



Standard Practice for Preparation of Contaminated Test Coupons for the Evaluation of Cleaning Agents¹

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1. Scope

1.1 This practice describes the procedure for the preparation of single- and double-sided contaminated metallic test coupons for the evaluation of cleaning agents. It is applicable for the evaluation of cleaning agents proposed for the cleaning of oxygen-enriched systems and components. It also is applicable to other systems where contamination is a concern.

1.2 Several classes of contaminants most likely to be found in oxygen-enriched systems and components are identified. However, if the user of this practice has identified contaminants not included in these classes, such identified contaminants may be substituted for the preparation of the test coupons.

1.3 Preparation of nonmetallic substrates is not addressed, although similar methodology may be used. Solvent and cleaning agent compatibility with the nonmetallic substrate should be verified prior to the preparation of the test coupons. Typical nonmetallic materials utilized in oxygen systems are contained in Guide G 63.

1.4 *This practice may involve hazardous materials, operations, and equipment. This practice does not purport to address all of the safety concerns associated with its use. It is the responsibility of whomever uses this practice to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 1193 Specification for Reagent Water²

E 1235 Test Method for Gravimetric Determination of Nonvolatile Residue (NVR) in Environmentally Controlled Areas for Spacecraft³

F 303 Practice for Sampling Aerospace Fluids and Components⁴

F 312 Methods for Microscopical Sizing and Counting Par-

ticles from Aerospace Fluids on Membrane Filters⁵

F 324 Test Method for Nonvolatile Residue of Volatile Cleaning Solvents Using the Solvent Purity Meter⁴

F 331 Test Method for Nonvolatile Residue of Halogenated Solvent Extract from Aerospace Components (Using Rotary Flash Evaporator)⁴

G 63 Guide for Evaluating Nonmetallic Materials for Oxygen Service⁵

G 94 Guide for Evaluating Metals for Oxygen Service⁵

2.2 ANSI:

B46.1 Surface Texture (Surface Roughness, Waviness, and Lay)

3. Terminology

3.1 Definitions:

3.1.1 *contaminant, n*—unwanted molecular and particulate matter that could affect or degrade the performance of the components upon which they reside.

3.1.2 *contamination, n*—a process of contaminating.

3.1.3 *surface roughness, R_a, n*—the arithmetic average deviation of the surface profile from the centerline, normally reported in micrometres.

3.1.4 *nonvolatile residue (NVR), n*—residual molecular and particulate matter remaining following the filtration of a solvent containing contaminants and evaporation of the solvent at a specified temperature.

3.1.5 *particle (particulate contaminant), n*—a piece of matter in a solid state with observable length, width, and thickness.

3.1.5.1 *Discussion*—The size of a particle is usually defined by its great dimension and is specified in micrometres.

3.1.6 *molecular contaminant (nonparticulate contamination), n*—the molecular contaminant may be in a gaseous, liquid, or solid state.

3.1.6.1 *Discussion*—It may be uniformly or nonuniformly distributed, or be in the form of droplets. Molecular contaminants account for most of the NVR.

3.1.7 *blank, n*—the contamination level of the fluid when the test coupon is omitted.

3.1.7.1 *Discussion*—Sometimes referred to as “background” level.

3.1.8 *control coupon (witness coupon), n*—a coupon made from the same material as the test coupons, but in this test

¹ This practice 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 11.01.

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

⁴ *Annual Book of ASTM Standards*, Vol 10.05.

⁵ *Annual Book of ASTM Standards*, Vol 14.04.