
Standard Method of Test for Vitrified Clay Pipe

AASHTO Designation: T 281-24¹

Technically Revised: 2024

Editorially Revised: 2024

Technical Subcommittee: 4a, Concrete Drainage Structures

ASTM Designation: C301-18(2022)



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1. SCOPE

- 1.1. These test methods cover the equipment for, and the techniques of, testing vitrified clay pipe prior to installation. Tests using whole pipe determine the resistance to crushing and hydrostatic forces. Tests using pipe fragments measure the amount of water absorption of the pipe body and the quantity of acid-soluble material that may be extracted from it.
- 1.2. The values stated in SI units are to be regarded as the 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.*
Note 1—The following standards also apply to clay pipe and can be referenced for further information: ASTM C12, C425, C700, and C828.
- 1.4. *The quality of the results produced by this standard is dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of R 18 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with R 18 alone does not completely assure reliable results. Reliable results depend on many factors; following the suggestions of R 18 or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.*

2. REFERENCED DOCUMENTS

- 2.1. *AASHTO Standards:*
 - M 231, Weighing Devices Used in the Testing of Materials
 - M 339M/M 339, Thermometers Used in the Testing of Construction Materials
 - R 18, Establishing and Implementing a Quality Management System for Construction Materials Testing Laboratories
- 2.2. *ASTM Standards:*
 - C12, Standard Practice for Installing Vitrified Clay Pipe Lines
 - C425, Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings
 - C700, Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated
 - C828, Standard Test Method for Low-Pressure Air Test of Vitrified Clay Pipe Lines

- C896, Standard Terminology Relating to Clay Products
- E1, Standard Specification for ASTM Liquid-in-Glass Thermometers
- E6, Standard Terminology Relating to Methods of Mechanical Testing
- E230/E230M, Standard Specification for Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples
- E879, Standard Specification for Thermistor Sensors for General Purpose and Laboratory Temperature Measurements
- E1137/E1137M, Standard Specification for Industrial Platinum Resistance Thermometers
- E2877, Standard Guide for Digital Contact Thermometers

2.3. *International Electrotechnical Commission Standards:*

- IEC 60584-1:2013 Thermocouples - Part 1: EMF Specifications and Tolerances
- IEC 60751:2008 Industrial Platinum Resistance Thermometers and Platinum Temperature Sensors

3. TERMINOLOGY

- 3.1. *Definitions*—For definitions of terms used in these test methods, refer to ASTM E6 and C896.

4. SIGNIFICANCE AND USE

- 4.1. *Meaning and Suitability*—The tests called for herein, from their results, indicate the suitability and acceptability of vitrified clay pipe for specifications acceptance, design purposes, regulatory statutes, manufacturing control, and research.

5. BEARING STRENGTH

5.1. *Test Specimens:*

- 5.1.1. The test specimens shall be sound, full-size pipe and shall be selected by the purchaser, or purchaser's representative, at points designated by the purchaser when placing the order.
- 5.1.2. The number of specimens to be tested shall not exceed 0.5 percent of the number of pipes of each size furnished, except that no less than two specimens shall be tested.

5.2. *Measurement and Inspection of Specimens:*

- 5.2.1. The specimens shall be free of all visible moisture and frost. These specimens shall be inspected and measured for conformance with the applicable specifications. The results of these observations shall be recorded.
- 5.2.2. Specimens that are observed to have defects in excess of the limits permitted in the applicable specifications shall be discarded and replaced with additional specimens from the lot to be tested.

5.3. *Loading Apparatus*—See Figure 1.

5.3.1. *Testing Machine:*

- 5.3.1.1. The loading apparatus shall consist of a testing machine capable of applying loads, with upper and lower bearings capable of transmitting these loads to the pipe. The bearings shall be bearing beams and contact edges.