

*Institute of Environmental Sciences and Technology*

IEST-RP-CC031.3

Contamination Control Division  
Recommended Practice 031.3

# **Method for Characterizing Outgassed Organic Compounds from Cleanroom Materials and Components**



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# Method for Characterizing Outgassed Organic Compounds from Cleanroom Materials and Components

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### 1 SCOPE AND LIMITATIONS

#### 1.1 Scope

This Recommended Practice (RP) describes a test method appropriate for semiquantitative determination and qualitative characterization of organic compounds outgassed from materials or components exposed to air or gases in cleanrooms or other controlled environments. This RP specifies four outgassing temperatures—50 °C (122 °F), 75 °C (167 °F), 100 °C (212 °F), and 150 °C (302 °F)—to baseline cleanroom materials and components. The RP may become the basis of an agreement between customer and supplier in the specification, procurement, and certification of materials. This RP can also be applied for other materials where outgassing is a concern.

#### 1.2 Limitations

The method described in this RP is designed to screen primarily cleanroom materials but can also be applied to materials used in other controlled environments for identification of outgassed compounds detectable by dynamic headspace gas chromatography-mass spectrometry (GC-MS). The method described is not designed to provide absolute quantitative results. Information on the composition of the materials under test may be useful in selecting the appropriate outgassing temperature to use.

### 2 REFERENCES

Due to the pioneering nature of this document, normative references are not available. Users are encouraged to investigate the possibility of applying other RP documents.

### 3 TERMS AND DEFINITIONS

#### **analytical sample**

A portion of material or component, analyzed.

#### **cleanroom components**

The individual fabricated parts that may consist of one or more material types and are used in areas subject to contamination control specifications.

Example: filter assemblies

#### **contamination-free aluminum foil**

An aluminum foil free of organic contamination within the detection limit of a chosen test method.

#### **dynamic headspace analysis**

The process of thermal desorption of a sample in a flowing gas stream and collecting the outgassing compounds for subsequent analysis.

#### **gas chromatography-mass spectrometry (GC-MS)**

A single tool for the identification and quantitation of volatile and semivolatile organic compounds in complex mixtures.

#### **gate oxide integrity (GOI)**

A measure of the reliability of a thin gate oxide that controls the switching of a transistor.

#### **integrated circuit**

An interconnected array of discrete devices (transistors, diodes, and capacitors) contained on a single semiconducting substrate to form a complete circuit or multiple circuits.

#### **n-dope**

To introduce an impurity (dopant) into the crystal lattice of a semiconductor to modify its electronic properties; for example, adding phosphorous to silicon to make the material n-type.