



Standard Practice for Determination of Soluble Residual Contaminants in Materials by Ultrasonic Extraction¹

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1. Scope

1.1 This practice may be used to extract nonvolatile and semivolatile residues from materials such as new and used gloves, new and used wipes, component soft goods, and so forth. When used with proposed cleaning materials (wipes, gloves, and so forth), this practice may be used to determine the potential of the proposed solvent or other fluids to extract contaminants (plasticizers, residual detergents, brighteners, and so forth.) and deposit them on the surface being cleaned.

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

1.3 The values stated in SI units are to be regarded standard. No other units of measurement are included in this standard.

1.4 *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:²

D1193 Specification for Reagent Water

E1235 Test Method for Gravimetric Determination of Nonvolatile Residue (NVR) in Environmentally Controlled Areas for Spacecraft

F324 Test Method for Nonvolatile Residue of Volatile Cleaning Solvents Using the Solvent Purity Meter (Withdrawn 1987)³

F331 Test Method for Nonvolatile Residue of Solvent Extract from Aerospace Components (Using Flash Evaporator)

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.

³ The last approved version of this historical standard is referenced on www.astm.org.

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

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

3.1.2 *contaminate*, *v*—a process of contaminating.

3.1.3 *nonvolatile residue (NVR)*, *n*—residual molecular and particulate matter remaining following the filtration and controlled evaporation of liquid containing contaminants.

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*—A molecular contaminant may be uniformly or nonuniformly distributed, or be in the form of droplets. Molecular contaminants account for most of the NVR.

3.1.6 *degas*, *v*—the process of removing gases from a liquid.

4. Summary of Practice

4.1 A material, glove, hand wipe, and so forth, is placed in a container containing the test fluid. This container is then placed in an ultrasonic cleaning bath and treated for a given period of time at the recommended temperature for the test fluid. This results in either a solution if the contaminant is soluble in the test fluid or an emulsion if the contaminant is not soluble in the test fluid. The test fluid may then be analyzed for nonvolatile residue that was extracted from the test specimen.

4.1.1 In the case of aqueous-based agents, the material may be treated in accordance with Specification **D1193** Type II water or Type II water containing an extracting agent.

4.1.1.1 When Type II water is used, the water and material may be analyzed without further treatment. Typical methods of analysis may include weighing the material before and after treatment or more sophisticated analytical procedures such as total carbon (TC) or high-pressure liquid chromatography.

4.1.1.2 When cleaning agents are used, the materials are rinsed with Type II water after the removal from the cleaning