



Standard Practice for Cleaning Methods and Cleanliness Levels for Material and Equipment Used in Oxygen-Enriched Environments¹

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1. Scope

1.1 This practice covers the selection of methods and apparatus for cleaning materials and equipment intended for service in oxygen-enriched environments. Contamination problems encountered in the use of enriched air, mixtures of oxygen with other gases, or any other oxidizing gas may be solved by the same cleaning procedures applicable to most metallic and nonmetallic materials and equipment. Cleaning examples for some specific materials, components, and equipment, and the cleaning methods for particular applications, are given in the appendices.

1.2 This practice includes levels of cleanliness used for various applications and the methods used to obtain and verify these levels.

1.3 This practice applies to chemical-, solvent-, and aqueous-based processes.

1.4 This practice describes nonmandatory material for choosing the required levels of cleanliness for systems exposed to oxygen or oxygen-enriched atmospheres.

1.5 This practice proposes a practical range of cleanliness levels that will satisfy most system needs, but it does not deal in quantitative detail with the many conditions that might demand greater cleanliness or that might allow greater contamination levels to exist. Furthermore, it does not propose specific ways to measure or monitor these levels from among the available methods.

1.6 The values stated in both inch-pound and SI units are to be regarded separately as the standard unit. The values given in parentheses are for information only.

1.7 *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.* Federal, state and local safety and disposal regulations concerning the particular hazardous materials, reagents, operations, and equipment being used should be reviewed by the user. The user is encouraged to

obtain the Material Safety Data Sheet (MSDS) from the manufacturer for any material incorporated into a cleaning process. Specific cautions are given in Section 8.

2. Referenced Documents

2.1 ASTM Standards:²

- A 380 Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
- D 1193 Specification for Reagent Water
- E 312 Practice for Description and Selection of Conditions for Photographing Specimens
- E 1235 Test Method for Gravimetric Determination of Non-volatile Residue (NVR) in Environmentally Controlled Areas for Spacecraft
- E 2042 Practice for Cleaning and Maintaining Controlled Areas and Clean Rooms
- F 312 Test Methods for Microscopical Sizing and Counting Particles from Aerospace Fluids on Membrane Filters
- F 331 Test Method for Nonvolatile Residue of Solvent Extract from Aerospace Components (Using Flash Evaporator)
- G 63 Guide for Evaluating Nonmetallic Materials for Oxygen Service
- G 88 Guide for Designing Systems for Oxygen Service
- G 121 Practice for Preparation of Contaminated Test Coupons for the Evaluation of Cleaning Agents
- G 122 Test Method for Evaluating the Effectiveness of Cleaning Agents
- G 125 Test Method for Measuring Liquid and Solid Material Fire Limits in Gaseous Oxidants
- G 127 Guide for the Selection of Cleaning Agents for Oxygen Systems
- G 128 Guide for Control of Hazards and Risks in Oxygen Enriched Systems
- G 131 Practice for Cleaning of Materials and Components By Ultrasonic Techniques
- G 136 Practice for Determination of Soluble Residual Contaminants in Materials by Ultrasonic Extraction

¹ This practice is under the jurisdiction of ASTM Committee G04 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 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.