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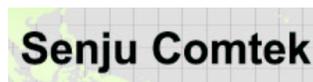
iNEMI Position Statement on the Definition of “Low-Halogen” Electronics (BFR/CFR/PVC-Free)

The trend toward low-halogen materials in electronic products has created a need for supply chain alignment on the maximum levels of bromine (Br) and chlorine (Cl) allowed in electronic materials and systems that are identified as “low halogen” (or “halogen-free” and/or “BFR/CFR/PVC-free”). A common definition of maximum halogen levels for low-halogen components and materials will enable the development of compliant material sets as well as support the various technology development projects that are occurring within iNEMI and other industry initiatives.

This position statement defines maximum parts per million of bromine (Br) and chlorine (Cl) to be considered “BFR/CFR/PVC-free” when used in flame retardants and PVC in electronic components and assemblies. (Brominated and chlorinated compounds are the halogens that most commonly appear in electronic products, and are the most likely to be used to achieve flame retardancy.) Although the halogens fluorine (F) and iodine (I) may be present in some electronics, they are not included in the scope of this position statement. The halogen astatine (At) is also excluded as it is radioactive and has no functional use in electronics.

This position statement also defines acceptable levels of PVC, a chlorinated polymer that is commonly used as an insulation material for electronic components and assemblies, particularly cables and wires.

Materials used in process (such as soldering fluxes), product delivery systems, and packaging are not within the scope of this definition.



iNEMI and the member companies listed below support the following definition of “low halogen” (BFR/CFR/PVC-free) electronics.

A **component*** must meet all of the following requirements to be Low Halogen (“BFR/CFR/PVC-Free”):

- 1) All printed board (PB) and substrate laminates shall meet Br and Cl requirements for low halogen as defined in IEC 61249-2-21 and IPC-4101B per 1a below (refer to IEC and IPC standards for actual requirements).
 - 1a) Non-halogenated epoxide with a glass transition temperature of 120°C minimum. The maximum total halogens contained in the resin plus reinforcement matrix is 1500 ppm with a maximum chlorine of 900 ppm and maximum bromine being 900 ppm.
- 2) For components* other than printed board and substrate laminates:
Each plastic within the component contains < 1000 ppm (0.1%) of bromine [if the Br source is from BFRs] and < 1000 ppm (0.1%) of chlorine [if the Cl source is from CFRs or PVC or PVC copolymers].

** Other than those terms listed below, the definitions of terms used in this position statement, such as “component,” are in accordance with IPC -T-50 and/or JESD88.*

Plastic

Any of a group of synthetic or natural organic compounds produced by polymerization, optionally combined with additives (organic or inorganic fillers, modifiers, etc.) into a homogeneous material capable of being molded, extruded, coated, printed or cast into various shapes and films.

PVC copolymer

Copolymers are polymers derived from two or more monomers. Highly chlorinated PVC copolymers, block polymers, and congeners are not considered acceptable alternatives to PVC for low-halogen components.

iNEMI member companies supporting this definition:

Cisco
Dell Inc.
Doosan Corporation
HP
Intel Corporation

Lenovo
Nan Ya Plastics Corporation
Senju Comtek Corp.
Sun Microsystems, Inc.
Tyco Electronics Ltd.