



Designation: E 257 – 98

Standard Test Method for Sulfur in Organic Compounds by Sodium Peroxide Bomb Ignition¹

This standard is issued under the fixed designation E 257; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the determination of sulfur in organic compounds by sodium peroxide bomb ignition. It is intended for application to samples of organic materials containing more than 0.5 % sulfur. The presence of iron may require a separation such as is described.

1.2 *This standard does not purport to address all of the safety problems, 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 hazard statements, see Section 7 and Note 2 and Note 3.

NOTE 1—A test method based on an oxygen bomb combustion of petroleum products is described in Test Method D 129.

1.3 Review the current Material Safety Data Sheets (MSDS) for detailed information concerning toxicity, first aid procedures, and safety precautions

2. Referenced Documents

2.1 ASTM Standards:

D 129 Test Method for Sulfur in Petroleum Products (General Bomb Method)²

D 1193 Specification for Reagent Water³

E 180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial Chemicals⁴

E 200 Practice for Preparation, Standardization, and Storage of Standard Solutions for Chemical Analysis⁴

3. Summary of Test Method

3.1 The sample is oxidized with sodium peroxide in the presence of an accelerator (potassium nitrate) and an oxygen-

bearing compound (sucrose), and the sulfur is converted to sulfate. The contents of the bomb are dissolved in water. The solution is acidified, filtered, and barium chloride solution added to precipitate the sulfate present. The barium sulfate is removed by filtration, ignited to constant weight, and calculated to percentage sulfur.

4. Significance and Use

4.1 This test method may be used to determine the total sulfur content of unknown organic samples or to assay known sulfur containing organic compounds.

4.2 This test method may be used on organic materials in which the complete conversion of sulfur to sulfate can be accomplished by sodium peroxide bomb ignition.

4.3 This test method assumes that sulfate is quantitatively measured by precipitation with barium chloride solution.

5. Apparatus

5.1 *Sodium Peroxide Bomb*, ⁵ flame ignition type, 22-mL capacity. This consists of a 99 % nickel fusion cup, 99 % nickel cap cover, lead gaskets, a bomb body, a screw cap, a wrench, an ignition housing, a bomb socket, glass mixing rod, and a sodium peroxide measuring dipper. A less expensive nickel-plated brass cap cover may be substituted.

5.2 *Safety Shield*—Any heavy-duty commercially available shield should suffice to confine the results of an explosion in the event of bomb body rupture during flame ignition.

5.3 *Burner*, blast-type, using gas and air. For some bomb work, the cheaper bunsen burner has been found to be satisfactory. The final ignition of crucibles may be done with a blast burner, a Meker-type burner, or a muffle furnace operating at approximately 800°C.

5.4 *Capsules*, gelatin, size No. 00, for liquid samples.

5.5 *Crucible*, filtering, 25-mL capacity, porcelain filtering crucible, fine porosity.

¹ This test method is under the jurisdiction of ASTM Committee E15 on Industrial and Specialty Chemicals and is the direct responsibility of Subcommittee E15.01 on General Standards.

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

³ *Annual Book of ASTM Standards*, Vol 11.01.

⁴ *Annual Book of ASTM Standards*, Vol 15.05.

⁵ A suitable ignition bomb and assembly is available from the Parr Instrument Co., 211 Fifty-Third St., Moline, IL. The 22-mL fusion cup is part No. N-200.