



Standard Test Method for Outdoor Weathering Exposure of Crosslinked Polyethylene (PEX) Tubing¹

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1. Scope

1.1 This test method describes the procedure for exposing crosslinked polyethylene (PEX) tubing produced in accordance with Specification **F876** to natural (sunlight) ultraviolet (UV) radiation and evaluating the effects of the exposure. This test method outlines the requirements for specimen size and preparation, exposure orientation, minimum UV exposure energy, post exposure testing and reporting.

NOTE 1—While other laboratory UV exposure systems are available, this test method relies on natural sunlight as the UV radiation source. Laboratory methods may be added in the future if testing confirms a correlation between natural sunlight and laboratory exposure.

1.2 PEX tubing is not designed for outdoor use. Data from short-term exposure testing per this test method can be used to judge the relative performance of PEX tubing stored outdoors for short periods of time prior to installation completely shielded from sunlight.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 The following precautionary caveat pertains only to the test method and post exposure testing portions, Sections 8 and 9 of this test method. *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:²

D1435 Practice for Outdoor Weathering of Plastics

D1598 Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure

D1600 Terminology for Abbreviated Terms Relating to Plastics

F412 Terminology Relating to Plastic Piping Systems

F876 Specification for Crosslinked Polyethylene (PEX) Tubing

F2023 Test Method for Evaluating the Oxidative Resistance of Crosslinked Polyethylene (PEX) Tubing and Systems to Hot Chlorinated Water

G147 Practice for Conditioning and Handling of Nonmetallic Materials for Natural and Artificial Weathering Tests

3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology **F412** and abbreviations are in accordance with Terminology **D1600**, unless otherwise indicated.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *nominal exposure time period, n*—the number of months corresponding to the measured TUV as defined in **Table 1**.

3.2.2 *polar orientation, n*—the longitudinal direction of the specimens with respect to the Equator.

3.2.3 *solar UV radiation, n*—the portion of the light spectrum falling within the range of 295nm to 385nm.

3.2.4 *total solar UV radiation (TUV), n*—the sum of measured UV Energy for the time period specimens are exposed, expressed in MJ/m². The historical average monthly TUV values for Central Arizona, 5° off horizontal exposure are listed in **Table 1**.

3.2.5 *tubing bow, n*—the resultant curvature of a tubing sample taken from a coil.

3.2.6 *UV energy, n*—the amount of solar UV radiation per unit time based on a 5° off horizontal specimen placement for Central Arizona expressed as MJ/m².

3.2.6.1 *Discussion*—UV Energy for Central Arizona was selected as it represents the worst case North American location based on a 4-year average of 1998 through 2001. This information was provided by Atlas Material Testing Technology LLC.

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

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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.