



Designation: D2093 – 03 (Reapproved 2011)

Standard Practice for Preparation of Surfaces of Plastics Prior to Adhesive Bonding¹

This standard is issued under the fixed designation D2093; 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 describes surface preparations for plastic adherends, to be used prior to adhesive bonding of test specimens. It should be noted, however, that this practice specifies only the pretreating conditions of the plastic and does not cover the preparation of test specimens, testing conditions, or evaluation of tests. These are covered in the various ASTM test methods or specifications for specific materials.

1.2 *Physical Treatments* (for example, sanding and solvent wiping) are used in order to remove the glossy finish and all traces of dirt, grease, mold release, or other contaminants from the bonding surfaces.

1.3 *Chemical Treatments* (for example, sulfuric acid—dichromate solution and sodium naphthalene complex) are used in some cases to alter chemically the surface layers of the polymer itself to improve its adhesion characteristics.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information 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.* Specific precautionary statements are given in 6.1.

2. Referenced Documents

2.1 ASTM Standards:²

- D897 Test Method for Tensile Properties of Adhesive Bonds
- D903 Test Method for Peel or Stripping Strength of Adhesive Bonds
- D905 Test Method for Strength Properties of Adhesive

¹ This practice is under the jurisdiction of ASTM Committee D14 on Adhesives and is the direct responsibility of Subcommittee D14.40 on Adhesives for Plastics. Current edition approved Jan. 1, 2011. Published January 2011. Originally approved in 1962. Last previous edition approved in 2003 as D2093 – 03. DOI:10.1520/D2093-03R11.

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.

- Bonds in Shear by Compression Loading
- D907 Terminology of Adhesives
- D950 Test Method for Impact Strength of Adhesive Bonds
- D952 Test Method for Bond or Cohesive Strength of Sheet Plastics and Electrical Insulating Materials
- D1002 Test Method for Apparent Shear Strength of Single-Lap-Joint Adhesively Bonded Metal Specimens by Tension Loading (Metal-to-Metal)
- D1193 Specification for Reagent Water
- D3807 Test Method for Strength Properties of Adhesives in Cleavage Peel by Tension Loading (Engineering Plastics-to-Engineering Plastics)

3. Terminology

3.1 *Definitions*—Many terms are defined in Terminology D907.

4. Significance and Use

4.1 This practice is useful for reducing some of the surface variability of plastics (due to differences in manufacturing methods) that might otherwise cause excessive variation in the results of ASTM test methods designed to measure adhesion. The treatments specified are convenient for laboratory work.

4.2 This practice is not necessarily designed to provide optimum adhesion to the surfaces and the treatments specified may not always be practical for industrial use.

4.3 This practice does not address all of the surface preparation methods available; nor does this practice cite all of the types or classes of plastics currently available.

4.4 This practice is used as a starting point for evaluating surface preparation techniques for plastic adherends prior to adhesive bonding.

5. Apparatus

5.1 *Abrasive, Aluminum Oxide*, 320 grit, free of waxes, lubricants, or other potential contaminants.

5.2 *Glass Dish*, borosilicate, of appropriate dimensions, in which to heat the sulfuric acid-dichromate solution.

5.3 *Hot Plate* to provide a source for heating the acid.

5.4 *Cotton Cloths*, lint-free, clean, white, or non-linting paper wipers.