



Designation: C1103 – 22

Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines¹

This standard is issued under the fixed designation C1103; 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 procedures for testing the joints of installed precast concrete pipe sewer lines, when using either air or water under low pressure to demonstrate the integrity of the joint and the construction procedures. This practice is used for testing precast concrete sewer lines utilizing rubber gasket sealed joints.

NOTE 1—The user of this practice is advised that methods described herein may also be used as a preliminary test to enable the manufacturer or installer to demonstrate the condition of sewer pipe prior to delivery.

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.

NOTE 2—The owner shall specify the following: who will conduct, observe, and furnish labor, material, and measuring devices and pay for the tests; who is responsible for determining local ground conditions; and whether an air or water test is to be used.

NOTE 3—The user of this practice is advised that test criteria presented in this practice are similar to those in general use. Pipe shall be accepted by infiltration or exfiltration testing utilizing Practice C969 (C969M).

NOTE 4—Test times tabulated and the rate of air loss in this practice are based on successful testing of installed pipelines. However, since air and water have different physical properties, retests of some pipelines not meeting field air tests have been successful when tested with water.

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. Specific precautions are given in Section 6.*

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.*

¹ This practice is under the jurisdiction of ASTM Committee C13 on Concrete Pipe and is the direct responsibility of Subcommittee C13.09 on Methods of Test.

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2. Referenced Documents

2.1 ASTM Standards:²

C822 Terminology Relating to Concrete Pipe and Related Products

C969 Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines

C969M Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines (Metric)

3. Terminology

3.1 *Definitions*—For definitions of terms relating to concrete pipe, see Terminology C822.

4. Summary of Practice

4.1 The joint in the sewer line to be tested is covered on the inside of the pipe by a ring with two end element sealing tubes. Air or water, at low pressure, is introduced through a connection on the ring into the annular space between the ring and joint. The amount of air, or water, loss is used to determine the acceptability of the installed sewer line.

5. Significance and Use

5.1 This is not a routine test. The values recorded are applicable only to the sewer being tested and at the time of testing.

6. Safety Precautions

6.1 The use of compressed air is dangerous if a sewer line is not prepared properly and proper procedures are not followed.

6.2 It is imperative that all pressures be relieved completely before the test apparatus is loosened for removal.

6.3 Pressurizing lines for the two end element sealing tubes shall be separate from the lines for pressurizing the void volume created by the joint test apparatus. The pressures required to seal the end element tubes shall be as specified by the apparatus manufacturer, and are greater than the pressure

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.

required to test the joint. The line for pressurizing the void volume shall include a 6 psi (41 kPa) pressure relief device to reduce hazards and avoid overpressurization.

7. Preparation of the Sewer Joint

7.1 Check the size of access openings to ensure that the test apparatus will fit in the sewer line.

7.2 Clean the joint and interior joint surfaces to eliminate debris prior to wetting and testing.

NOTE 5—The user of this practice is advised that a wetted interior surface is desirable and will produce more consistent results. Air may pass through the walls of dry pipe. This can be overcome by wetting the pipe.

7.3 Review safety precautions in Section 6.

8. Procedures

8.1 The following procedures apply to testing with either air or water.

8.1.1 Determine groundwater conditions surrounding the sewer line to be tested, and select the type of test to be conducted.

8.1.2 If the groundwater pressure is equal to or greater than the test pressure, and the sewer line or joint is not leaking, the sewer line or joint is acceptable in accordance with Practice C969 (C969M) and no additional testing is required. If one or more joints are leaking, but the total amount of leakage in the sewer line being tested is equal to, or less than, the allowable leakage rate established in accordance with Practice C969 (C969M), the line is acceptable and no additional testing is required provided visible leaks are repaired. Moisture or beads of water appearing on the surface of the joint will not be considered as visible leakage.

8.1.3 Review proper operation, safety, and maintenance procedures as provided by the manufacturer of the joint test apparatus.

8.1.4 Move the joint test apparatus into the sewer line to the joint to be tested and position it over the joint. Make sure the end element sealing tubes straddle both sides of the joint and the hoses are attached. For the water test, the bleed-off petcock must be located at top dead center.

8.1.5 Inflate end element sealing tubes with air in accordance with equipment and manufacturer's instructions.

NOTE 6—The user of this practice is advised that all test pressures are measured as gauge pressure, which is defined as any pressure greater than atmospheric pressure. Since water produces a pressure of 0.43 psi (3 kPa) for every foot of depth, test pressures must be increased to offset the depth of groundwater over the sewer line. If the groundwater level is 2 ft (0.6 m) or more above the top of the pipe at the upstream end or if the pressure required for the test is greater than 6 psi (41 kPa) gauge, the joint test

method shall not be used and the infiltration test may be used (see Practice C969 (C969M)).

NOTE 7—An air or water reservoir shall be included in the joint test system. By maintaining a constant supply of air or water in a reservoir, continuous pumping of air or water is not required, and any variances in test equipment and joint space will be negated. The reservoir shall have a minimum volume of 2.5 ft³ (0.07 m³).

8.2 Joint Air Test:

8.2.1 Review procedures in 8.1.

8.2.2 Pressurize the void volume with air to 3.5 psi (24 kPa) greater than the pressure exerted by groundwater above the pipe. Allow the air pressure and temperature to stabilize before shutting off the air supply, and start of test timing.

8.2.3 If pressure holds, or drops less than 1 psi (7 kPa) in 5 s, the joint is acceptable. Practically, the test is a go/no go test.

8.2.4 If the joint being tested fails, it shall be retested, or repaired if necessary, and retested, in accordance with this practice.

8.2.5 After the joint test is completed, exhaust void volume, then exhaust end element tubes prior to removal of apparatus.

8.2.6 Use or failure of the joint air test shall not preclude acceptance by appropriate water infiltration and exfiltration testing (see Practice C969 (C969M)), or other means.

8.3 Joint Water Test:

8.3.1 Review procedures in 8.1.

8.3.2 Introduce water into void volume until water flows evenly from open petcock. Close the petcock and pressurize with water to 3.5 psi (24 kPa) above the pressure exerted by groundwater above the pipe. Shut off the water supply.

8.3.3 If the pressure holds, or drops less than 1 psi (7 kPa) in 5 s, the joint is acceptable. Practically, the test is a go/no go test.

8.3.4 If the joint being tested fails, it shall be retested, or repaired if necessary, and retested, in accordance with this practice.

8.3.5 After the joint test is completed, exhaust end element tubes which will automatically release the water from the void volume, prior to removal of apparatus.

8.3.6 Use or failure of this joint water test shall not preclude acceptance by appropriate water infiltration or exfiltration testing (see Practice C969 (C969M)), or other means.

9. Precision and Bias

9.1 No justifiable statement is presently capable of being made either on precision or bias of these procedures since the test results merely state whether this is in conformance to the criteria for success specified. Due to the sealing effects of groundwater and internal flow on concrete sewer lines, the test conditions and results are not reproducible.