



Designation: E 1235 – 95^{ε1}

Standard Test Method for Gravimetric Determination of Nonvolatile Residue (NVR) in Environmentally Controlled Areas for Spacecraft [Metric]¹

This standard is issued under the fixed designation E 1235; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

^{ε1} NOTE—To bring Subcommittee E21.05's existing standards into compliance with Part H of ASTM's Form and Style Manual, the M designation has been editorially removed in July 2000.

1. Scope

1.1 This test method covers the determination of nonvolatile residue (NVR) fallout in environmentally controlled areas used for the assembly, testing, and processing of spacecraft.

1.2 The NVR of interest is that which is deposited on sampling plate surfaces at room temperature; it is left to the user to infer the relationship between the NVR found on the sampling plate surface and that found on any other surfaces.

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.*

1.4 The values stated in SI units are to be regarded as the standard.

2. Referenced Documents

2.1 ASTM Standards:

D 1193 Specification for Reagent Water²

E 1234 Practice for Handling, Transporting, and Installing Nonvolatile Residue (NVR) Sample Plates Used in Environmentally Controlled Areas for Spacecraft³

F 50 Practice for Continuous Sizing and Counting of Airborne Particles in Dust-Controlled Areas and Clean Rooms Using Instruments Capable of Detecting Single Sub-Micrometre and Larger Particles³

2.2 U.S. Federal Standard:⁴

FED-STD-209 Airborne Particulate Cleanliness Classes in Cleanrooms and Clean Zones

2.3 U.S. Department of Defense Standards:⁴

MIL-F-51068F Filters, Particulate (High-Efficiency Fire Resistant)

MIL-P-27401 Propellant Pressurizing Agent, Nitrogen

MIL-STD-1246 Product Cleanliness Levels and Contamination Control Program

T.O. 00-25-203, 1 Dec. 1972, Change 15, 24 Oct. 1992, Contamination Control of Aerospace Facilities, U.S. Air Force

2.4 Institute of Environmental Sciences:⁵

IES-RP-CC001.3 HEPA and ULPA Filters

IES-RP-CC006.2 Testing Cleanrooms

IES-RP-CC016.1 The Rate of Deposition of Nonvolatile Residue in Cleanrooms

2.5 American National Standards Institute:

ANSI/ASME B46.1-1985 Surface Texture (Surface Roughness, Waviness, and Lay)⁶

2.6 Other:

Industrial Ventilation, A Manual of Recommended Practice, Latest Edition⁷

3. Terminology

3.1 Definitions:

3.1.1 *air cleanliness class (airborne particulate cleanliness class), n*—the level of cleanliness specified by the maximum allowable number of particles per cubic meter (cubic foot) of air as defined in FED-STD-209.

3.1.2 *bumping, n*—uneven boiling of a liquid caused by irregular rapid escape of large bubbles of highly volatile components as the liquid mixture is heated or exposed to vacuum.

3.1.3 *clean area, n*—a general term that includes cleanrooms, controlled areas, good housekeeping areas, and other areas that have contamination control by physical design and specified operating procedures.

3.1.4 *clean zone, n*—a defined space in which the contamination is controlled to meet specified cleanliness levels.

3.1.4.1 *Discussion*—The clean zone may be open or enclosed and may or may not be located within a cleanroom.

¹ This test method is under the jurisdiction of ASTM Committee E-21 on Space Simulation and Applications of Space Technology and is the responsibility of Subcommittee E21.05 on Contamination.

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² *Annual Book of ASTM Standards*, Vol 11.01.

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

⁴ Available from Standardization Documents Order Desk, Bldg. 4, Section D, 700 Robbins Ave., Philadelphia, PA, 19111-5094, Attn.: NPODS.

⁵ Available from Institute of Environmental Sciences, 940 E. Northwest Highway, Mount Prospect, IL 60056.

⁶ Available from American Society of Mechanical Engineers, United Engineering Center, 345 E. 47th St., New York, NY 10017.

⁷ Available from Committee on Industrial Ventilation, PO Box 16153, Lansing, MI 48901, American Conference of Government and Industrial Hygienists.