



Standard Guide for the Selection of Cleaning Agents for Oxygen Systems¹

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1. Scope

1.1 The purpose of this guide is to establish a procedure to select cleaning agents, both solvents and water-based detergents, for oxygen service. This includes of laboratory-scale tests for cleaning effectiveness, materials compatibility and oxygen compatibility.

1.2 The effectiveness of a particular cleaning agent depends upon the method by which it is used, the nature and type of the contaminants, and the characteristics of the article being cleaned, such as size, shape, and material. Final evaluation of the cleaning agent should include testing of actual products and production processes.

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.*

2. Referenced Documents

2.1 ASTM Standards:

- D 471 Test Method for Rubber Property—Effect of Liquids²
- D 543 Test Method for Resistance of Plastics to Chemical Reagents³
- D 1193 Specification for Reagent Water⁴
- D 1460 Test Method for Rubber Property—Change in Length During Liquid Immersion²
- D 2512 Test Method for Compatibility of Materials with Liquid Oxygen (Impact Sensitivity Threshold and Pass-Fail Techniques)⁵
- D 2863 Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-like Combustion of Plastics (Oxygen Index)⁶
- D 2934 Practice for Rubber Seals—Compatibility with Service Fluids⁷
- D 4809 Test Method for Heat of Combustion of Liquid

Hydrocarbon Fuels by Bomb Calorimeter (Intermediate Precision Method)⁸

G 5 Reference Test Method for Making Potentiostatic and Potentiodynamic Anodic Polarization Measurements⁹

G 31 Practice for Laboratory Immersion Corrosion Testing of Metals⁹

G 59 Practice for Conducting Potentiodynamic Polarization Resistance Measurements⁹

G 63 Guide for Evaluating Nonmetallic Materials for Oxygen Service¹⁰

G 72 Test Method for Autogenous Ignition Temperature of Liquids and Solids in a High-Pressure Oxygen-Enriched Environment¹⁰

G 74 Test Method for Ignition Sensitivity of Materials to Gaseous Fluid Impact¹⁰

G 93 Practice for Cleaning Methods for Material and Equipment Used in Oxygen-Enriched Environments¹⁰

G 94 Guide for Evaluating Metals for Oxygen Service¹⁰

G 121 Practice for Preparation of Contaminated Test Coupons for the Evaluation of Cleaning Agents¹⁰

G 122 Test Method to Evaluate the Effectiveness of Cleaning Agents¹⁰

2.2 CGA Document:

CGA Pamphlet G-4.1 Cleaning Equipment for Oxygen Service

3. Significance and Use

3.1 The purpose of this guide is to provide information that may be considered when selecting and qualifying a cleaning agent for an oxygen system.

3.2 Insufficient cleanliness can result in the ignition of contaminants or components by a variety of mechanisms. Therefore, an acceptable level of contamination for each condition of use in oxygen service should be defined. The acceptable level of contamination may depend on various factors, such as:

3.2.1 The nature and type of the contaminants,

3.2.2 The location and degree of contamination,

3.2.3 The type of substrate material,

3.2.4 The configuration and end use of the equipment or part to be cleaned, and

¹ This guide is under the jurisdiction of ASTM Committee G4 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 09.01.

³ Annual Book of ASTM Standards, Vol 08.01.

⁴ Annual Book of ASTM Standards, Vol 11.01.

⁵ Annual Book of ASTM Standards, Vol 15.03.

⁶ Annual Book of ASTM Standards, Vol 08.02.

⁷ Annual Book of ASTM Standards, Vol 09.02.

⁸ Annual Book of ASTM Standards, Vol 05.03.

⁹ Annual Book of ASTM Standards, Vol 03.02.

¹⁰ Annual Book of ASTM Standards, Vol 14.04.