



Standard Test Method for Bromine Chloride in Liquid Chlorine by High Performance Liquid Chromatography (HPLC)¹

This standard is issued under the fixed designation E2037; 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 method uses high performance liquid chromatography (HPLC) to determine bromine chloride levels in liquid chlorine at the 10 to 1400 $\mu\text{g/g}$ (ppm) range.

1.2 Review the current safety data sheet (SDS) for detailed information concerning toxicity, first aid procedures, and safety precautions.

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

1.4 *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.* Specific hazard statements are given in Section 8.

2. Referenced Documents

2.1 ASTM Standards:²

E180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial and Specialty Chemicals (Withdrawn 2009)³

E806 Test Method for Carbon Tetrachloride and Chloroform in Liquid Chlorine by Direct Injection (Gas Chromatographic Procedure)

2.2 Federal Standards:⁴

CFR 173 Title 49 Transportation; Shippers' General Requirements for Shipments and Packaging, including Sections:

¹ This test method is under the jurisdiction of ASTM Committee E15 on Industrial and Specialty Chemicals and is the direct responsibility of Subcommittee E15.02 on Product Standards.

Current edition approved June 1, 2015. Published June 2015. Originally approved in 1999. Last previous edition approved in 2007 as E2037-07. DOI: 10.1520/E2037-15.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from U.S. Government Publishing Office, 732 N. Capitol St., NW, Washington, DC 20401-0001, <http://www.gpo.gov>.

173.304 Charging of Cylinders with Liquefied Compressed Gas

173.314 Requirements for Compressed Gases in Tank Cars

173.315 Compressed Gases in Cargo Tanks and Portable Tank Containers

2.3 Other Document:⁵

Chlorine Institute Pamphlet No. 1 Chlorine Basics

3. Summary of Test Method

3.1 Weighed samples of chlorine delivered into a cooled graduated centrifuge tube. One mL of cooled HPLC eluent is added before the chlorine is allowed to evaporate. After the chlorine has evaporated the remaining eluent is analyzed directly on the HPLC for bromine chloride concentration.

4. Significance and Use

4.1 This test method was developed for the determination of bromine chloride in liquid chlorine. Bromide is a common contaminant in all salt sources that are used in the production of chlorine. This bromide content of the salt is converted into bromine chloride in the liquid chlorine product. This test method is sensitive enough to measure the levels of bromine chloride observed in normal production chlorine.

5. Interferences

5.1 This test method is selective for bromine chloride. At this time there are no known interference in the materials used in this test method.

5.2 Contact with any metal surfaces should be avoided due to the corrosive nature of the sample.

6. Apparatus

6.1 A high performance liquid chromatograph (HPLC) composed of the following:

6.1.1 *HPLC Pump*, capable of 1 mL/min flow,

6.1.2 *HPLC UV Detector*, capable of operating at 221 nm with a 1-cm cell,

6.1.3 *HPLC Injection Valve*, 20 μL loop, all nonmetal, and

⁵ Available from The Chlorine Institute, 1300 Wilson Blvd., Ste. 525, Arlington, VA 22209, <http://www.chlorineinstitute.org>.