



Standard Test Method for Determining Ignition Sensitivity of Materials to Mechanical Impact in Ambient Liquid Oxygen and Pressurized Liquid and Gaseous Oxygen Environments¹

This standard is issued under the fixed designation G 86; 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 method² describes test equipment and techniques to determine the impact sensitivity of materials in oxygen under two different conditions: (1) in ambient pressure liquid oxygen (LOX) or (2) under pressure-controlled conditions in LOX or gaseous oxygen (GOX). It is applicable to materials for use in LOX or GOX systems at pressures from ambient to 68.9 MPa (0 to 10 000 psig). The test method described herein addresses testing with pure oxygen environments; however, other oxygen-enriched fluids may be substituted throughout this document.

1.2 This test method provides a means for ranking nonmetallic materials as defined in Guide G 63 for use in liquid and gaseous oxygen systems and may not be directly applicable to the determination of the sensitivity of the materials in an end-use configuration. This test method may be used to provide batch-to batch acceptance data. This test method may provide a means for evaluating metallic materials in oxygen-enriched atmospheres also; however, Guide 94 should be consulted for preferred testing methods.

1.3 Values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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.* See also Section 9.

2. Referenced Documents

2.1 ASTM Standards:

D 2512 Test Method for Compatibility of Materials with Liquid Oxygen (Impact Sensitivity Threshold and Pass-Fail Techniques)³

¹ This test method is under the jurisdiction of ASTM Committee G 4 on Compatibility and Sensitivity of Materials in Oxygen Enriched Atmospheres and is the direct responsibility of G 4.01 on Test Methods.

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² NASA Handbook 8060.1B, *Pressurized Liquid and Gaseous Oxygen Mechanical Impact Test*, Sept. 1981, pp. 4-72.

³ *Annual Book of ASTM Standards*, Vol. 15.03.

D 1193 Specification for Reagent Water⁴

D 4080 Specification for Trichloroethylene, Technical and Vapor Degreasing⁵

G 63 Guide for Evaluating Nonmetallic Materials for Oxygen Service⁶

G 88 Guide for Designing Systems for Oxygen Service⁶

G 93 Practice for Cleaning Methods for Materials and Equipment Used in Oxygen-Enriched Environments⁶

G 94 Guide for Evaluating Metals for Oxygen Service⁶

2.2 Military Document:

MIL-D-16791 Detergent, General Purpose (Liquid, Non-ionic), Type One⁷

2.3 American Chemical Society:

Trichloroethylene, Reagent Grade⁸

2.4 Compressed Gas Association:

G-4 Oxygen⁹

G-4.1 Cleaning Equipment for Oxygen Service⁹

G-4.3 Oxygen, Gaseous, Type I B⁹

G-4.3 Oxygen, Liquid, Type II B⁹

G-10.1 Nitrogen, Gaseous, Type I B⁹

G-10.1 Nitrogen, Liquid, Type II B⁹

2.5 NASA Standard:

NSS 1740.15 Safety Standard for Oxygen and Oxygen Systems¹⁰

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *GOX, n*—gaseous oxygen.

3.1.2 *LOX, n*—liquid oxygen.

3.1.3 *mechanical impact, n*—a blow delivered by a plummet that has been dropped from a preestablished height onto a striker pin in contact with a sample.

3.1.4 *reaction, n*—a chemical change or transformation in the sample initiated by a mechanical impact.

⁴ *Annual Book of ASTM Standards*, Vol. 11.01.

⁵ *Annual Book of ASTM Standards*, Vol. 15.05.

⁶ *Annual Book of ASTM Standards*, Vol. 14.02.

⁷ Available from Naval Publications and Forms Center, 5801 Tabor Ave., Philadelphia, PA 19120.

⁸ American Chemical Society, 1155 16th St., N.W., Washington, DC 20036.

⁹ Compressed Gas Association, 1725 Jefferson Davis Highway, Arlington, VA 22202-4100.

¹⁰ National Aeronautics and Space Administration, Washington, DC 20546.