Designation: F3097 – 15

Standard Practice for Installation of an Outside Sewer Service Cleanout through a Minimally Invasive Small Bore Vacuum Excavation[1]

This standard is issued under the fixed designation F3097; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers installation methods, test methods and required materials for the installation of an outside sewer service clean out, by means of a small vacuum excavated borehole. The utilization of this practice greatly reduces disruption to the general public and requires minimal restoration.

1.2 *Units*—The values stated in inch-pound units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C920 Specification for Elastomeric Joint Sealants

D1600 Terminology for Abbreviated Terms Relating to Plastics

D2855 Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings

D3034 Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

F412 Terminology Relating to Plastic Piping Systems

3. Terminology

3.1 Unless otherwise indicated, definitions are in accordance with Terminology F412, and abbreviations are in accordance with Terminology D1600.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *adhesive/sealant*—an elastomeric bonding agent designed to provide a water activated, leak resistant flexible bond between a PVC pipe saddle and a lateral sewer service pipe.

3.2.2 *borehole* —a small diameter vacuum excavated hole.

3.2.3 *cleanout*—a fitting located on a lateral sewer service pipe having a vertical riser pipe extending therefrom to the surface providing access to the lateral sewer service pipe.

3.2.4 *cleanout riser pipe*—a section of pipe that is connected to the boss of a saddle and extends from the saddle to the surface.

3.2.5 *coring*—the process of remotely cutting a hole through the crown of a sewer service pipe such that the coupon is retrieved to establish communication from a cleanout riser pipe and a lateral sewer service pipe.

3.2.6 *coupon*—a disc shaped piece of the lateral sewer service pipe produced by coring.

3.2.7 *lateral sewer service pipe*—a sewer pipe that connects a building to a municipal, main sewer pipe in a lateral direction and collects sanitary waste or storm water.

3.2.8 *saddle*—a PVC saddle that encompasses more than 50% of a lateral sewer service pipe where the side walls of the saddle extend beyond the spring line of the host pipe. The saddle includes setoff tabs that allow for uniform distribution of the adhesive/sealant.

3.2.9 *setoff tabs*—Protruding tabs located on the underside of the saddle one located on each side of the saddle boss for the purpose of insuring a specific annulus between the host pipe and the saddle and a specific layer thickness of adhesive/sealant.

3.2.10 *sonde*—a device outfitted in a closed circuit video inspection camera that emits a signal in subterranean pipelines that is traceable by use of a locating receiver at surface.

4. Summary of Practice

4.1 The process of installing a cleanout through a minimally invasive excavation begins with locating the 4 in. or 6 in. sewer service lateral. This is accomplished by use of a CCTV outfitted with a locatable sonde and vacuum excavating a small borehole, providing access to the exterior surface of a lateral

[1] This practice is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.67 on Trenchless Plastic Pipeline Technology.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

sewer service pipe. Once the lateral sewer service pipe has been exposed, a self-clamping saddle is prepared by applying a specified amount of adhesive/sealant to the underside of the saddle and a riser pipe is attached to the boss of the saddle. The prepared saddle is lowered into the small diameter bore hole until it contacts the lateral sewer service pipe; a downward force is applied to the riser pipe causing the side walls of the saddle to spread and encompass more than 50-percent of the host pipe. Surface restoration is minimal and in most cases is accomplished the same day the cleanout is installed.

5. Significance and Use

5.1 This practice is for use by designers and specifiers, regulatory agencies, owners, and inspection organizations who are involved in the installation of a sewer service cleanout

6. Components

6.1 The saddle shall be formed as a semi-circle and shall encompass more than 180-degrees of the pipe circumference. The saddle shall have an inner diameter equal to the outer diameter of the host pipe (see Fig. 1).

6.2 The riser pipe shall be PVC pipe in accordance with Specification D3034.

6.3 Adhesive/Sealant shall be in accordance with Specification C920.

6.4 The solvent cement shall be in accordance with Practice D2855.

7. Tools Required for Installation

7.1 *Vacuum excavation unit*—mobile piece of equipment that supplies sufficient volume of vacuum necessary to excavate a vertical bore hole.

7.2 *Coring equipment*—A suitable coring saw with an outer diameter ⅛ in. less than the inner diameter if the riser pipe with a cutting blade suitable for the specific pipe material on which the cleanout has been installed.

7.3 *Power head*—power device that rotates the coring saw.

7.4 *Extension rods*—extension shafts that connect the power head to the coring saw. Available in various lengths according to the depth of the service lateral pipe that the cleanout is being attached to.

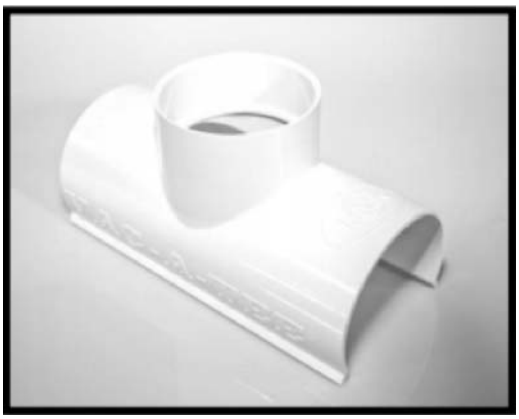

FIG. 1 Saddle greater than 180°

7.5 *Video camera*—CCTV camera that's outfitted with a sonde locating device and a compatible receiver. The camera is suitable sewer pipe conditions.

