Designation: D 2898 – 94 (Reapproved 1999)

Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing[1]

This standard is issued under the fixed designation D 2898; 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 These test methods cover the durability of a fire-retardant treatment of wood under exposure to accelerated weathering. It is intended that fire-retardant treatment of the specimen be by pressure impregnation, rather than being simply by a surface coating with or without a protective layer. Two conditioning methods are described, both suitable for application to a test specimen prior to subjecting that specimen to an appropriate fire test. These methods are applicable to treated wood products or assemblies thereof. The test specimens will be in the form of, or suitable for fabrication into, fire test specimens, such as those described in Test Methods E 84, E 108, and E 286.

1.2 The text of these test methods references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of these test methods.

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:*

E 84 Test Method for Surface Burning Characteristics of Building Materials[2]

E 108 Test Methods for Fire Tests of Roof Coverings[2]

E 286 Test Method for Surface Flammability of Building Materials Using an 8-ft (2.44-m) Tunnel Furnace[2]

3. Significance and Use

3.1 These test methods provide a choice between two methods of exposing fire-retardant-treated wood products or assemblies to controlled accelerated weathering or conditioning. The conditioning simulates effects of leaching, drying, temperature and, in one method, ultraviolet light.

3.2 Method A was devised for larger specimens, and Method B for smaller ones. A research study[3] showed that the two exposure methods, A and B, were equivalent in leaching effect as demonstrated by the flame-spread results obtained on specimens exposed by either method when tested by Test Methods E 84 and E 286.

4. Apparatus (see Fig. 1 and Fig. 2)

4.1 The test apparatus shall be capable of subjecting the specimen uniformly to the test conditions described in Section 6.

4.2 No special means of protecting the specimen back and edges are required, but water shall not impinge directly on those surfaces which are not exposed either to the weather in the assembled form, or to fire in the subsequent test. Water spray nozzles shall be provided and arranged so as to distribute water evenly over the exposed specimen surface.

4.3 Heating shall be thermostatically controlled. Forced air movement shall be uniform across the specimen surface, with provisions made for adequate air changes to assure thorough drying.

4.4 In Method B, ultraviolet light shall be distributed as evenly as possible over the specimen surface, using sunlamps[4] directed normal to, and mounted 26 in. (66 cm) above the specimen measured from the bottom of the lamp. One lamp shall be used for each 8 ft^2(0.74 m^2) of specimen, or fraction thereof.

5. Test Specimen

5.1 The test specimen shall include all those essential parts of the corresponding fire test specimen that may be subjected to weather exposure in normal use. Shingles or shakes shall be applied to their intended sheathing.

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[1] These test methods are under the jurisdiction of ASTM Committee D-7 on Wood and are the direct responsibility of Subcommittee D07.07 on Fire Performance of Wood.

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[2] *Annual Book of ASTM Standards,* Vol 04.07.

[3] Correlation of ASTM Exposure Tests for Evaluating Durability of Fire-Retardant Treatment of Wood. Forest Products Laboratory, Research Paper FPL 194. U.S.D.A. Forest Service. 1973.

[4] General Electric Type H275 RUV (275 W) or Osram Ultra-Vitalox®(300 W), or equivalent, is suitable.

FIG. 1 Rain Test Apparatus Suitable for Method A

NOTE 1—Specimens may be mounted in sections which can be reassembled subsequently without trimming into the appropriate fire test specimen.

5.2 The specimen surface shall have a slope of 4 in 12 in Method A. For Method B, the surface shall have a slope ranging from 4 in 12 minimum to 8 in 12 maximum.

6. Exposure Cycle

6.1 *Method A*:

6.1.1 Subject the specimens to an exposure cycle consisting of twelve one-week cycles. Each cycle is to consist of 96 h of water exposure and 72 h of drying.

6.1.2 Apply water in a moderately fine spray uniformly over the exposed specimen surfaces by spray nozzles that deliver an average of 0.7 in. (1.78 cm) of water per hour (0.0073 gal/min·ft^2(0.30 L/min·m^2) of specimen surface) at a temperature between 35 and 60°F (2 and 16°C). Do not recirculate the water (see Note 2).

