



Designation: D 2794 – 93 (Reapproved 1999)^{e1}

Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)¹

This standard is issued under the fixed designation D 2794; 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.

^{e1} NOTE—Deleted reference to multiple sources in former Footnotes 3 and 4 in December 1999.

1. Scope

1.1 This test method covers a procedure for rapidly deforming by impact a coating film and its substrate and for evaluating the effect of such deformation.

1.2 This test method should be restricted to testing in only one laboratory when numerical values are used because of the poor reproducibility of the method. Interlaboratory agreement is improved when ranking is used in place of numerical values.

1.3 *This standard does not purport to address 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:

D 609 Practice for Preparation of Cold-Rolled Steel Panels for Testing Paint, Varnish, Conversion Coatings, Lacquer, and Related Coating Products²

D 823 Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels²

D 1186 Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base²

3. Terminology

3.1 Description of Term Specific to This Standard:

3.1.1 *impact resistance, of a coating*—the number of inch-pounds (kilogram-metres) required to produce cracking in the deformed coating.

4. Summary of Test Method

4.1 The organic coatings under test are applied to suitable thin metal panels. After the coatings have cured, a standard

weight is dropped a distance so as to strike an indenter that deforms the coating and the substrate. The indentation can be either an intrusion or an extrusion. By gradually increasing the distance the weight drops, the point at which failure usually occurs can be determined. Films generally fail by cracking, which is made more visible by the use of a magnifier, by the application of a copper sulfate (CuSO_4) solution on steel, or by the use of a pin hole detector.

5. Significance and Use

5.1 Coatings attached to substrates are subjected to damaging impacts during the manufacture of articles and their use in service. In its use over many years, this test method for impact resistance has been found to be useful in predicting the performance of organic coatings for their ability to resist cracking caused by impacts.

6. Apparatus

6.1 *Tester*, consisting of a vertical tube to guide a cylindrical weight that is dropped on a punch resting on the test panel.

6.1.1 *Guide Tube*, 24 to 48 in. (0.6 to 1.2 m) long mounted vertically in a base plate. A slot is cut lengthwise on one side of the tube to act as a guide for a cylindrical weight that fits inside the tube. Graduations are marked in inch-pounds along the slot. The base is constructed so that a thin flat panel can be inserted at 2 in. (50 mm) below the tube.

6.1.2 *Weight*, metal cylinder, made to fit inside the guide tube. A pin is fitted into one side of the weight to act as a guide by riding in the slot of the tube and to serve as a handle by which the weight can be raised and released and serve as the indicator of inch-pounds (kilogram-metres).

6.2 *Indenter*—A steel punch with a hemispherical head having a diameter of either 0.500 in. (12.7 mm) or 0.625 in. (15.9 mm). The head rests on the test panel and the punch is held vertically by a guide ring.

6.3 *Panel Support*—A steel fixture with a 0.64-in. (16.3-mm) diameter cylindrical hole centered under the indenter for supporting the test panel.

6.4 *Magnifier*.

6.5 *Pin Hole Detector*.

¹ This test method is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.23 on Physical Properties of Applied Paint Films.

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² *Annual Book of ASTM Standards*, Vol 06.01.