



## Standard Guide for Testing Synthetic Plasticizers Used in Rubber<sup>1</sup>

This standard is issued under the fixed designation D 1992; 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 guide covers test methods for synthetic plasticizers that are used in rubber applications.

1.2 *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.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

D 70 Test Method for Density of Semi-Solid Bituminous Materials—Pycnometer Method<sup>2</sup>

D 92 Test Method for Flash and Fire Points by Cleveland Open Cup<sup>3</sup>

D 891 Test Methods for Specific Gravity, Apparent, of Liquid Industrial Chemicals<sup>4</sup>

D 1045 Test Methods for Sampling and Testing Plasticizers Used in Plastics<sup>5</sup>

D 1209 Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)<sup>6</sup>

D 1218 Test Method for Refractive Index and Refractive Dispersion of Hydrocarbon Liquids<sup>3</sup>

D 1544 Test Method for Color of Transparent Liquids (Gardner Color Scale)<sup>7</sup>

D 1962 Test Method for Saponification Value of Drying Oils, Fatty Acids, and Polymerized Fatty Acids<sup>8</sup>

D 2111 Test Methods for Specific Gravity of Halogenated Organic Solvents and Their Admixtures<sup>4</sup>

D 2196 Test Method for Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield) Viscometer<sup>7</sup>

D 2288 Test Method for Weight Loss of Plasticizers on Heating<sup>5</sup>

E 203 Test Method for Water Using Volumetric Karl Fischer Titration<sup>4</sup>

### 3. Significance and Use

3.1 Synthetic plasticizers are primarily esters and they are used with the more polar elastomers such as CR or NBR to improve processing, adjust hardness, and improve low temperature properties. These esters may be either monomeric or polymeric and are derived from many different organic acids.

3.2 These test methods may be used in establishing and confirming quality control standards for the synthetic plasticizers used in rubber compounding. It is not implied that the test methods in this guide are the only ones of significance, but these test methods list the properties most commonly specified for ester plasticizers. Other parameters may be needed for specific application of these materials.

### 4. Sampling

4.1 The method of sampling for either tank cars or drums is described in Test Methods D 1045.

### 5. Volatility

5.1 Volatility is normally measured as mass loss after 2 and 24 h when tested at 155°C. The procedure is described in Test Method D 2288.

### 6. Moisture

6.1 The moisture content should be determined using the Karl Fischer reagent procedure as described in Test Method E 203.

### 7. Acid Number

7.1 The acid number, expressed as milligrams of KOH per gram of plasticizer, may be determined from Test Methods D 1045.

### 8. Saponification Number

8.1 The saponification value is expressed in milligrams per gram of plasticizer and may be determined by Test Method D 1962.

### 9. Color

9.1 For clear light colored plasticizers, the APHA platinum-cobalt color standards may be used as described in Test Method

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee D11 on Rubber and is the direct responsibility of Subcommittee D11.20 on Compounding Materials and Procedures.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 04.03.

<sup>3</sup> Annual Book of ASTM Standards, Vol 05.01.

<sup>4</sup> Annual Book of ASTM Standards, Vol 15.05.

<sup>5</sup> Annual Book of ASTM Standards, Vol 08.01.

<sup>6</sup> Annual Book of ASTM Standards, Vol 06.04.

<sup>7</sup> Annual Book of ASTM Standards, Vol 06.01.

<sup>8</sup> Annual Book of ASTM Standards, Vol 06.03.