



Standard Practice for Exposure of Adhesive Specimens to High-Energy Radiation¹

This standard is issued under the fixed designation D 1879; 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 The purpose of this practice is to define conditions for the exposure of polymeric adhesives in bonded specimens to high-energy radiation prior to determination of radiation-induced changes in physical or chemical properties. This recommended practice specifically covers the following kinds of radiation: gamma or X-ray radiation, electron or beta radiation, neutrons, and mixtures of these such as reactor radiation.

1.2 This practice specifies only the conditions of irradiation but does not cover the preparation of test specimens, testing conditions, or the evaluation of test. These are covered in the various ASTM methods or specifications for specific materials.

1.3 This practice covers procedures for the following five types of exposure:

Procedure A—Exposure at ambient conditions.

Procedure B—Exposure at controlled temperature.

Procedure C—Exposure in a medium other than air.

Procedure D—Exposure under load.

Procedure E—Exposure combining two or more of the variables listed in Procedures A to D.

NOTE 1—The problems of measuring the properties of materials during irradiation involve shielding and remote control facilities and are, therefore, not considered in this practice.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are provided for information purposes only.

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

1.5.1 **Electrical Hazard: Warning**—The users of this practice must be aware that there are inherent dangers associated with the use of electrical instrumentation and that this practice cannot and will not substitute for a practical knowledge of the instrument used for a particular procedure.

1.5.2 **Radio Frequency: Warning**—Persons with pacemakers may be affected by the radio frequency.

2. Referenced Documents

2.1 ASTM Standards:

D 618 Practice for Conditioning Plastics and Electrical Insulating Materials for Testing²

D 907 Terminology of Adhesives³

D 1671 Test Method for Absorbed Gamma Radiation Dose in the Fricke Dosimeter⁴

D 1672 Practice for Exposure of Polymeric Materials to High-Energy Radiation⁴

D 2953 Classification System for Polymeric Materials for Service in Ionizing Radiation⁵

2.2 ANSI Document:

N1.1 Glossary of Terms in Nuclear Science and Technology⁶

2.3 IEEE Documents:⁷

278 Classifying Electrical Insulating Materials Exposed to Neutron and Gamma Radiation

323 Qualifying Class 1E Equipment for Nuclear Power Generating Stations

3. Terminology

3.1 Many terms in this practice are defined in Terminology D 907.

3.2 *gray, n*—the unit of absorbed dose when the energy per unit mass imparted to matter by radiation is one joule per kilogram.

3.3 *rad, n*—the unit of absorbed dose when the energy per unit mass imparted to matter by radiation is 100 ergs per gram.

NOTE 2—To convert from rad to gray (Gy), multiply by 1.00×10^{-2} .

4. Significance and Use

4.1 The procedures outlined in this practice are designed to standardize the exposure of adhesive-bonded specimens for the purpose of studying the effects of high-energy radiation, but have been made flexible enough so that a large variety of conditions may be met within the scope of this one irradiation method. Because of this flexibility in the procedures it is

² Annual Book of ASTM Standards, Vol 08.01.

³ Annual Book of ASTM Standards, Vol 15.06.

⁴ Discontinued; see 1984 Annual Book of ASTM Standards, Vol 12.02.

⁵ Discontinued; see 1985 Annual Book of ASTM Standards, Vol 12.02.

⁶ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

⁷ Available from Institute of Electrical and Electronics Engineers, 345 E. 47th St., New York, NY 10017.

¹ This practice is under the jurisdiction of ASTM Committee D-14 on Adhesives and is the direct responsibility of Subcommittee D14.80 on Metal Bonding Adhesives.

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