

Subject 651

July 6, 2018

SUMMARY OF TOPICS

The following changes in requirements to the Standard for Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings, UL 651, are being proposed:

1. Non-solvent type PVC Fittings (Push-Fit) for use with PVC conduit

2. UL 651 Recycled Material Clause 4.1.3 Removal of Reference to Withdrawn Standard ASTM D5033

STP BALLOTS AND ALL COMMENTS DUE: August 20, 2018

If you are interested in applying for STP 651 membership or are aware of potential candidates for this STP, please contact the STP Project Manager, Joshua.Johnson@ul.com.

For your convenience in review, proposed additions to existing requirements are shown underlined and proposed deletions are shown ~~lined-out~~.

1. Non-solvent type PVC Fittings (Push-Fit) for use with PVC conduit

RATIONALE

Proposal submitted by: David Gerstetter, Underwriters Laboratories, Inc

Article 352 of NFPA 70 simply requires PVC conduit, factory elbows, and associated Fittings to be listed. However, UL 651, the UL Standard for Safety for Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings, currently only contains certification requirements for Fittings that are solvent cemented to PVC conduit. Advancements in the design of Fittings are driving the demand for the development of new certification requirements for non-solvent type Fittings for use with PVC conduit. This proposal serves to add certification requirements in UL 651 for one style of non-solvent type fitting, a Push-Fit Fittings. The Push-Fit Fittings have been used for several years in the plumbing industry. More recently Push-Fit Fittings have been Certified for use with electrical metallic tubing, EMT, and are now attempting to cross over and be used with PVC electrical conduit.

PROPOSAL

1.1.4 Rigid PVC conduit and fittings covered in these requirements are intended to be joined to each other and to rigid PVC boxes, conduit bodies, and fittings in the field by such means of as a push-fit or a cement that is or contains a solvent for polyvinyl chloride.

5.1.3 A fitting shall be constructed so that it can be secured to polyvinyl chloride (PVC) conduit ~~by means of a solvent type of cement~~ without damage to the fitting or conduit.

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5.9 Push-fit fittings

5.9.1 A push-fit fitting shall be constructed as described in 5.1.

5.9.2 A nonmetallic push-fit fitting shall comply with the tests for push-fit fittings specified in 7.6.

5.9.3 A push-fit fitting intended for use in a wet location shall comply with the Wet-Locations Test, 7.3.2.

5.9.4 A push-fit fitting intended to be installed, uninstalled and then reinstalled not more than 10 times may be marked for “re-use” or “reusable” when the fittings have subjected to the conditioning as indicated in 7.6.1.6 and yield compliant results when subjected to the performance tests of 7.6.1.1 through 7.6.1.5.

7.3.3 Ultraviolet-light and water test

7.3.3.1 Cemented fittings

7.3.3.1.1 Six as-received service-entrance heads are to be conditioned as described in 7.3.3.2 – 7.3.3.4. As a result of the conditioning, the fittings shall:

- a) Not have cracks or openings; and
- b) Comply with the Impact Test, 7.3.5.

7.3.3.1.2 Each sample is to be exposed to ultraviolet light and water by using the following method:

Xenon-arc, Type B, in accordance with Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials, ASTM G 155 – continuous exposure to light and intermittent exposure to water spray, with a programmed cycle of 120 minutes consisting of a 102-minute light exposure and an 18-minute exposure to water spray with light. The apparatus is to operate with a 6500 W, water-cooled xenon-arc lamp, orosilicate glass inner and outer optical filters, a spectral irradiance of 0.35 W/m²/nm at 340 nm, and a black-panel temperature of 63 ±3°C (145 ±5°F).

7.3.3.1.3 The samples are to be mounted on the inside of the cylinder in the ultraviolet-light apparatus so that they do not touch each other. After the exposure, the samples are to be removed from the cylinder and visually compared to the unconditioned samples.

7.3.3.1.4 The samples are to be exposed for a total of 1000 hours.

7.3.3.2 Push-fit fittings

7.3.3.2.1 Six as-received push-fit fittings are to be conditioned as described in 7.3.3.2.2 - 7.3.3.2.4. As a result of the conditioning, the fittings shall not have cracks, openings or unseated ferrous components preventing use.

7.3.3.2.2 Each sample is to be exposed to ultraviolet light and water by using the following method:

Xenon-arc, Type B, in accordance with Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials, ASTM G 155 - continuous exposure to light and intermittent exposure to water spray, with a programmed cycle of 120 minutes consisting of a 102-minute light exposure and an 18-minute exposure to water spray with light. The apparatus is to operate with a 6500 W, water-cooled xenon-arc lamp, borosilicate glass inner and outer optical filters, a spectral irradiance of 0.35 W/m²/nm at 340 nm, and a black-panel temperature of 63 ±3°C (145 ±5°F).

7.3.3.2.3 The samples are to be mounted on the inside of the cylinder in the ultraviolet-light apparatus so that they do not touch each other. After the exposure, the samples are to be removed from the cylinder and visually compared to the unconditioned samples.

7.3.3.2.4 The samples are to be exposed for a total of 1000 hours.

7.3.6 Impact test after cold conditioning

7.3.6.1 Cemented fittings

7.3.6.1.1 Six as-received service-entrance heads are to be conditioned at minus 20 ±1°C (minus 4 ±2°F) for 5 hours. Immediately after removal from the conditioning, the samples shall comply with Impact Test, 7.3.5.

7.3.6.2 Push-fit fittings

7.3.6.2.1 Six as-received push-fit fittings of each trade size are to be conditioned at minus 20 ±1°C (minus 4 ±2°F) for 5 hours. After removal from the conditioning, the samples shall withstand an impact without splitting, crushing, breaking dislodging any ferrous components or causing any damage to the push-fit fitting preventing usage.

7.3.6.2.2 Within five seconds after the conditioning described in 7.3.6.2.1, each fitting to be impacted shall be placed on a flat steel plate so that the impact shall strike the fitting perpendicular to the fitting's longitudinal axis. The impact shall be produced by dropping a weight above the fitting from the vertical distance specified in Table 7.3. The weight is to consist of a steel cylinder 1-1/4 inches (31.8 mm) in diameter and weighing 5 pounds (2.3 kg).

7.5 Evaluation of Elastomeric Materials

7.5.1 Elastomeric materials

7.5.1.1 General

7.5.1.1.1 Components of the body of an expansion-deflection or deflection joint, or of push-fit fittings, constructed of an elastomeric material shall comply with the requirements in 7.5.2 – 7.5.4.

7.5.1.2 Vertical burning flame test