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An American National Standard

Standard Test Method for Water Infiltration Resistance of Plastic Underground Conduit Joints Which Use Flexible Elastomeric Seals[1]

This standard is issued under the fixed designation F 1365; 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.

ε[1] NOTE—Editorial changes were made in April 1999.

1. Scope

1.1 This test method covers the determination of the water infiltration resistance of gasketed plastic underground conduit joints using a pressurized water bladder apparatus.

1.2 The values stated in inch-pound units are to be regarded as the standard. The SI values in parentheses are provided for information only.

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:*

D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing[2]

D 2122 Method for Determining Dimensions of Thermoplastic Pipe and Fittings[3]

F 512 Specification for Smooth-Wall Poly(Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation[3]

2.2 *Underwriter's Laboratories (UL) Standard:*

UL 651 Schedule 40 and 80 Rigid PVC Conduit[4]

2.3 *National Electrical Manufacturers Association (NEMA) Standards:*

TC-2 Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80)[5]

TC-6 PVC and ABS Plastic Utilities Duct for Underground Installation[5]

TC-8 Extra-Strength PVC Plastic Utilities Duct for Underground Installation[5]

3. Significance and Use

3.1 Underground electrical and communication conduit should be impervious to groundwater in order to prevent damage to conductors and utility vaults. The bladder test described in this test method may be used to qualify potential gasketed conduit systems by indicating whether the joint system will prevent water infiltration.

3.2 This test method can be used to qualify joints for plastic underground conduits using flexible elastomeric seals. However, it should not be assumed that a joint system that passes this test method will be able to seal under cases of misinstallation or abuse, or both.

3.3 This test method covers all of the following gasketed conduit types: encased burial (EB) excluding EB20, direct burial (DB), telecommunications, cable television, and Schedule 40 conduit and Schedule 80 conduit. Trade sizes covered are 2-in. nominal size and larger. (See UL 651; NEMA TC-2, TC-6, and TC 8; and Specification F 512.)

3.4 This test method also covers fittings that are intended for use with the conduit types described in 3.3 and which use flexible elastomeric seals.

4. Apparatus

4.1 *General*—One type of bladder joint tester is shown in Fig. 1.

4.2 *Bladder*:

4.2.1 The bladder shall be similar to that shown in Fig. 1. The bladder shall be comprised of a reinforced elastomeric tube that is capable of providing a watertight capsule around the subject joint specimen.

4.2.2 The bladder shall be able to safely contain an internal water pressure of at least 11.0 psi (75 kPa).

4.2.3 The bladder shall have plumbing connections that allow the bladder to be pressurized with water and that allow trapped air to be bled out of the bladder.

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[1] This test method is under the jurisdiction of ASTM Committee F-17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.40 on Test Methods.

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[2] *Annual Book of ASTM Standards*, Vol 08.01.

[3] *Annual Book of ASTM Standards*, Vol 08.04.

[4] Available from Underwriters Laboratories (UL), 333 Pfingsten Rd., Northbrook, IL 60062.

[5] National Electrical Manufacturers Association (NEMA), 1300 North 17th Street, Rosslyn, VA 22209.

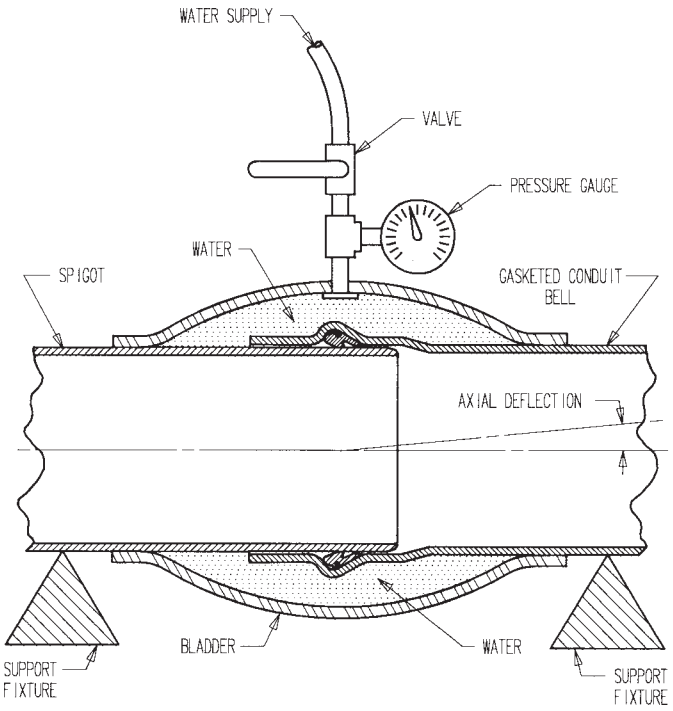

FIG. 1 Bladder Test Apparatus

4.2.4 The bladder shall have a pressure gage that indicates pressure in the bladder. This gage shall be capable of measuring 11 psi (75 kPa) (gage) with an accuracy of ±0.5 psi (±3.5 kPa) (gage).

