

# ASTM D5769 - 10 Standard Test Method for Determination of Benzene, Toluene, and Total Aromatics in Finished Gasolines by Gas Chromatography/Mass Spectrometry

**Instrument:** [Agilent 5973N MSD system with an Agilent 6890N GC](#)

## Significance and Use

Test methods to determine benzene and the aromatic content of gasoline are necessary to assess product quality and to meet fuel regulations.

This test method can be used for gasolines that contain oxygenates (alcohols and ethers) as additives. It has been determined that the common oxygenates found in finished gasoline do not interfere with the analysis of benzene and other aromatics by this test method.

## 1. Scope

1.1 This test method covers the determination of benzene, toluene, other specified individual aromatic compounds, and total aromatics in finished motor gasoline, including gasolines containing oxygenated blending components, by gas chromatography/mass spectrometry (GC/MS).

1.2 This test method has been tested for the following concentration ranges, in liquid volume percent, for the following aromatics: benzene, 0.1 to 4 %; toluene, 1 to 13 %; and total (C6 to C12) aromatics, 10 to 42 %. The round-robin study did not test the method for individual hydrocarbon process streams in a refinery, such as reformates, fluid catalytic cracked naphthas, and so forth, used in the blending of gasolines.

1.3 Results are reported to the nearest 0.01 % for benzene and 0.1 % for the other aromatics by liquid volume.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 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 its use.

## 2. Practical Application

Instrumentation: [Agilent 5973N MSD system with an Agilent 6890N GC](#)

Column: HP-1 GC Capillary Column 60 m x 0.25 mm x 1  $\mu$ m

Injection Mode: Split/Splitless

Injection Type: Split

Split Ratio: 250:1

Carrier Gases: Helium at 28.5 psi constant pressure mode, 35 cm/sec average linear velocity at 50 °C

Col./Oven Temp: 60 °C at 0 min, to 120 °C at 3 °C/min, then to 250 °C at 10 °C/min

Inlet temperature: 250 °C

Injection volume: 0.2  $\mu$ L

MSD Detector Conditions:

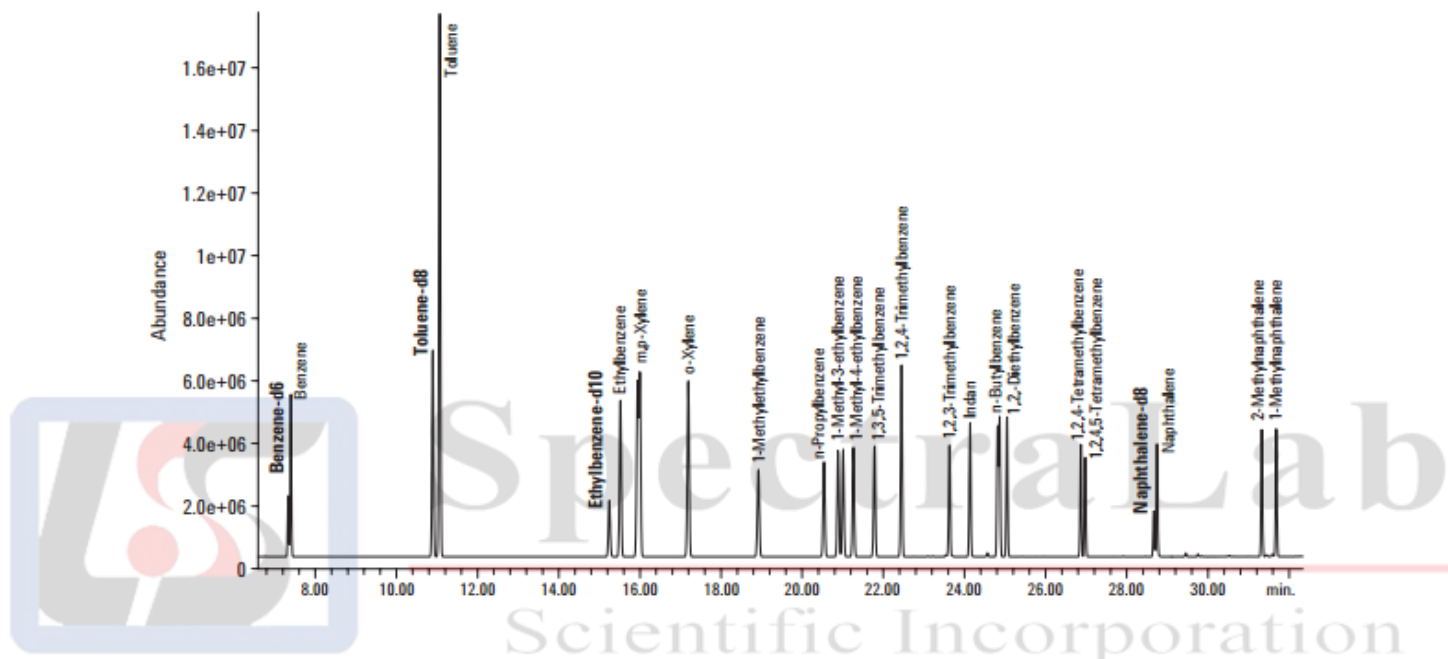
GC/MS Inlet temperature: 280 °C

Ion Source temperature: 250 °C

Quadrupole temperature: 150 °C

Solvent Delay: 3 min  
Electron Energy: 70 eV  
Emission Current: 35 amps  
Scan Range: 45-300 Daltons  
Sampling Rate: 2<sup>3</sup> A/D  
Scan Speed: 2.89 scans/sec  
Autotune: Standard

Standard Injection: Accustandard method D5769 calibration standards



**Figure 3. TIC of a calibration standard containing all 23 analytical compounds and four internal standards for the analysis of aromatics in gasoline.**

### 3. Referenced Documents

ASTM Standards

[D1298](#) Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method

[D4052](#) Test Method for Density, Relative Density, and API Gravity of Liquids by Digital Density Meter

[D4057](#) Practice for Manual Sampling of Petroleum and Petroleum Products

[D4307](#) Practice for Preparation of Liquid Blends for Use as Analytical Standards

<http://www.astm.org/Standards/D5769.htm>

<https://www.chem.agilent.com/Library/applications/5989-0093EN.pdf>