6.1.3 Dry at a thermostatically controlled temperature of 135 to 140°F (57 to 60°C) in a room or cell. The controlling temperature shall be the air temperature measured 1 in. (2.54 cm) above the specimen surface. Accompany drying with air movement directed across the face of the specimens at a rate of at least 25 ft/min (7.62 m/min).

6.1.4 At the end of each cycle, change the position of each specimen within the apparatus so that each specimen or segment occupies approximately an equal number of cycles in each location used.

6.2 *Method B*:

6.2.1 Subject the specimen to a 24-h exposure cycle consisting of 4 h wetting, 4 h drying, 4 h wetting, 4 h drying, and 8 h rest. Repeat this cycle for a total of 1000 h.

6.2.2 Apply water in a moderately fine spray uniformly over the exposed specimen surface at a rate of 0.3 ± 0.02 gal/min·ft^2(12.2 ± 0.8 L/min·m^2) of specimen surface. The temperature shall not exceed 90°F (32°C). During the first three cycles drain all water rather than recirculate it. In each subsequent wetting period, circulate a volume of at least 5 gal (18 L) of fresh water through each spray head.

NOTE 2—Water quality may be important in some cases, especially pH and hardness, and should be noted.

6.2.3 Dry at a temperature of 150 ± 5°F (63± 3°C), withthis temperature attained within 15 min from the start of drying. The controlling temperature shall be the air temperature 1 in. (2.54 cm) above the specimen surface. Obtain the temperature by bare thermocouples or other temperature sensors which are protected from the direct radiation of the lamps by a shield not larger than 2 in.^{2}(12.9 cm^2). Accompany drying with air movement directed across the face of the specimen at a rate of at least 25 ft/min (7.62 m/min). Exposure to the ultraviolet sunlamps shall be continuous throughout the drying period.

6.2.4 At the end of one or more cycles, change the position of the specimens within the apparatus so that each specimen or segment occupies approximately an equal number of cycles in each location used.

7. Conditioning

7.1 Upon completion of the prescribed exposure, the specimen shall be conditioned to a moisture content specified by the applicable fire test standard.

8. Keywords

8.1 fire retardant; fire retardant treated wood; fire testing; weathering

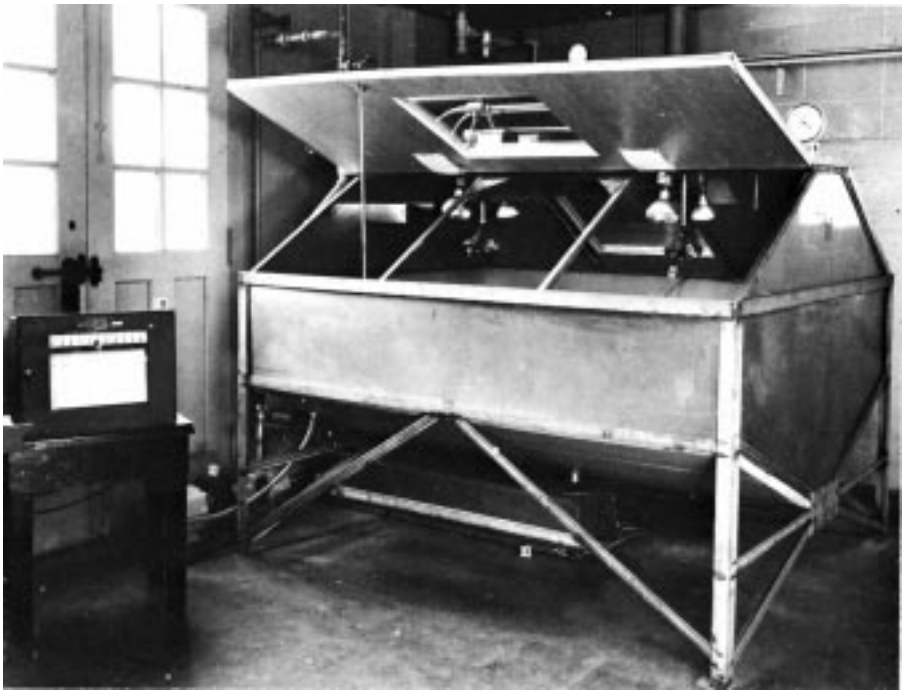

FIG. 2 Exposure Chamber Suitable for Method B