

MS-6/2009

Model Specification and Checklist for Polyethylene (PE) Pipe for the Sliplining of Sewers

The Plastics Pipe Institute

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INTRODUCTION

To properly prepare a specification for a sliplining project, information on the project must be collected. The checklist is intended to be a starting point and is designed to help collect the information needed to specify the PE liner for a project.

CHECK LIST

1. Select a pipe liner diameter.

For a sliplining project, the first step is to verify the inside diameter of the existing pipe. Also determine the type of pipe to be sliplined. This information is necessary to select the liner size.

As a rule of thumb, when sliplining, the liner should be about 10% smaller than the existing pipe to insure that the liner will fit inside the existing pipe. Differential settlement bends and other small offsets make it difficult to install liners larger than 90% of the ID of the original pipe ID. TV inspection and field evaluations will influence using the rule of thumb or using a larger or smaller fitting liner.

Example: The existing pipe is concrete pipe with an ID of 12". What is the 90% of the ID? $12" \times 90\% = 10.8$ inches.

The closest pipe size to 10.8 inches is 10.75" inch OD IPS HDPE pipe. See Appendix for pipe sizes and liner sizes.

2. Determine a liner wall thickness.

For gravity flow sewer applications, usually the ground water level determines the liner thickness. In the PPI PE Handbook (2nd ed.) , Chapter 11, "Pipeline Rehabilitation by Sliplining with PE Pipe", Table 1, "Allowable Height of Water " shows that a not-grouted PE 4xxx DR 26 pipe can handle 4 feet of water for 50 years with a safety factor of 2.

The table shows that by grouting, a greater depth can be obtained. In most situations, grout is not needed. Grout is used when the existing pipe is in very bad condition or there are large voids. Grouting is standard practice for culverts.

Example: A sewer line has a burial depth from four feet on one end to 20 feet on the other end. There is not ground water above the pipe on the shallow end. Where the pipe is buried 20 feet deep, the ground level is 4 feet above the pipe most of the year.

Since the ground water level is 4 feet, Table 2 shows that a DR 26 PE 4xxx pipe will handle the hydrostatic loading.

3. Determine the flow capacity

To determine the flow capacity, the installed slope of the old line is needed. For a comparison, we will assume that the slope of both lines is the same and is 0.001.

Example: Using Manning's equation in the PPI PE Handbook (2nd ed., p. 404) , the flow rate for 12" concrete pipe with a slope of .001 and "n" factor of 0.015 is determined to be 438 gpm.

The PE liner pipe is 10.75" OD DR 26 pipe. The slope is 0.001, and the "n" factor is .009. The flow rate after lining is 433 gpm.

4. Design necessary accesses.

Before any design is done, a field survey of the existing line is needed. The existing sewer line must be evaluated to determine the actual condition of the old sewer pipe and the above ground conditions related to traffic, other utilities and the impact of excavations.

The existing line must be inspected with closed circuit television to determine the condition of the old line (dropped joints, dirt, bellies, and repairs). The TV inspection can be used to locate services. Below are details needed:

a. Insertion pit:

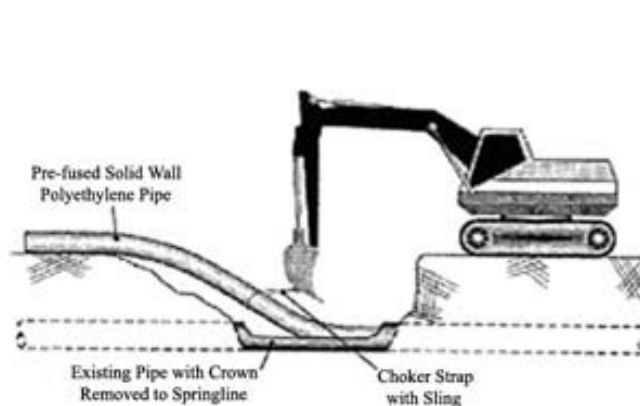


Figure 1 Push Technique for Solid Wall Polyethylene Pipe

- b. Sealing the annular space between the liner and the existing pipe at the manhole is important.

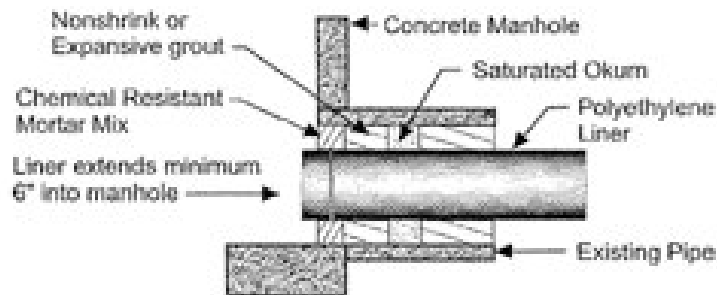


Figure 2 Typical Manhole Seal for Gravity Flow Applications

- c. Service connections must be connected to the liner. Electrofusion sewer saddles offer an excellent connection.

