)	Solid Wall HDPE I.D., inches (mm)	Spirally Wound PCV Pipe O.D., inches (mm)	Spirally Wound PVC Pipe I.D., inches (mm)	Profile Wall PVC O.D., inches (mm)	Profile Wall PVC I.D., inches (mm)	CSP Nominal Size., inches (mm)
24 (600)	20.24 (514.1)	18.00 (457.2)	22.00 (558.8)	20.65 (524.5)	20.45 (519.4)	20.00 (508.0)	22.60 (574.0)	20.70 (525.8)	21 (525)
30 (750)	27.06 (687.3)	24.00 (609.6)	28.00 (711.2)	26.29 (667.8)	27.45 (697.2)	27.00 (685.8)	25.60 (650.2)	23.50 (596.9)	27 (675)
36 (900)	33.82 (859.0)	30.00 (762.0)	32.00 (812.8)	30.03 (762.8)	32.79 (832.9)	32.00 (812.8)	32.20 (817.9)	29.50 (749.3)	30 (750)
42 (1050)	40.65 (1032.5)	36.00 (914.4)	40.00 (1016.0)	36.95 (938.5)	38.79 (985.3)	38.00 (965.2)	38.70 (983.0)	35.50 (901.7)	36 (900)
48 (1200)	45.20 (1148.1)	40.00 (1016.0)	42.00 (1066.8)	39.42 (1001.3)	42.79 (1086.9)	42.00 (1066.8)	---	---	42 (1050)
54 (1350)	47.47 (1205.7)	42.00 (1066.8)	48.00 (1219.2)	44.33 (1126.0)	48.79 (1239.3)	48.00 (1219.2)	---	---	48 (1200)
60 (1500)	---	---	54.00 (1371.6)	50.68 (1287.3)	54.79 (1391.7)	54.00 (1371.6)	---	---	54 (1350)
66 (1650)	---	---	---	---	---	---	---	---	60 (1500)
72 (1800)	---	---	---	---	---	---	---	---	66 (1650)
78 (1950)	---	---	---	---	---	---	---	---	72 (1800)
84 (2100)	---	---	---	---	---	---	---	---	78 (1950)
90 (2250)	---	---	---	---	---	---	---	---	84 (2100)
96 (2400)	---	---	---	---	---	---	---	---	90 (2250)

09021.03 INSTALLATION.

- A. Prior to sliplining, clean the existing pipe of obstructions, solids, and so forth that will prevent the insertion of the liner.
- B. Hold the liner pipe down to create the minimum change in flowline, especially on the inlet end. An example of this would entail attaching a block to the top of the liner pipe, or adding weight to the invert to resist floatation during backfilling with flowable mortar.

- C. Fill all voids between the liner pipe and the host culvert with flowable mortar. Staged grouting is recommended. Ensure that all voids between the liner pipe and host pipe have been filled with flowable mortar by providing 2 feet (0.6 meters) of head when filling.

09021.04 METHOD OF MEASUREMENT.

Measurement will be as follows:

A. Sliplining Existing Culverts.

Feet (meters), measured to the nearest foot (meter), shown in the contract documents for each culvert.

B. Flowable Mortar

Article 2506.04 of the Standard Specifications applies.

09021.05 BASIS OF PAYMENT.

Payment will be the contract unit price as follows:

A. Sliplining Existing Culverts.

1. Per lineal foot (meter).
2. Payment includes all costs to inspect and clean the host culvert and all labor, equipment, and materials for sliplining and blocking the liner pipe into the host culvert.

B. Flowable Mortar.

Article 2506.05 of the Standard Specifications applies.