



Designation: D494 – 04

Standard Test Method for Acetone Extraction of Phenolic Molded or Laminated Products¹

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1. Scope

1.1 This test method covers the determination of the amount of acetone-soluble matter in molded or laminated phenolic products.

1.2 The values stated in SI units are to be regarded as the standard.

1.3 *This standard does not purport to address all of the safety problems, 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

D618 Practice for Conditioning Plastics for Testing

D883 Terminology Relating to Plastics

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

3. Terminology

3.1 All definitions are in accordance with Terminology D883.

4. Significance and Use

4.1 For molded phenolic products, acetone extraction should be considered solely as a quantitative expression of a property normally associated with degree of cure. There is no demonstrably rigorous relation between the optimum mechanical and electrical properties of a well-cured piece and the numerical value of the acetone test. The amount of acetone-soluble matter is affected by: (1) nature of resin and filler, (2) lubricant, (3) molding temperature, (4) length of cure, (5)

thickness of the section from which sample is taken, (6) nature of molded piece, (7) technique used in molding, (8) distribution of fines in the material to be extracted, and (9) method of grinding the specimen. These variations under some conditions may cause a difference of 3 to 4 % in acetone-extractable matter. For this reason, the test method should be used only as a comparative test for measuring undercure.

4.2 For laminated phenolic products, acetone extraction indicates change in stage of cure, change in resin content, change in type of resin used, presence of plasticizers or other acetone-extractable addition agents, and is affected in general by the same factors as stated in 6.1

5. Apparatus

5.1 *Sieves*—The set of sieves used shall consist of sieves Nos. 40 (425- μ m) and 140 (106- μ m), with a cover and receiving pan, conforming to the requirements of Specification E11.

5.2 *Extraction Apparatus*—The apparatus may be of the type shown in Fig. 1, or a Wiley-Richardson type, as shown in Fig. 2. The former type is more suitable for use with small electric hot plates, while the latter is more suitable for use with oil or water baths. In either case, it shall be possible to control the temperature so that the rate of extraction can be regulated accurately.

5.3 *Drying Dishes*—The drying dishes shall be lightweight dishes, approximately 63.5 mm [2½ in.] in diameter and 38.1 mm [1½ in.] in height.

6. Preparation of Sample

6.1 *Precautions*—It is of utmost importance that extreme care shall be taken during the preparation of the sample for extraction. The sample shall be drillings if possible; however, if not possible, other suitable means of producing particles equivalent to drillings may be used. Drillings taken from a large molded product shall be truly representative of all sections of the part in proper proportions. The drills for sampling shall be kept sharp and so operated that no undue heating of the material shall occur which will tend to preclude the material.

6.2 If it is impracticable to obtain samples by drilling, the parts may be broken up with a lathe, planer, milling machine, or a suitable grinder. A mortar and pestle or a pebble mill is

¹ This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.70 on Analytical Methods.

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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.