



Designation: D 3160 – 96a

## Standard Test Method for Phenol Content of Cumene (Isopropylbenzene) or AMS ( $\alpha$ -Methylstyrene)<sup>1</sup>

This standard is issued under the fixed designation D 3160; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method covers the determination of phenol in the range from 0.25 to 50 mg/kg in refined cumene (isopropylbenzene) or AMS ( $\alpha$ -methylstyrene).

1.2 The following applies to all specified limits in this test method: for purposes of determining conformance with this test method, an observed value or a calculated value shall be rounded off “to the nearest unit” in the last right-hand digit used in expressing the specification limit, in accordance with the rounding-off method of Practice E 29<sup>E 29</sup>.

1.3 *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.* For specific hazard statements, see Section 7.

### 2. Referenced Documents

2.1 *ASTM Standards:*

D 1193 Specification for Reagent Water<sup>2</sup>

D 3437 Practice for Sampling and Handling of Liquid Cyclic Products<sup>3</sup>

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications<sup>4</sup>

2.2 *Other Document:*

OSHA Regulations, 29 CFR, Paragraphs 1910.000 and 1910, 1200.<sup>5</sup>

### 3. Summary of Test Method

3.1 The phenol content of cumene or AMS is determined by the color development of phenol with 4-aminoantipyrine. The sample absorbance is compared to phenol standards at 472 nm on a spectrophotometer.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-16 on Aromatic Hydrocarbons and Related Chemicals and is the direct responsibility of Subcommittee D16.0H on Styrene, Ethylbenzene, and C<sub>9</sub> and C<sub>10</sub> Aromatic Hydrocarbons.

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<sup>2</sup> Annual Book of ASTM Standards, Vol 11.01.

<sup>3</sup> Annual Book of ASTM Standards, Vol 06.04.

<sup>4</sup> Annual Book of ASTM Standards, Vol 14.02.

<sup>5</sup> Available from Superintendent of Documents U.S. Government Printing Office, Washington, DC 20402.

### 4. Significance and Use

4.1 This test method is useful in determining phenol in the range from 0.25 to 50 mg/kg in commercially available cumene or AMS.

4.2 Phenol will inhibit certain reactions involving cumene or AMS.

### 5. Apparatus

5.1 *Balance*—Any balance capable of measuring weights to the nearest 0.001 g.

5.2 *Spectrophotometer*—Any spectrophotometer that can measure 0 to 2 absorbance units at 472 nm with a wavelength repeatability of 5 nm.

5.3 *Spectrophotometer Cells*, 2 cm.

5.4 *Separatory Funnel*, 2 L.

5.5 *Volumetric Flask*, 100 mL.

5.6 *Pipettes*, 1, 2, 3, and 5 mL.

5.7 *Filter Paper*.<sup>6</sup>

### 6. Reagents

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used.

6.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water as defined by Type I or II of Specification D 1193<sup>D 1193</sup>.

6.3 *Cumene or AMS*—Wash 1 L of cumene or AMS with 5 % aqueous sodium hydroxide in a separatory funnel. Discard the aqueous sodium hydroxide phase and filter the hydrocarbon through dry filter paper.<sup>6</sup> Store the hydrocarbon under a nitrogen blanket. The previous steps are taken to ensure that the hydrocarbon will not contain phenol or peroxides.

6.4 *Solution of 4-Amino-Antipyrine*—Dissolve 3.00 g of amino-antipyrine in distilled water and dilute to volume in a dark amber 100-mL volumetric flask. This should be stable for two weeks.

6.5 *Ammonium Persulfate Solution*—Dissolve 2.00 g of ammonium persulfate in distilled water and dilute to volume in a 100-mL volumetric flask. A fresh solution should be made up weekly.

6.6 *Ammonium Hydroxide*, 0.880 specific gravity.

<sup>6</sup> Filter paper, IPS available from Whatman Inc., 9 Bridewell Place, Clifton, NJ 07014 or equivalent, have been found suitable for this purpose.