



Designation: D5870 – 22

Standard Practice for Calculating Property Retention Index of Plastics¹

This standard is issued under the fixed designation D5870; 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 practice covers procedures for the calculation of a property retention index (PRI) of thermoplastic and thermoset plastics after exposure to thermal aging, natural or artificial accelerated weathering, or chemical exposures.

1.2 This practice is not intended to establish a fixed procedure for conducting the exposure test, but it is intended to provide a set of specific procedures used to calculate the retention index of a characteristic property of the material after it has been exposed. Selection of the specific exposure test conditions depends on the material being tested and the property being measured. It is up to the user to determine which exposure test conditions are most relevant to the specific material and the service condition being used. The exposure test used must be conducted in accordance with conditions described in specific exposure standards.

1.3 This practice does not describe procedures for sampling the materials to be tested. These procedures are described in the standards and specifications applicable to the material being evaluated.

1.4 The procedure used to calculate the PRI depends on whether the test used to characterize the materials being exposed is destructive or nondestructive. The PRI can be useful in describing short-term mechanical, electrical, and other properties of plastics at specified temperatures after the materials have been subjected to an exposure test.

1.5 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—There is no similar or equivalent ISO standard. ISO 11248 is significantly different since it pertains only to thermosetting resins.

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the*

Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 ASTM Standards:²

D543 Practices for Evaluating the Resistance of Plastics to Chemical Reagents

D618 Practice for Conditioning Plastics for Testing

D883 Terminology Relating to Plastics

D1435 Practice for Outdoor Weathering of Plastics

D1499 Practice for Filtered Open-Flame Carbon-Arc Exposures of Plastics

D1898 Practice for Sampling of Plastics (Withdrawn 1998)³

D2565 Practice for Xenon-Arc Exposure of Plastics Intended for Outdoor Applications

D3045 Practice for Heat Aging of Plastics Without Load

D4329 Practice for Fluorescent Ultraviolet (UV) Lamp Apparatus Exposure of Plastics

D4364 Practice for Performing Outdoor Accelerated Weathering Tests of Plastics Using Concentrated Sunlight

D4459 Practice for Xenon-Arc Exposure of Plastics Intended for Indoor Applications

D4674 Practice for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Office Environments

D6360 Practice for Enclosed Carbon-Arc Exposures of Plastics

G113 Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials

2.2 ISO Standards:⁴

ISO 291 Plastics—Standard Atmospheres for Conditioning and Testing

ISO 877 Plastics—Methods of Exposure to Solar Radiation, Part 1: General Guidance, Part 2: Direct Weathering and Exposure Behind Window Glass, and Part 3: Intensified Weathering Using Concentrated Solar Radiation

¹ This practice is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.50 on Durability of Plastics.

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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.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

*A Summary of Changes section appears at the end of this standard