7.6 *Water*—The amount of water required to perform the exfiltration test is outlined in Table 1.

8. Procedure

8.1 The first step in installing a trenchless sewer service cleanout begins with locating the non-lined lateral sewer service pipe. A method utilized and associated with this installation process consists of inserting a video camera with an internal sonde into the lateral service line remotely from the mainline pipe, or from the interior building cleanout. A technician at the surface uses a compatible receiver to locate the signal from the camera/sonde to mark the specific location for the new cleanout as dictated by the utility owner (Refer to Fig. 2). The identified location shall be marked by driving a steel pin in the soil when possible, or marking the surface with marking paint. The video camera operator shall determine the condition of the lateral pipe is suitable for the saddle placement prior to vacuum excavation to form the borehole.

8.2 A borehole approximately 20-in. in diameter is created by vacuum excavation. This is accomplished by cutting the soil by use of compressed air or by water jetting. The loosened soil is simultaneously drawn under a controlled vacuum through suction tubing and discharged into a mobile debris tank (Refer to Fig. 3). This process continues until the lateral pipe is exposed. The sewer service pipe is cleaned to remove debris. The cleaning process is accomplished by using an extendable water pressure cleaning nozzle. A saddle is affixed to one end of a PVC riser pipe using solvent cement in accordance with Practice D2855. The elastomeric adhesive/sealant is applied to the underside of the saddle. The pipe and saddle are lowered down into the hole until the saddle contacts the pipe, a manual downward force is applied to the riser pipe causing the side walls of the saddle to spread until the lower most portion of the saddle extends a short distance beyond the spring line of the pipe causing the saddle to draw down onto the pipe producing a clamping affect.

8.3 Once the saddle has been installed, (Refer to Fig. 4) approximately 4 oz. of water is introduced into the riser pipe in order to activate the adhesive/sealant. Once the recommended

TABLE 1 Water Volume Required to Perform Leak Test

Depth of Lateral (ft)	Amount of Water Required (Gal)
6	15.68
7	18.29
8	20.90
9	23.51
10	26.15
11	28.73
12	31.36
13	33.96
14	36.58
15	39.18
16	41.80
17	44.40
18	47.02
19	49.63
20	52.25

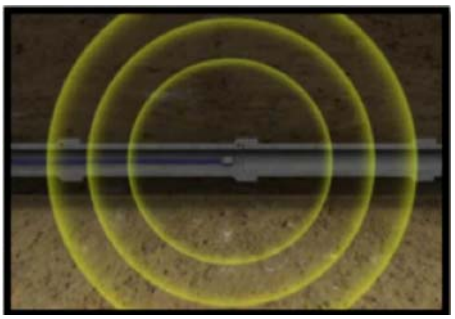

FIG. 2 Locating the Lateral Pipe

FIG. 3 Vacuum Excavation Equipment

time has passed after the saddle has been attached to the pipe and the vacuum excavated borehole is filled and compacted with approved backfill material such as sand, the water test is performed. Once the water test has passed, the crown of the lateral pipe is cored by means of a powered core saw that is inserted down the riser pipe into contact with the crown of the pipe removing the coupon within the core saw.

8.3.1 Next, the annular space between the borehole and the riser pipe is filled with a minimum of 2 ft. of sand or pea-gravel. The remaining is backfilled as specified by the engineer to within 6-in. of the surface grade and an approved cleanout cap is installed. The surface is restored to match the existing condition such as adding black soil with seed or sod, or concrete or asphalt. The adhesive/sealant is typically cured within 12 h of application and can be water tested any time thereafter. Once the saddle connection has been tested and confirmed to be verifiably non-leaking, the crown of the lateral

FIG. 4 Vacuum Excavated Borehole

pipe is cored and the cored coupon is retrieved through the core bit. The surface is then restored to its original condition

8.4 *Exfiltration Water Test*—Prior to coring for accessing the lateral pipe, an exfiltration water test shall be performed. This is accomplished by filling the riser pipe with a minimum six-foot column of water. The test shall be performed no less than 12-h from the time of affixing the saddle to the pipe. The column of water shall be left for a minimum of five (5)-min before commencing the exfiltration test. Next the water level shall be measured from the top of the riser pipe for a five (5)-min period. No drop in water elevation will be allowed. The coupon shall not be cored until a verifiable non-leaking connection has been confirmed. Should the leak test fail or not pass a repair is made by pouring a low viscosity epoxy resin down the riser pipe to a depth of 1 in. above the crown of the pipe. The epoxy resin leaches out through any breach in the seal sealing the breach. The epoxy resin cures and the leak test is performed again once the test passes then the coring process as described above is repeated. The crown of the pipe is never cored opening until the leak test has been satisfied proving a verifiable non-leaking connection between the saddle and the lateral pipe has been made.

9. Keywords

9.1 adhesive; borehole; coring; coupon; minimally invasive; riser pipe; saddle; vacuum excavation