



Designation: G 120 – 95

Standard Practice for Determination of Soluble Residual Contamination in Materials and Components by Soxhlet Extraction¹

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1. Scope

1.1 This practice describes a procedure for the determination of residual contamination in systems and components requiring a high level of cleanliness, such as oxygen, by Soxhlet extraction.

1.2 This practice may be used for extracting nonvolatile and semivolatile residues from solids such as new and used gloves, new and used wipes, contaminated test specimens or control coupons, small pieces of hardware, component softgoods, etc. When used with proposed cleaning materials (wipes, gloves, etc.), this practice may be used to determine the potential of the proposed solvent to extract contaminants (plasticizers, residual detergents, brighteners, etc.) and deposit them on the surface being cleaned.

1.3 This practice is not suitable for the evaluation of particulate contamination.

1.4 The values stated in SI units are standard. Values in parentheses are for information only.

1.5 *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 1193 Specification for Reagent Water²

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

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 93 Practice for Cleaning Methods and Equipment Used in

Oxygen-Enriched Environments⁵

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

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

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

3.1.5 *molecular contaminant (non-particulate contamination), n*—the molecular contaminant may be in a gaseous, liquid, or solid state.

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

3.1.6 *control coupon (witness coupon), n*—a coupon made from the same material and prepared in exactly the same way as the test coupons, which is used to verify the validity of the method or part thereof.

3.1.6.1 *Discussion*—In this test method, the control coupon will be contaminated in the same manner as the test coupons and will be subjected to the identical extraction procedure.

4. Summary of Practice

4.1 The sample is placed in an extraction thimble or between two plugs of glass wool and extracted using an appropriate solvent (see Practice G 93 for recommendations) in a Soxhlet extractor. The solvent is brought to the boiling point; the pure solvent vapors travel to the condenser where they condense and drip into the thimble. When the liquid level in the thimble reaches the top of the Soxhlet siphon, the solvent and extracted soluble contaminant are siphoned back into the boiler. This process is allowed to continue for several hours. The solvent and extract are then concentrated or dried for analysis.

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 G04.01 on Test Methods.

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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 14.02.