

The *Benzene in Gasoline Regulations* include provisions that allow for alternative sampling or analysis methods to be used by a primary supplier for reporting purposes. A primary supplier proposing to use an equivalent test method for reporting purposes must provide to Environment Canada at least 60 days notice before using the method, a description of the method and evidence that it is equivalent to the reference method. Where the sampling or analysis methods being used at a site have been demonstrated as equivalent methods pursuant to section 6 of the *Benzene in Gasoline Regulations*, those methods can also be used for reporting purposes under the *Sulphur in Gasoline Regulations*. Please refer to both regulations for specific requirements.

The following table summarizes those methods for which equivalency for reporting purposes has been demonstrated in accordance with the *Benzene in Gasoline Regulations*. Primary suppliers proposing to use these methods for reporting under the Regulations may refer to this information in respect to the evidence of equivalency requirements of section 6 of the Regulations. (Note that information in the table regarding equivalent test methods is subject to change and therefore should be verified with Environment Canada prior to such use)

### **Equivalent Methods for Sampling and Analysis under the *Benzene in Gasoline Regulations***

<b>Section 5: Reference Methods Specified in Regulation <sup>1</sup></b>	<b>Section 6: Equivalent Methods</b>	<b>Date of EC's Acknowledgement Letter</b>
<p><b>5(1) Sampling by any ASTM method set out in section 7 of CAN/CGSB 3.5-99</b> <i>Unleaded Automotive Gasoline</i></p> <p><b>Includes:</b></p> <ul style="list-style-type: none"> <li>• <b>ASTM D4177</b> <i>Standard Practice for Automated Sampling of Petroleum and Petroleum Products</i></li> <li>• <b>ASTM D5842</b> <i>Standard Practice for Sampling and Handling of Fuels for Volatility Measurement</i></li> <li>• <b>ASTM D5854</b> <i>Standard Practice for Mixing and Handling of Liquid Samples of Petroleum and Petroleum Products</i></li> <li>• <b>ASTM D2885</b> <i>Standard Test Method for Determination of Octane Number of Spark-Ignition Engine Fuels by On-Line Direct Comparison Technique</i></li> <li>• <b>ASTM D4057</b> <i>Standard Practice for Manual Sampling of Petroleum and Petroleum Products</i></li> </ul>	<p><b>Consumers' Co-operative Refineries Limited In-house method</b> <i>CCRL Modified CGSB Gasoline Batch Sampling Method</i></p> <p><b>Shell In-house Sampling Method</b></p>	<p style="text-align: center;"><b>June 16, 1999</b></p> <p style="text-align: center;"><b>August 28, 2002</b></p>

## Equivalent Methods for Sampling and Analysis under the *Benzene in Gasoline Regulations*

Section 5: Reference Methods Specified in Regulation <sup>1</sup>	Section 6: Equivalent Methods	Date of EC's Acknowledgement Letter
<p><b>5(2) Concentration of benzene and aromatics in gasoline</b></p> <p><b>CAN/CGSB 3.0 No. 14.3-94</b> <i>Standard Test Method for the Identification of Hydrocarbon Components in Automotive Gasoline Using Gas Chromatography</i></p>	<p><b>Imperial Oil In-house Method ECIM 2024</b> <i>Benzene and Total Aromatics in Motor Gasoline (Mogas) by Gas Chromatography</i></p> <p><b>Shell In-house Detailed Hydrocarbon Analysis</b></p>	<p style="text-align: center;">April 28, 1999</p> <p style="text-align: center;">June 14, 1999</p>
<p><b>5(3) Concentration of olefins in gasoline</b></p> <p><b>CAN/CGSB 3.0 No. 14.3-94</b> <i>Standard Test Method for the Identification of Hydrocarbon Components in Automotive Gasoline Using Gas Chromatography</i></p>	N/A	N/A
<p><b>5(4) Concentration of sulphur in gasoline <sup>2</sup></b></p> <p><b>ASTM D5453-00</b> <i>Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence</i></p>	<p><b>ASTM D7039</b> <i>Standard Test Method for Sulfur in Gasoline and Diesel Fuel by Monochromatic Wavelength Dispersive X-ray Fluorescence Spectrometry</i></p> <p><b>Equivalency valid only for sulphur concentrations in the range of 2 to 500 mg/kg</b></p>	October 25, 2005
<p><b>5(5) Vapour pressure of gasoline at 37.8 °C</b></p> <p><b>ASTM D5191-01</b> <i>Standard Test Method for Vapor Pressure of Petroleum Products (Mini Method)</i></p>	<p><b>ASTM D5482</b> <i>Standard Test Method for Vapor Pressure of Petroleum Products (Mini Method- Atmospheric)</i></p> <p><b>Imperial Oil House method Q5482</b></p>	<p style="text-align: center;">November 17, 1998</p> <p style="text-align: center;">March 2001</p>
<p><b>5(6) Evaporative fractions of gasoline @ 93.3 °C (E200) and 148.9 °C (E300)</b></p> <p><b>ASTM D86-01</b> <i>Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure</i></p>	N/A	N/A
<p><b>5(7) Concentration of oxygen in gasoline</b></p> <p><b>CAN/CGSB 3.0 No. 14.3-94</b> <i>Standard Test Method for the Identification of Hydrocarbon Components in Automotive Gasoline Using Gas Chromatography</i></p>	<p><b>ASTM D4815</b> <i>Standard Test Method for Determination of MTBE, ETBE, TAME, DIPE, Amyl Alcohol and C<sub>1</sub> to C<sub>4</sub> Alcohols in Gasoline by Gas Chromatography</i></p>	January 26, 1999

