



Designation: D 3348 – 98

An American National Standard

Standard Test Method for Rapid Field Test for Trace Lead In Unleaded Gasoline (Colorimetric Method)¹

This standard is issued under the fixed designation D 3348; 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 test method² is intended for use in the field by nontechnical people for the quantitative measurement of lead in unleaded gasoline in the range from 0.01 to 0.10 g Pb/U.S. gal (2.64 to 26.4 mg Pb/L). This method applies to all commercial gasolines and responds to all types of lead alkyls as well as to other organic and inorganic forms of lead.

NOTE 1—This test method is a screening test and is not to be used as a replacement for Test Method D 3116, Test Method D 3229, or Test Method D 3237.

1.2 The values stated in SI units shall be regarded as standard.

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 precautionary statements, see Note 3 and Note 4 and Section 7.

2. Referenced Documents

2.1 ASTM Standards:

- D 3116 Test Method for Trace Amounts of Lead in Gasoline³
- D 3229 Test Method for Low Levels of Lead in Gasoline by X-Ray Spectrometry⁴
- D 3237 Test Method for Lead in Gasoline by Atomic Absorption Spectrometry⁵

3. Summary of Test Method

3.1 The gasoline is treated with iodine and tetraethyl ammonium chloride in chloroform and subjected to ultraviolet light. The lead alkyls form water-soluble lead alkyl iodides, which are removed from the gasoline by shaking it with an aqueous ammonium nitrate solution. The aqueous extract is

filtered into a solution of 4-(2-pyridylazo)-resorcinol disodium salt (PAR) and ammonium hydroxide. The lead is determined by measuring its PAR complex colorimetrically at 490 nm using a previously prepared calibration curve.

4. Significance and Use

4.1 This test is used to determine trace quantities of lead in unleaded gasoline. Unwarranted amounts of lead may cause deposits in automotive pollution control equipment and poisoning of catalytic mufflers.

5. Interferences

5.1 PAR also reacts with many other metals forming highly colored complexes. However, none of these are normally found present in a soluble form in gasoline. The following metals were found to form colors with PAR and if present may interfere to give high results: Fe II, Fe III, Co II, Ni II, Cu II, Zn II, Cd II, Mn II, Sn II, V IV, Pb II, U VI, Ti IV, and the rare earths.

6. Apparatus

6.1 *Ultraviolet Lamp*,⁶ long wavelength, 3660 Å, placed in a standard 4-W fluorescent fixture.

NOTE 2—A 3-min electric timer⁷ is connected to the fixture in the prototype kit.

6.2 *Measuring Block*, aluminum, drilled to hold an 18 by 150-mm test tube, with a mark at a level equal to 5.0 mL of liquid in the test tube.

6.3 *Colorimeter, Portable*, capable of operating at 490 nm. Any equivalent instrument capable of measurement near 514 nm (the optimum Pb-PAR complex wavelength) may be used.

6.4 *Test Tubes*,⁸ borosilicate, 18 by 150 mm.

6.5 *Pipets*, glass, dropping, capable of delivering 2.0 mL with a 2-mL bulb.

NOTE 3—**Caution:** Gasoline or any of the reagents must not come in

¹ This test method is under the jurisdiction of ASTM Committee D-2 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.03 on Elemental Analysis.

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² This test method is based on the use of the Mobil Lead Test Kit (Fig. X1.1).

³ *Annual Book of ASTM Standards*, Vol 05.01.

⁴ Discontinued—See 1992 *Annual Book of ASTM Standards*, Vol 05.02.

⁵ *Annual Book of ASTM Standards*, Vol 05.02.

⁶ Lamp F4T5.BL, available from the General Electric Co., or equivalent, has been found satisfactory for this purpose.

⁷ Three-minute timer, available from H. M. Rhodes, Avon, CT 06001, Catalog No. 90021, has been found satisfactory for this purpose.

⁸ Disposable culture tubes, available from the Sargent Welch Co., 35 Stern Ave., Springfield, NJ 07081, Catalog No. S-79523K, have been found satisfactory for this purpose.