



Designation: F3632 – 23

Standard Practice for Close Tolerance Pipe Slurrification (CTPS) Method to Replace, Rehabilitate, and Repair Existing Buried Asbestos Cement (AC) Pipe Systems¹

This standard is issued under the fixed designation F3632; 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 the requirements and test methods of an EPA-approved alternative work practice (AWP) for the replacing of an Asbestos Cement (AC) pipe by the Close Tolerance Pipe Slurrification Method in accordance with said EPA CTPS AWP issued on June 10, 2019. This process utilizes a patented method (US 10,557,587 B2)² and other specially designed tools designed to work with the EPA regulations surrounding AC pipe work. Specifically, the special (patented) back reaming tool (US 8,365,841 B2)² delivers the required bentonite-based fluid to maintain a wet cutting environment which is an important requirement for cutting Asbestos Cement Material (ACM). The sizing of the cutting head is set at 0.25 in. in diameter greater than the replacement pipe's outside diameter to facilitate the removal of the ACM. This close tolerance sizing creates a scenario where the new pipe, along with the injection of the drill fluid, will allow the slurry to flow and subsequently expel at pre-determined pit locations. The slurry containing the ACM is then removed from the site and properly disposed of. Any remaining trace amounts of asbestos fiber in the ground are encapsulated in a skim coat of the slurry remaining around the new pipe, the skim coat having the consistency of a lightweight concrete material commonly known as excavatable flowable fill.

1.2 *Units*—The values stated in SI units are to be regarded as the 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:

- D1600 Terminology for Abbreviated Terms Relating to Plastics
- D2657 Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings
- D3035 Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
- F412 Terminology Relating to Plastic Piping Systems
- F1417 Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air
- F2164 Practice for Field Leak Testing of Polyethylene (PE) and Crosslinked Polyethylene (PEX) Pressure Piping Systems Using Hydrostatic Pressure
- F2620 Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings

2.2 AWWA Standards:

- AWWA C605 Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings
- AWWA C900 Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm)
- AWWA C906 Polyethylene (PE) Pressure Pipe and Fittings, 4IN. Through 65 IN. (100 MM Through 1,650 MM), for Waterworks
- AWWA Manual of Practice M23 PVC Pipe – PVC Pipe - Design and Installation

2.3 Plastic Pipe Institute (PPI):

- Plastic Pipe Institute's Handbook of PE Pipe Design of PE Piping Systems

¹ This test method is under the jurisdiction of ASTM Committee F36 on Technology and Underground Utilities and is the direct responsibility of Subcommittee F36.20 on Inspection and Renewal of Water and Wastewater Infrastructure. Current edition approved June 1, 2023. Published July 2023. DOI: 10.1520/F3632-23.

² The methods (created by Dimitroff, Ted R.) US 10,557,587 B2 and US 8,365,841 B2 are covered by a patent. Interested parties are invited to submit information regarding the identification of an alternative(s) to this patented item to the ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend.

2.4 Environmental Protection Agency:

EPA Notice of Final Approval Alternative Work Practice
Standard for Asbestos Cement Pipe Replacement – EPA-
HQ-OAR-2017-0427 : FRL-9994-29-OAR

40 CFR 61.145 Standard for demolition and renovation

40 CFR 61.150 Standard for waste disposal for
manufacturing, fabricating, demolition, renovation, and
spraying operations

40 CFR 61.154 Standard for active waste disposal sites

40 CFR 61.155 Standard for operations that convert
asbestos-containing material into nonasbestos (asbestos-
free) material

2.5 OSHA Standards:

29 CFR 1926.1101 Asbestos

3. Terminology

3.1 Definitions:

3.1.1 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 *ACM, n*—Asbestos Containing Material: any material containing more than 1 % asbestos

3.2.2 *AC Pipe, n*—Asbestos Cement Pipe

3.2.3 *ACPRP, n*—Asbestos Cement Pipe Replacement Project

3.2.4 *competent person, n*—one who is capable of identifying existing asbestos hazards in the workplace, is capable of selecting the appropriate control strategy, and has the authority to take prompt corrective measures. Personnel must be trained to meet the criteria of the EPA Model Accreditation Plan for contractors/Supervisor/Workers for Class II work.

