



Designation: E 1548 – 93 (Reapproved 1998)

Standard Practice for Preparation of Aerospace Contamination Control Plans¹

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1. Scope

1.1 This practice is intended to assist in the preparation of formal plans for contamination control, especially of aerospace critical surfaces. Requirements may be established at the systems level, either by the customer or the systems integrator, or at the subsystem level. Subsystem requirements may be imposed by the responsible subsystem supplier or they may be flowed down from the systems organization (4.7). The extent of detail and level of cleanliness required can vary with the particular application and type of hardware being built, but all aspects of contamination control must be included in a final plan. Therefore, each of the following elements must be considered for inclusion in a contamination control plan (CCP):

1.1.1 *Cleanliness requirements* for deliverable hardware addressing particulate, molecular, or biological contaminants or combination thereof. Specify contamination limits and any budget allocations.

1.1.2 *Implementation plans* to achieve, verify, and maintain the specified cleanliness requirements. Specify material and process controls, cleaning techniques, verification tests, protection and prevention plans, transportation controls, and corrective action for discrepancies.

1.1.3 *Environmental controls* including clean facilities to be used, facility maintenance, and monitoring schedule.

1.1.4 *Personnel and operational controls* including operating procedures, restrictions, training, motivation, and organizational responsibilities including the organization or individual for implementation and verification of the CCP.

2. Referenced Documents

2.1 ASTM Standards:

E 595 Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment²

E 1216 Practice for Sampling for Surface Particulate Contamination by Tape Lift²

E 1235M Test Method for Gravimetric Determination of Nonvolatile Residue (NVR) in Environmentally Controlled Areas for Spacecraft²

E 1549M Specification for ESD Controlled Garments Required in Cleanrooms and Controlled Environments for Spacecraft for Non-Hazardous and Hazardous Operations²

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 Particles²

F 303 Practices for Sampling Aerospace Fluids from Components²

F 312 Methods for Microscopical Sizing and Counting Particles from Aerospace Fluids on Membrane Filters³

2.2 Government Standards:

FED-STD-209 Airborne Particulate Cleanliness Classes in Cleanrooms and Clean Zones⁴

MIL-STD-1246 Product Cleanliness Levels and Contamination Control Program⁴

USAF Tech Order 00-25-203 Contamination Control of Aerospace Facilities, U.S. Air Force⁴

NOTE 1—The Institute of Environmental Sciences has several Recommended Practices which may also be useful in the preparation of a CCP.

3. Terminology

3.1 Definitions:

3.1.1 *bidirectional reflectance distribution function (BRDF)*—the scattering properties of light reflected off surfaces, expressed as the ratio of differential outputs of radiance divided by differential inputs of radiance. Surface contaminants scatter the incident radiation in all directions and with variable intensities; BRDF is a method to quantify the spatial distribution of the scattered energy.

3.1.2 *biological contamination*—living material such as algae, bacteria, fungus, etc. which is capable of reproducing, thus being an increasing contaminant source.

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

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² *Annual Book of ASTM Standards*, Vol 15.03.

³ *Annual Book of ASTM Standards*, Vol 14.02.

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