



Standard Test Method for Aromatics in Light Naphthas and Aviation Gasolines by Gas Chromatography¹

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1. Scope

1.1 This test method covers the determination of benzene, toluene, C_8 and heavier aromatics, and total aromatics in the concentration range from 1.0 to 30 % of the individual aromatic compounds listed above in the following products: (1) aviation gasolines described in Specification D 910; (2) reformer products having a final boiling point below 350°F (177°C); and (3) reformer feed and other petroleum products having a final boiling point below 300°F (149°C). The results are reported to the nearest 0.1 % by liquid volume.

NOTE 1—Test Method D 2600 should be used to determine aromatics in concentrations below 1.0.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in SI units are for information only.

1.3 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems 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 Notes 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, and Annex A1.*

2. Referenced Documents

- 2.1 *ASTM Standards:*
D 910 Specification for Aviation Gasolines²
D 2600 Test Method for Aromatic Traces In Light Saturated Hydrocarbons by Gas Chromatography³
E 260 Practice for Packed Column Gas Chromatography⁴

3. Summary of Test Method

3.1 The sample is introduced into a gas chromatographic column containing a strongly polar liquid phase. The polar phase has very little affinity for saturated and olefinic hydrocarbons, while exhibiting a pronounced selectivity for aromatics. This selectivity results in the elution of all saturated and olefinic hydrocarbons in the products described above prior to the elution of benzene. Can either a thermal conductivity or flame ionization detector be used.

Calibration is performed by using synthetic blends of the aromatic compounds charged at the same constant volume as is used to analyze the sample. *n*-undecane or *n*-dodecane is used as an internal standard. Typical retention times are shown in Table 1 and a typical chromatogram is shown in Fig. 1.

NOTE 2—Reference should be made to Practice E 260.

NOTE 3: **Warning**—Naphthas and gasolines are extremely flammable, harmful if inhaled; see Annex A1.1. Precautionary statements for individual compounds follow in text.

4. Significance and Use

4.1 A knowledge of aromatic hydrocarbons in light naphthas and aviation gasolines is needed to assess product quality and meet specifications for aromatics as may be set by consumers and regulatory agencies.

5. Apparatus

5.1 *Chromatograph*—Any chromatographic instrument may be used which has the following performance and characteristics:

5.1.1 *Sensitivity*—An over-all sensitivity sufficient to detect 0.1 volume % of any aromatic compound of interest with a peak height of at least 2 mm without loss of resolution as defined in 5.1.3.

5.1.2 *Sample Inlet System*—A sample inlet system that allows a constant volume of liquid sample to be injected.

5.1.3 *Column*—Inject Blend 1, Table 2, into the chromatograph and record the chromatogram. (**Warning**—See Notes 4, 5, and 6.) Any column and conditions may be used provided, under conditions of the test, *n*-decane is eluted prior to benzene and the depth of the valley after *n*-decane is not less than 50 % of the height of the decane peak. The benzene, toluene, and C_8 and heavier aromatics must be completely resolved from each other, and the internal standard, *n*-undecane or *n*-dodecane, must be completely separated from all aromatic compounds.

NOTE 4: **Warning**—Benzene is a poison, carcinogen, harmful or fatal if swallowed; see Annex A1.2.

NOTE 5: **Warning**—Toluene and ethylbenzene are flammable, vapor harmful; see Annexes A1.3 and A1.4, respectively.

TABLE 1 Typical Retention Time, Minutes

Column	1	2	3	4	5
<i>n</i> -decane	2.3	6.8	2.6	2.0	10.2
Benzene	2.9	7.6	3.0	3.3	15
Toluene	4.5	11.4	4.3	5.3	19.1
Ethylbenzene	6.6	17.2	6.0	7.7	23.3
<i>n</i> -undecane	...	10.1	3.8	...	...
<i>n</i> -dodecane	5.85	...	...	4.7	17.3

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 D02.04 on Hydrocarbon Analysis.

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² *Annual Book of ASTM Standards*, Vol 05.01.

³ *Annual Book of ASTM Standards*, Vol 05.02.

⁴ *Annual Book of ASTM Standards*, Vol 14.01.