Installation Standard
for
TRENCHLESS INSERTION OF POLYETHYLENE (PE) PIPE FOR SEWER LATERALS

IAPMO IS 26 - 2002

This standard shall govern the Trenchless Installation of Polyethylene (PE) pipe for use in sanitary and storm sewers. The installed pipe shall comply with the requirements of the Uniform Plumbing Code (UPC) published by the International Association of Plumbing and Mechanical Officials (IAPMO) as to grade and connections to existing pipe and shall also comply with this standard.

Note: *The following sections of the Uniform Plumbing Code apply.*

103.5.3	Testing of Systems
103.5.4.2	Responsibility
103.5.5	Other Inspections
103.5.5.1	Defective Systems
103.6.2	Other Connections
202.0	Definition of PE
301.1	Minimum Standards
310.0	Workmanship
313.0	Protection of Piping, Materials and Structures
315.0	Backfilling
316.2.3	Connection to Other Materials
Chapter 7	Sanitary Drainage
701.2	Fittings

ABBREVIATIONS

ASTM	American Society for Testing Materials
IAPMO	International Association of Plumbing and Mechanical Officials
UPC	Uniform Plumbing Code

301.1 Minimum Standards

301.1.1 Materials

Materials shall comply with the following: The Polyethylene pipe used is covered by the ASTM standards listed later in this standard

Materials	ASTM Standard
HDPE Extra High Molecular Weight 3408 SDR 17 Pipe	F 714
Socket-Type PE Fittings for Outside Diameter-Controlled Polyethylene Pipe	D 2683

Note: The HDPE 3408 SDR 17 pipe used in this process was selected because of its ability to retain its circular shape even when bent on a 4 foot radius during and after installation.

301.1.2 Table 14-1 Standards

ASTM D 1412
ASTM D 2239
ASTM D 2683
ASTM D 2447

ASTM D 2657
ASTM D 3261
ASTM F 714
ASTM F 894
IAPMO PS 25

313.0 Protection of Pipe

313.1 Storage and Handling

Pipe shall be stored in a way to protect it from mechanical damage (slitting, puncturing, etc.). It shall be stored under cover to keep it clean and avoid long term exposure to sunlight. Exposure to sunlight during normal construction periods is not harmful.

705.1.0 Types of Joints.

PE joints shall be made as follows:

705.1.6 Molded Rubber Coupling Joints

Molded rubber coupling joints shall be installed in accordance with Appendix I of the UPC and with section 705.1.6.

705.1.8 Shielded Coupling Joints

Shielded coupling joints shall be installed in accordance with Appendix I of the UPC and with section 705.1.8.

705.1.9 Hubless Cast Iron Pipe Joints

Hubless cast iron pipe joints shall be installed in accordance with Appendix I of the UPC and with section 705.1.9.

301.1.1 Heat Fusion Joints.

Heat fusion joints shall be made according to the manufacturer's procedure, installation instructions, and either ASTM D 2659 or ASTM D 3261 and shall meet the requirements of section 701.1 of the UPC.

1211.0 Trenchless Installation of sewers will be as follows:

I. Preliminary Steps:

Inspect the inside of the sewer line using a television camera and video tape recorder to ascertain the line condition. Mark the details revealed by the video inspection including:

1. The ground surface to show the location of the lateral tie of the city wye.
2. The line location with an arrow in the street pointing back at the lateral.
3. The property denoting the lateral location.
4. The locations of the proposed excavations.

Obtain utility line identification service contact information and all applicable permits.

II. Excavation

In addition to the above markings, the local utility companies will mark utilities. Considerations are soil density; clearance from obstacles, utilities, and structures; location of bends; and water service locations. Excavations and shoring shall be in accordance with jurisdictional safety requirements.

III. Set Up

Fuse the proper length of polyethylene pipe in accordance with ASTM D 2657 or ASTM D 3261 and fuse the end to a small length that is attached to the pulling head. A rod pusher cable is pushed through the damaged host pipe and attached to the pulling cable, which is then drawn through the pipe. The clevis end of the cable is attached to the pulling head. The pulling equipment is then set up according to the Manufactures instructions.

IV. Pulling

Pull the pulling head through. Once the pull is done, complete the connection to the existing piping.

707 Cleanouts

Cleanouts shall be installed in accordance with UPC section 707.

103.5 Inspections:

The completed piping shall be internally inspected by television camera unless waived by the Administrative Authority.

712.0 Testing:

Completed piping shall be subjected to testing in accordance with section 712.0 or 723.0 of the UPC.

EQUIPMENT

COMPONENTS

The entire Trenchless system has been officially adopted and printed in the Universal Plumbing Code (UPC) as the standard for trenchless underground pipe replacement. The standard appears on page 323 of the January 2000 UPC Code Book.

Trenchless sewer replacement tools are designed for use with polyethylene (PE) pipe. Polyethylene pipe is joined by heat fusion. The result is a seamless connection that provides the same strength as any other part of the pipe. Normal pipe couplings can be used for attachment to existing plumbing. This pipe is available in 20- or 40-foot lengths.

The components of the Trenchless sewer replacement system vary, depending on whether you have purchased the 4-Inch, 4/6-Inch or 8-Inch system.

4-Inch System Components:	Description
6 series alloy resistance plate	2 ft by 2 ft x 1 inch aluminum plate for counteracting the pull of the steel cable
6 series pulley base (yoyo)	Aluminum base with a 10-inch diameter aluminum cable pulley (plus Annulus)
Annulus	A mounting fixture for the pulling ram
4-inch 20-ton hydraulic puller	Twin hydraulic cylinders fixed with cable grips
200 ft long ¼ inch duct rodder	Spool of ¼ fiberglass cable to assist the pulling of the steel cable through defective sewer
4-inch splitting head	A cone shaped piece of steel designed to burst the original pipe as it is pulled through
75/150 feet steel cables	2 lengths of cable
2 ¾ inch clevis terminators	Swaged steel cable for attaching the steel cable to the splitting head
Hydraulic power supply	5.5 horsepower, oil base power supply
4-inch butt fusion machine	Machine used for heat-fusing lengths of high density polyethylene (HDPE) together
Extraction frame	Open frame to assist in extracting the splitting head at the end of the replacement job

The 4/6-Inch and 8-Inch systems include all of the above components plus a larger additional splitting head for larger "commercial" sewer laterals, as well as a 30-ton hydraulic puller.

Additionally, the Water Tool is an accessory to the system, which cuts through steel, copper, galvanized steel, plastic and all types of pipe.