4.3 *Support Fixture*:

4.3.1 The support fixture shall constrain movement of the test specimen and bladder during testing.

4.3.2 The support fixture shall be capable of axially deflecting the joint specimen about the joint to the maximum deflection angle recommended by the joint manufacturer.

NOTE 1—Axial deflection of a gasketed pipe joint will also induce diametric deformation of the bell and spigot if the angle of axial deflection is large enough. This can be beneficial when evaluating the sealing ability of a gasketed pipe joint.

5. Test Specimens

5.1 The gasketed joint specimen shall be comprised of a gasketed bell and a spigot with a chamfer on the outside diameter edge. Both the bell and spigot shall be of sufficient length to extend out beyond the bladder enough to provide a means by which to attach the specimen/bladder assembly to the support fixture.

5.2 Bell specifications and spigot chamfer specifications shall be determined by the manufacturer, but the specimens shall be representative of normal and customary production by the manufacturer. (See Method D 2122.)

5.3 Three specimens shall be tested for each size of gasketed conduit.

6. Conditioning

6.1 Condition specimens for at least 2 h in air at a temperature of 73.4 ± 3.6°F (23 ± 2°C) and conduct the test in a room maintained at the same temperature. (See Practice D 618.)

7. Procedure

7.1 Select and condition three sets of gasketed bells and spigots of the same nominal size according to Sections 5 and 6 of this test method.

7.2 Mark the specimens with consecutive numbers, starting with "1" and ending with "3."

7.3 Select a bell/spigot pair and apply a joint lubricant recommended by the conduit manufacturer to both the bell and spigot according to the lubricant manufacturer's directions.

7.4 Insert the spigot into the bell until the insertion line on the spigot is flush with the bell lip.

7.5 Slide the bladder over the assembled conduit joint and center the bladder over the joint seam. Seal the ends of the bladder to the spigot and bell.

NOTE 2—The type of clamps used to seal the bladder to the specimen and the location of the clamps on the specimen may influence the amount of bell and spigot deformation when the joint is deflected axially.

7.6 Attach all plumbing in accordance with 4.2.3 and 4.2.4 to the bladder assembly.

7.7 Attach the bladder/specimen assembly to the test fixture in a horizontal, axially straight position.

7.8 Fill the bladder with water and bleed off trapped air. Do not allow the bladder to pressurize past 5 psi (34 kPa) during the filling and air bleeding of the bladder.

7.9 After all air is bled from the bladder, pressurize the bladder to 11 psi (75 kPa) and allow the bladder pressure to stabilize for 5 min.

7.10 After the stabilization period, make the necessary adjustments to the bladder pressure to return it to 11.0 ± 0.5 psi (75 ± 3.5 kPa).

7.11 Check for water leakage inside specimen. Leakage at this point constitutes failure of the test.

7.12 Visually check for leakage of the joint at 5, 10, and 15-min intervals. If leakage is detected at any interval, discontinue the test. Any leakage constitutes a failure of the test.

7.13 If no leakage has occurred to this point, repeat 7.12 after axially misaligning the same joint to the maximum amount allowed by the joint manufacturer.

7.14 Any leakage during any part of the test constitutes failure of the test and the test may be suspended at that point.

7.15 Repeat 7.3 through 7.14 for the remaining joints.

7.16 If other sizes of conduit are to be tested, repeat 7.1 through 7.15.

8. Report

8.1 Each test of a nominal size of conduit (three specimens) shall generate a test report.

8.2 The test report shall include the following:

8.2.1 Identification of the bell and spigot specimens used in the test, including nominal size, type of conduit, material of manufacture, type and source of gasket, and the name of the joint manufacturer.

8.2.2 Whether the joint passed or failed the test. If the joint failed, state at what point in the test failure occurred.

8.2.3 Date(s) of testing.

8.2.4 Location of testing.

8.2.5 Name(s) of personnel conducting test.

8.2.6 Comments, if appropriate.

9. Precision and Bias

9.1 No statement is made about either the precision or bias of this test method for determining water infiltration resistance since the result merely states whether there is conformance to the criteria for success specified in the procedure.

10. Keywords

10.1 bladder; gasketed conduit; underground conduit; water infiltration