



Standard Guide for Evaluating Nonmetallic Materials for Oxygen Service¹

This standard is issued under the fixed designation G 63; 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 guide applies to nonmetallic materials, (hereinafter called materials) under consideration for oxygen or oxygen-enriched fluid service, direct or indirect, as defined below. It is intended for use in selecting materials for applications in connection with the production, storage, transportation, distribution, or use of oxygen. It is concerned primarily with the properties of a material associated with its relative susceptibility to ignition and propagation of combustion; it does not involve mechanical properties, potential toxicity, outgassing, reactions between various materials in the system, functional reliability, or performance characteristics such as aging, shredding, or sloughing of particles, except when these might contribute to an ignition.

1.2 When this document was originally published in 1980, it addressed both metals and nonmetals. Its scope has been narrowed to address only nonmetals and a separate standard Guide G 94 has been developed to address metals.

1.3 *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.*

NOTE 1—The American Society for Testing and Materials takes no position respecting the validity of any evaluation methods asserted in connection with any item mentioned in this guide. Users of this guide are expressly advised that determination of the validity of any such evaluation methods and data and the risk of use of such evaluation methods and data are entirely their own responsibility.

NOTE 2—In evaluating materials, any mixture with oxygen exceeding atmospheric concentration at pressures higher than atmospheric should be evaluated from the hazard point of view for possible significant increase in material combustibility.

2. Referenced Documents

2.1 ASTM Standards:

- D 217 Test Methods for Cone Penetration of Lubricating Grease²
- D 566 Test Method for Dropping Point of Lubricating Grease²

¹ This guide 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 Subcommittee G04.02 on Recommended Practices.

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

- D 1264 Test Method for Water Washout Characteristics of Lubricating Greases²
- D 1743 Test Method for Corrosion Preventive Properties of Lubricating Greases²
- D 1748 Test Method for Rust Protection by Metal Preservatives in the Humidity Cabinet²
- D 2512 Test Method for Compatibility of Materials with Liquid Oxygen (Impact Sensitivity Threshold and Pass-Fail Technique)³
- D 2863 Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)⁴
- D 4809 Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Intermediate Precision Method)⁵
- G 72 Test Method for Autogenous Ignition Temperature of Liquids and Solids in a High-Pressure Oxygen-Enriched Environment⁶
- G 74 Test Method for Ignition Sensitivity of Materials to Gaseous Fluid Impact⁶
- G 86 Test Method for Determining Ignition Sensitivity of Materials to Mechanical Impact in Ambient Liquid Oxygen and Pressurized Liquid and Gaseous Oxygen Environments⁶
- G 88 Guide for Designing Systems for Oxygen Service⁶
- G 93 Practice for Cleaning Methods for Material and Equipment Used in Oxygen-Enriched Environments⁶
- G 94 Guide for Evaluating Metals for Oxygen Service⁶
- G 124 Test Method for Determining the Combustion Behavior of Metallic Materials in Oxygen-Enriched Atmospheres⁶
- G 125 Test Method for Measuring Liquid and Solid Material Fire Limits in Gaseous Oxidants⁶
- G 126 Terminology Relating to the Compatibility and Sensitivity of Materials in Oxygen-Enriched Atmospheres⁶
- G 127 Guide for the Selection of Cleaning Agents for Oxygen Systems⁶
- G 128 Guide for Control of Hazards and Risks in Oxygen-Enriched Systems⁶
- G 145 Guide for Studying Fire Incidents in Oxygen Systems⁶

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

⁴ *Annual Book of ASTM Standards*, Vol 08.02.

⁵ *Annual Book of ASTM Standards*, Vol 05.03.

⁶ *Annual Book of ASTM Standards*, Vol 14.04.