## Equivalent Methods for Sampling and Analysis under the *Benzene in Gasoline Regulations*

Section 5: Reference Methods Specified in Regulation <sup>1</sup>	Section 6: Equivalent Methods	Date of EC's Acknowledgement Letter
<b>5(8) Concentration of benzene and aromatics in oxygenates</b>  <b>CAN/CGSB 3.0 No. 14.3-94</b> <i>Standard Test Method for the Identification of Hydrocarbon Components in Automotive Gasoline Using Gas Chromatography</i>	<b>Imperial Oil In-house Method ECIM 2024</b> <i>Benzene and Total Aromatics in Motor Gasoline (Mogas) by Gas Chromatography</i>	April 28, 1999
<b>5(9) Concentration of benzene and aromatics in butane</b>  <b>ASTM D2163-91</b> <i>Standard Test Method for Analysis of Liquefied Petroleum (LP) Gases and Propane Concentrates by Gas Chromatography</i>	N/A	N/A
<b>5(10) Concentration of sulphur in oxygenates <sup>3</sup></b>  <b>ASTM D5453-00</b> <i>Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence</i>	N/A	N/A
<b>5(11) Concentration of sulphur in butane</b>  <b>ASTM D6667-01</b> <i>Standard Test Method for Determination of Total Volatile Sulfur in Gaseous Hydrocarbons and Liquefied Petroleum Gases by Ultraviolet Fluorescence</i>	N/A	N/A

N/A indicates that Environment Canada has not sent acknowledgment letters recognizing the equivalency for these reference methods.

<sup>1</sup> Subsection 1(2) of the Regulations automatically incorporates amendments to the reference methods.

<sup>2</sup> October 8, 2003 amendments to subsection 5(4) of the Regulations changed the test method for sulphur in gasoline to ASTM D5453-00, *Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence* from CAN/CGSB 3.0 No. 16.1-98, *Sulphur in Gasoline by Energy Dispersive X-Ray Fluorescence Spectrometry (EDXRF)*.

May 26, 1999 amendments to subsection 5(4) of the Regulations changed the test method for sulphur in gasoline to CAN/CGSB 3.0 No. 16.1-98, *Sulphur in Gasoline by Energy Dispersive X-Ray Fluorescence Spectrometry (EDXRF)* from ASTM D2622-94, *Standard Test Method for Sulfur in Petroleum Products by X-Ray Spectrometry*. Prior to the amendments, Environment Canada had sent acknowledgment letters recognizing the equivalency of ASTM D5453 and CGSB 3.0 No. 16.1-98 to ASTM D2622.

<sup>3</sup> October 8, 2003 amendments to subsection 5(10) of the Regulations changed the test method for sulphur in oxygenates to ASTM D5453-00, *Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence* from ASTM D2622-94, *Standard Test Method for Sulfur in Petroleum Products by X-Ray Spectrometry*. Prior to the amendments, Environment Canada had sent acknowledgment letters recognizing the equivalency of CGSB 3.0 No. 16.1-98 *Sulphur in Gasoline by Energy Dispersive X-Ray Fluorescence Spectrometry (EDXRF)* to ASTM D2622.