

STATE

OF

TENNESSEE

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March 1, 2006

SPECIAL PROVISION

REGARDING

SLIP LINING OF ROADWAY CULVERTS

WITH POLYETHYLENE CULVERT PIPE RELINER

Description. This specification covers the requirements for high density polyethylene pipe for relining existing in-place metal culvert pipe. The contractor shall furnish and install the polyethylene pipes, at location indicated in the Proposal Contract, in accordance with this specification.

Material. The material used to manufacture the pipe shall be high density, high molecular weight polyethylene pipe material meeting the requirements of Type III, Class C, Category 5, Grade P34, as defined in ASTM D-1248 Standard Specification for Polyethylene Plastics Molding and Extrusion Materials. Clean reworked material generated by the manufacturer’s own production may be used so long as the pipe produced meet all the requirements of this specification.

The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign inclusions or other injurious defects. The pipe shall be as uniform as commercially practical in color, opacity, density and other physical properties.

The average nominal inside diameter of the pipe shall be true to the specified pipe size plus/minus ¼”. Standard laying lengths shall be a minimum of 20 ft., but not exceed 40 ft. or as specified by the maintenance Engineer.

The slipliner shall have a smooth noncorrugated interior and shall be capable of maintaining a minimum flow rate equivalent to 100% of the original in-place culvert. The solid wall slipliner shall have a “Standard Dimension Ratio” (SDR) equal to 32.5. SDR is defined as the ratio of the pipe outside diameter to the minimum thickness of the wall of the pipe. SDR can be expressed mathematically as:

$$SDR = \frac{D}{t}$$

Where D=Pipe outside diameter in inches

And t= Pipe minimum wall thickness in inches

The profile wall slip-liner shall be a helical-spiral manufactured, smooth outside surface, inside diameter sized, hollow-wall closed profile, HDPE pipe. The pipe shall exhibit a pipe stiffness of 46 psi when tested in accordance with ASTM D 2417, ASSHTO design specification, Section 18 and an SDR of 21.

Pipe Jointing. Joining of pipe shall be by either bell and spigot, thermal welding, metal collar, grooved press-on or spiral thread lock joint approved by the Engineer. The joint shall have sufficient mechanical strength to allow the pipe to be pulled or pushed without affecting the joint's integrity. Joining must provide water tight integrity for all joints. Joining of the pipe shall not interrupt the flow characteristics of the pipe.

Pipe Toughness. A twelve (12) inch section of pipe shall show no evidence of splitting, cracking or breaking when compressed between parallel plates to 40% of its outside diameter within 2 to 5 minutes. The pipe shall have sufficient rigidity to withstand being placed by either pulling or pushing and shall exhibit a minimal amount of distortion.

Certification. The manufacturer shall furnish certifications to the Tennessee Department of Transportation, Division of Materials and Tests, 6601 Centennial Blvd., Nashville, Tennessee stating that the material used in the manufacture of the pipe meets the requirements of ASTM D-1248 for the type, class, category, and grade specified. The manufacturer shall also certify that the finished pipe is in compliance with this specification.

Equipment. All equipment, necessary for the satisfactory performance of this work, shall be approved by the Engineer. This equipment shall include all machinery necessary for the installation of the polyethylene pipe and the reworking of the construction permits.

Construction Requirements. The contractor shall reestablish the flow-line of eroded inverts, as directed by the Engineer, with grout meeting the requirements of Subsection 918.21 of the specifications. Premixed grout may be used subject to approval of the Engineer.

After installation of the polyethylene pipe is complete, the contractor shall seal the inlet end of the pipe with a water tight seal between the polyethylene and the existing pipe. Cementitious sealants are not to be used. This sealant shall be one recommended by the pipe manufacturer and approved by the Engineer. All incidental work, such as brush removal, flow-line adjustments, etc., shall be accomplished by the contractor. Where required, a bullnose device shall be pulled through the existing culvert to facilitate the sliplining installation. The bullnose device shall be of appropriate diameter to return the culvert to its approximate shape.

Before the pipe is cut off flush with the existing headwall, it will be allowed to return to ambient temperature, plus/minus 6 degrees.

Pipe storage areas shall be approved by the Engineer. All drainage structures and ditches shall remain open at the times. All traffic control shall be in accordance with the Manual of Uniform Traffic Control Devices.

If the Engineer determines that a roadway culvert is not repairable by sliplining, the Department reserves the right to delete that culvert from the contract.

All pipe reliner sizes need prior approval before purchase.

All polyethylene pipe shall be approved by the Engineer prior to installation.

Basis of Payment. All cost incurred in grouting eroded inverts of existing culvert pipes shall be included in the contract bid price for cement (per 94 pound bag).

If pre-mixed grout is used, the amount of cement in each bag, or other units of pre-mixed grout, must be determined and expressed in equivalent 94 pound bag units for payment purposes.

Payment for accepted quantities of polyethylene pipe shall be paid for at the contract unit price bid by size per linear foot in place. Said unit prices shall constitute full compensation for furnishing polyethylene pipes, and all other labor, materials and any incidentals necessary to complete the item.