Designation: D3632 – 98 (Reapproved 2011)

Standard Test Method for Accelerated Aging of Adhesive Joints by the Oxygen-Pressure Method[1]

This standard is issued under the fixed designation D3632; 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 test method describes how to estimate the relative resistance to deterioration of adhesive films and adhesive-bonded joints placed in a high-pressure oxygen environment. The instructions include both wood-to-wood and wood-to-metal joints as well as free film of adhesive. The effects of chemicals such as fire retardants, preservatives, or wood extractives, can be evaluated by using materials containing these chemicals for adherends.

1.2 This test method is primarily intended for elastomer-based construction adhesives, but is also applicable to other types of adhesives that may be susceptible to oxygen degradation. This accelerated test does not correlate exactly with the natural aging of the adhesive because of the varied conditions of natural aging and the absence of factors such as moisture and stress. The results of this accelerated test are only comparative and must be evaluated against the performance of bonded joints whose natural and accelerated aging characteristics are known.

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:*[2]

D143 Test Methods for Small Clear Specimens of Timber

D454 Test Method for Rubber Deterioration by Heat and Air Pressure

D572 Test Method for Rubber—Deterioration by Heat and Oxygen

D573 Test Method for Rubber—Deterioration in an Air Oven

D907 Terminology of Adhesives

D2339 Test Method for Strength Properties of Adhesives in Two-Ply Wood Construction in Shear by Tension Loading

3. Terminology

3.1 *Definitions*—Many definitions in this test method are defined in Terminology D907.

4. Summary of Test Method

4.1 This test method entails subjecting specimens with known physical properties to a controlled aging environment for specific time periods, then observing the physical properties again and noting any changes. The controlled environment consists of elevated temperature (70°C) (158°F) and oxygen at elevated pressure 2.07 MPa (300 psi).

4.2 Three types of test specimens are offered. The party requesting the adhesive evaluation will choose the type of specimen to be used.

Specimen Type	Configuration	Physical Property Tested
A	wood-to-wood lap	shear strength
B	wood-to-metal lap	shear strength
C	unsupported film	flexibility

4.3 Three different oxygen-pressure aging exposures are offered. Use any exposure with any of the above specimens. The party requesting the adhesive evaluation will choose the exposure to which the specimens are subjected.

4.3.1 Constant exposure for 500 h with a single test of the physical property at the end of 500 h.

4.3.2 Constant exposure for 1000 h with a single test of the physical property at the end of 1000 h.

4.3.3 Constant exposure for up to 1000 h with a series of tests of the physical property after 200, 400, 600, 800, and 1000 h.

5. Significance and Use

5.1 This test method is useful to the adhesive manufacturer in research and development or in manufacturing control. The results are also used for specification acceptance or as a guide in adhesive selection.

[1] This test method is under the jurisdiction of ASTM Committee D14 on Adhesives and is the direct responsibility of Subcommittee D14.70 on Construction Adhesives.

Current edition approved Jan. 1, 2011. Published January 2011. Originally approved in 1977. Last previous edition approved in 2004 as D3632 – 98 (2004). DOI: 10.1520/D3632-98R11.

[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.

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. United States