



Designation: C1091 – 03a (Reapproved 2022)

Standard Test Method for Hydrostatic Infiltration Testing of Vitrified Clay Pipe Lines¹

This standard is issued under the fixed designation C1091; 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 test method defines procedures for hydrostatic infiltration testing of new installations of vitrified clay pipe lines, to demonstrate the structural integrity of the installed line. Refer to Practice C12.

1.2 This test method is suitable for testing gravity-flow pipe lines constructed of vitrified clay pipe or combinations of clay pipe and other pipe materials.

1.3 This test method is applicable to the testing of the pipe lines only. Manholes or other structures should be tested separately.

1.4 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.

1.5 *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.*

1.6 *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:*²

C12 Practice for Installing Vitrified Clay Pipe Lines

C828 Test Method for Low-Pressure Air Test of Vitrified Clay Pipe Lines

C896 Terminology Relating to Clay Products

¹ This test method is under the jurisdiction of ASTM Committee C04 on Vitrified Clay Pipe and is the direct responsibility of Subcommittee C04.20 on Methods of Test and Specifications.

Current edition approved Sept. 1, 2022. Published September 2022. Originally published in 1988. Last previous edition approved in 2018 as C1091 – 03a (2018). DOI: 10.1520/C1091-03AR22.

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. Terminology

3.1 Terminology C896 can be used for clarifications of terminology in this test method.

4. Summary of Test Method

4.1 This test method shall be performed on lines after connection laterals, if any, have been plugged and adequately braced to withstand the test pressure, and after the trenches have been backfilled and compacted.

5. Significance and Use

5.1 The tests called for herein, for their results, indicate the acceptability of installed vitrified clay pipelines.

6. Preparation of the Line

6.1 To ensure the proper seating of the test plugs and the accuracy of the test, the lines should be cleaned prior to testing.

6.2 Examples of methods for cleaning the lines are the sewer cleaning ball and high pressure flushing equipment.

7. Procedure

7.1 The hydrostatic infiltration test procedure is applicable where the measured water table is 2 ft (610 mm) or greater above the pipe barrel at the lower manhole of the test section. Where the ground water elevation is indeterminate, less than 2 ft (610 mm) above the top of the pipe barrel, or the line is partially below the water table, use a combination of both the air test and infiltration procedure.

NOTE 1—The most practical method for testing is Test Method C828, and is recommended. However, where ground water is present and meets the criteria established in , the infiltration test procedure outlined in this practice is recommended.

7.2 Determine the allowable infiltration rate for the test section using Table 1.

NOTE 2—What can be called false infiltration represents condensate on the pipe walls.

7.3 The test rate table is based on the standard of 50 gal/in. diameter-mile-day (4.6 L/mm diameter-kilometre-day).

7.4 Table 1 shows the allowable infiltration rate in gallons · 100 ft of pipe · hour (litres per 30.5 metres · hour) for each nominal pipe size.

TABLE 1 Allowable Infiltration Test Rate in Gallons/100 ft of Line · Hour (Litre/Metre · Hour)

nominal pipe size, in. (mm)	gal/100 ft · h (L/m · h)	nominal pipe size in. (mm)	gal/100 ft · h (L/m · h)
4 (100)	0.16 (0.020)	24 (610)	0.95 (0.12)
6 (150)	0.24 (0.030)	27 (685)	1.1 (0.13)
8 (200)	0.32 (0.039)	30 (760)	1.2 (0.15)
10 (255)	0.39 (0.049)	33 (840)	1.3 (0.16)
12 (305)	0.47 (0.059)	36 (915)	1.4 (0.18)
15 (380)	0.59 (0.073)	39 (990)	1.5 (0.19)
18 (455)	0.71 (0.088)	42 (1070)	1.7 (0.21)
21 (535)	0.83 (0.10)	48 (1220)	1.9 (0.24)

7.5 If the test section includes more than one pipe size, calculate the allowable test rate for each size and add to arrive at the total allowable test rate for the test section.

7.6 Discontinue all pumping of ground water for a period of 24 h prior to testing.

7.7 Plug the inlet to the section to be tested. If there is infiltration in the section upstream from the test section, the upstream section shall be plugged off or dewatered to prevent the manhole from filling with water.

7.8 Begin collection and measurement after constant flow is generated at the test section outlet. Collect the infiltration in a calibrated container or use a calibrated weir.

7.9 Terminate the infiltration test when sufficient water is collected or measured, or both, to establish the test rate.

7.10 If the infiltration rate (**Table 1**) is within the established limit, the line is presumed to have passed the test.

7.11 If there is no flow in the test section or the flow is minimal and cannot be measured, the line has passed the test.

8. Precision and Bias

8.1 No statement is made about either the precision or bias of this test method for measuring gallons (litres) and time, since the results merely state whether there is conformance to the criteria for success specified in the procedure.

9. Keywords

9.1 air test; clay pipe; hydrostatic test; infiltration; pipe; pressure test; sewers; vitrified clay pipe; water test

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, Tel: (978) 646-2600; http://www.copyright.com/

<https://standards.ansi.org/standards/astm/62545768-9820-4607-8d8c-380584ee7e04/astm-c1091-03a2022>