3.2.5 *drill fluid, n*—a bentonite-based lubricating fluid for the pipe reaming process that is pumped through the drilling stem/rod to create a wet cutting environment.

3.2.6 *friable asbestos material, n*—any material containing more than 1 % asbestos (ACM) that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

3.2.7 *Negative Exposure Assessment (NEA), n*—a demonstration by an employer that an employee's exposure during an operation is expected to be consistently below the Permissible Exposure Limit (PEL) and the Excursion Limit (EL). If the employer can demonstrate that employee exposures are below the PEL and EL by any of the following means, this is deemed a NEA.

3.2.7.1 Objective data,

3.2.7.2 Personal air sampling results collected from the previous 12 months,

3.2.7.3 Initial monitoring of the current project,

3.2.7.4 A Negative Exposure Assessment has been made, or

3.2.7.5 All employees in a regulated area are wearing supplied air respirators operated in the pressure demand mode, or other positive pressure mode respirator.

3.2.8 *NESHAP, n*—National Emission Standards for Hazardous Pollutants are stationary source standards for hazardous air pollutants. Hazardous air pollutants are those pollutants that are known or suspected to cause cancer or other serious health

effects, such as reproductive effects or birth defects, or adverse environmental effects.

3.2.9 *regulated area, n*—an area established by the contractor where Class II asbestos work is being conducted, along with any adjoining area where debris and waste accumulates. The requirements of a regulated area are: (1) It is clearly marked to minimize the number of persons therein while protecting persons outside the area; (2) access is limited to authorized personnel only; (3) eating, drinking, smoking, chewing, and the application of cosmetics are prohibited in this area; and (4) a competent person must supervise the work within the regulated area.

3.2.10 *skim coat, n*—the portion of the waste slurry that remains on the exterior of the new pipe.

3.2.11 *slurry, n*—the mixture composed of the drilling fluid, AC pipe, and soil.

4. Summary of Practice

4.1 Close Tolerance Pipe Slurrification is a trenchless method used to remove and replace an existing AC pipeline with a minimum amount of excavation. The CTPS method removes the existing AC pipe by pulling a rotating cutting head through the existing pipe while simultaneously injecting a bentonite-based lubricating fluid. The cutting head rotates at a sufficient speed to grind the existing pipe and surrounding soil, combining it with the bentonite-based lubricating fluid into a slurry. The accumulating slurry mixed with the ground up AC pipe is pushed down the existing pipe by the advancing replacement pipe and taken (vacuumed) out of the existing AC pipe through a series of vertical holes between the ground surface and the existing pipe at planned intervals or at the receiving pit. After completion of the CTPS process, the existing pipe will have been removed, the new pipe installed through the subsequent tight-fitting void, and the slurry containing the existing pipe fragments, soil, and bentonite fluid safely removed from the ground and properly disposed of at a landfill certified to receive ACM.

5. Significance and Use

5.1 This practice is for use by engineers, regulatory agencies, owners, and inspection organizations who are involved in the removal and replacement of AC pipes through the use of a method that is in compliance with the rules for removing and replacing AC pipe in accordance with NESHAP and OSHA requirements governing the handling, removal, and disposal of any ACM.

6. Materials

6.1 Pipe:

6.1.1 The pipe material used in the CTPS process shall conform to the requirements of Specification **D3035** (or AWWA C906) for HDPE pipe, or AWWA C900 for PVC pipe.

6.1.2 The required wall thickness and hydrostatic design stress rating for HDPE piping shall be as determined by engineering design for the subject application using Chapter 6 – Design of PE Piping Systems in the Plastic Pipe Institute's Handbook of PE Pipe. The required wall thickness and