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

Arlington Place One
2340 S. Arlington Heights Road, Suite 100
Arlington Heights, IL 60005-4516
Phone: (847) 981-0100 • Fax: (847) 981-4130
E-mail: information@iest.org • Web: www.iest.org

This Recommended Practice is published by the INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY to advance the technical and engineering sciences. Its use is entirely voluntary, and determination of its applicability and suitability for any particular use is solely the responsibility of the user.

This Recommended Practice was prepared by and is under the jurisdiction of Working Group 031 of the IEST Contamination Control Division.

First printing, September 2011

ISBN 978-09841330-9-3

PROPOSAL FOR IMPROVEMENT: The Working Groups of the INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY are continually working on improvements to their Recommended Practices and Reference Documents. Suggestions from those who use these documents are welcome. If you have a suggestion regarding this document, please use the online Proposal for Improvement form found on the IEST website at www.iest.org/proposal/form.html.

INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY
Arlington Place One
2340 S. Arlington Heights Road, Suite 100
Arlington Heights, IL 60005-4516
Phone: (847) 981-0100 • Fax: (847) 981-4130
E-mail: iest@iest.org • Web: www.iest.org

Method for Characterizing Outgassed Organic Compounds from Cleanroom Materials and Components

IEST-RP-CC031.3

CONTENTS

SECTION

APPENDIX

Institute of Environmental Sciences and Technology
Contamination Control Division
Recommended Practice 031.3

Method for Characterizing Outgassed Organic Compounds from Cleanroom Materials and Components

IEST-RP-CC031.3

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.