



# PUBLICLY AVAILABLE SPECIFICATION

## PRE-STANDARD

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Definition of “Low-Halogen” for electronic products

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### DEFINITION OF “LOW-HALOGEN” FOR ELECTRONIC PRODUCTS

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## INTRODUCTION

Halogenated polymeric materials and compounds are used in various engineering applications, including flame retardation. Several decades of use have proven these materials and compounds to be reliable and cost-effective. The electronic industry seeks to reduce the overall environmental impact of our products by working to develop reliable and cost-effective alternatives to these materials and compounds. However, the timetable for broad-scale adoption of low-halogen materials is difficult to predict, because applications such as complex multilayer PCBs and large molded integrated circuits will require further investigation and qualification of new materials.

The halogen group contains fluorine, chlorine, bromine, iodine, and astatine; however, this document will use the term “low-halogen” to refer only to bromine and chlorine to be consistent with the International Electrotechnical Commission (IEC) and IPC definitions of “halogen-free” (see Clause 2). Refer to Annex C for further explanation for exclusion of astatine, iodine and fluorine. In this document, the term “low-halogen” is used to identify a material that contains low concentrations of bromine and chlorine from brominated and chlorinated flame retardants (BFRs, CFRs) and polyvinyl chloride (PVC).

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## DEFINITION OF “LOW-HALOGEN” FOR ELECTRONIC PRODUCTS

### 1 Scope

This document provides terms and definitions for “low-halogen” electronic products that have the potential to contain the halogens bromine (Br) and chlorine (Cl) from the use of BFRs, CFRs, and PVC, and recommends methods for marking and labeling. This standard may be applied to all nonmetallic and nonceramic materials within electronic products including, but not limited to, materials in the following components commonly found in electronic products:

- 1) transistors, integrated circuits, modules consisting mainly of integrated circuits (e.g. multichip, hybrid), and memory modules;
- 2) resistors, capacitors, relays, inductors, and connectors;
- 3) printed circuit board assemblies (PCBAs) including components,
- 4) plastic in cables, sockets, switches and external wiring;
- 5) mechanical plastics (enclosures, fans, etc.);
- 6) films, tapes, inks, and adhesives;
- 7) soldering flux residues (when present);
- 8) sound, shock, and vibration dampeners (foams, resins, etc.).

This document establishes the maximum concentration level for the halogens bromine (Br) and chlorine (Cl) from the use of BFRs, CFRs, and PVC. While the halogen group contains fluorine, chlorine, bromine, iodine, and astatine, this document will use the term “low-halogen” to refer only to bromine and chlorine. Refer to Annex C for further explanation for exclusion of astatine, iodine and fluorine.

NOTE The definition of “low-halogen” is different from the term “halogen-free” as described in IEC 61249-2 sectional standard related to non-halogenated base material and as defined in the J-STD-609A marking and labeling standard; standards that pertain only to printed boards and are currently in use in the electronics and solid-state industries.

BFRs, CFRs, and PVC in materials that may be used during processing, in product delivery systems, or in packaging, but do not remain within the final product are not included in the scope of this document.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 62321: 2008, *Electrotechnical products – Determination of levels of six regulated substances (lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl ethers)*

EN 14582:2007-06, *Characterization of waste – Halogen and sulphur content – Oxygen combustion in closed systems and determination methods*

IEC 61249-2 (all parts), *Materials for printed boards and other interconnecting structures*

IPC-T-50, *Terms and Definitions for Interconnecting and Packaging Electronic Circuits*

IPC-4101, *Specification for Base Materials for Rigid and Multilayer Printed Boards*

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IPC/JEDEC J-STD-609, *Marking and Labeling of Components, PCBs and PCBAs to Identify Lead (Pb), Pb-free and Other Attributes*

ISO 11469:2000, *Plastics – Generic identification and marking of plastics products*

ISO 1043-4:1998, *Plastics – Symbols and abbreviated terms – Part 4: Flame retardants*

JESD88, *JEDEC Dictionary of Terms for Solid-state Technology*

JPCA–ES–01, *Test Method for Halogen Free Materials*

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