

WWW.SUBSURFACE-INC.COM



SUBSURFACE, INC

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Drainage

SUBSURFACE, INC

- Up to date technology.
- Latest products.
- Solutions for most applications.
- Trenchless, a better and less expensive way to rehabilitate existing structure without the cost and inconvenience.
- Not all culverts are the same. Not all solutions are the same.
- Over 125 years combined experience.
- Customers before contractors.

Topics

SUBSURFACE, INC

RCP Joint Repair
SOIL STABILIZATION/VOID FILLING
CIPP (Cured In Place Pipe)
Steam, Hot Water & UV Cure

RCP JOINT SEALING AND REPAIR

- What is the most common problem with RCP?
- What have we always done?
- ***STOP DOING THAT!***
- What if you could make them “better” without digging them up?
- How could I do that?
- Seal the joint from the inside and outside with a flexible adhesive long lasting polyurethane resin with a useful life expectancy of over 100 years!
- Replace lost soils and fill voids with another polyurethane product that is light weight, load bearing, highly expansive and also has a useful life of over 100 years.
- This process can be done on structures 36” and above.
- What about box culverts that have sheared?

Where Our Roads Go



- *Separated joint* is an RCP structure that has pulled apart as a result of freeze thaw cycles, vibration, piping, weakened bedding, poor installation and decomposing filter cloths



KOOL-AID

- You have to be willing to drink the juice!
- Recognize that you have options other than open cutting.
- You are not the first, no-dig technologies in surface transportation have come a long way.
- Time has shown us that most drainage structures that have been fully treated have a renewed life expectancy.

Specification for RCP Joint Sealing

- The spec must be understood by the engineer, the inspector and the contractor.
- Each step must be performed in order.
- Polyurethane resins have unique characteristics and are designed to function accordingly.
- Three separate resins are used.
 1. Saturating the oakum.
 2. Filling the back side of the joint.
 3. Stabilizing the soils and filling voids.





Completely Separated Joint



Broken Joint



Rebuilding Joint





Oakum Before Trimming



Drilling Holes



Injection and Observation Ports



Drilling the Backside of Joint



Expanding Grout



Injection



Expanding Grout



Gel Coat



Misaligned Joint



Finished Product



Polyurethane Resins

If cost does matter, then the temperature of the grout or resin matters!

Controlling the temperature is important from storage to the point of injection.

Heated storage

Heated drums

Heated hoses



EVERY DAY COUNTS!

- Winter is a good time to work in wetlands and hard to get at sites.









CURED-IN-PLACE PIPE (CIPP)

CIPP is a trenchless rehabilitation method used to repair existing pipelines. CIPP is a jointless, seamless, pipe-within-a-pipe with the capability to rehabilitate pipes ranging in diameter from very small to very large (4"-110").

- Each CIPP liner is specifically designed for each individual host and site.
- Starts out as raw felt or fiberglass based depending on cure
- Made to the thickness and diameter required per ASTM standard.

- Sent to a wet out facility where it is impregnated with the resins needed for hardening.
- Wet out liner is then refrigerated to prevent premature curing or crated if it is UV.
- Shipped to site in refrigerated truck if steam cured.
- Installed and cured on site.
- Does not bond to host.
- Structurally designed to be a load bearing pipe.
- Life expectancy of over 50 years.

LINING

Questions to be answered in deciding on a solution;

- What is the “host?” RCP-CMP
- Is the current conduit properly sized for the existing drainage area?
- How will this decision affect the hydraulics of the culvert?
- What is the depth to the invert?
- What is the length and grade?
- What kind of surface is above?
- What is the traffic count?
- How will the public be affected by the replace vs rehabilitate decision.
- How much will a detour cost?
- How much right of way is there on each side?
- Does cost matter?

WHY CONSIDER CIPP ?

- Good option when hydraulics are important in the decision.
- In an RCP host you can maintain a minimum of 100% of existing flow and in most cases gain a few points.
- Good for small diameter culverts.
- Farming and Ranching community like it because of flow characteristics.







Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP)¹

This standard is issued under the fixed designation F2019; 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 reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

1. Scope*

1.1 This practice covers the procedures for the reconstruction of pipelines and conduits (4 to 60 in. (100 to 1500 mm) diameter) by the pulled-in place installation of a resin-impregnated, flexible fabric tube into an existing conduit followed by inflation with compressed air (see Fig. 1). The resin/fabric tube can be cured by either the flow through the fabric tube of mixed air and steam or hot water or by use of ultraviolet light. When cured, the finished cured-in-place pipe will be continuous and tight fitting. This reconstruction process can be used in a variety of gravity flow applications such as sanitary sewers, storm sewers, process piping, electrical conduits, ventilation systems, and pressure applications.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered 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

- D543 Practices for Evaluating the Resistance of Plastics to Chemical Reagents
- D578 Specification for Glass Fiber Strands
- D638 Test Method for Tensile Properties of Plastics
- D790 Test Methods for Flexural Properties of Unreinforced

and Reinforced Plastics and Electrical Insulating Materials

D1600 Terminology for Abbreviated Terms Relating to Plastics

D3039/D3039M Test Method for Tensile Properties of Polymer Matrix Composite Materials

D3567 Practice for Determining Dimensions of “Fiberglass” (Glass-Fiber-Reinforced Thermosetting Resin) Pipe and Fittings

D5813 Specification for Cured-In-Place Thermosetting Resin Sewer Piping Systems

F412 Terminology Relating to Plastic Piping Systems

F1216 Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

F1417 Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air

2.2 AWWA Standard:

Manual on Cleaning and Lining Water Mains, M28³

2.3 NASSCO Standard:

Recommended Specifications for Sewer Collection System Rehabilitation⁴

3. Terminology

3.1 General:

3.1.1 Definitions are in accordance with Terminology F412. Abbreviations are in accordance with Abbreviations D1600, unless otherwise indicated.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *calibration hose*—an impermeable bladder installed inside the fabric tube, and inflated with air or steam, or both to press the tube firmly against the wall of the existing pipe until the resin is cured with air and steam or ultraviolet light. The calibration hose shall be removed when the installation is finished.

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.

³ Available from American Water Works Association (AWWA), 6666 W. Quincy Ave., Denver, CO 80235, http://www.awwa.org.

⁴ Available from National Association of Sewer Service Companies, 423 W. King Street, Suite 3000, Chambersburg, PA 17201

*A Summary of Changes section appears at the end of this standard

Extensions Before Lining



Refer Truck



Boiler House





Boiler Truck





CONTROL STRUCTURE



Bladder Bag



Liner Snug Fit



Finished Bag



Finished Liner



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