



## Halogen-Free Position Statement

**Bel Fuse** defines a “low-halogen” or “halogen-free” device per the iNEMI definition as indicated below. This position statement defines maximum PPM of bromine (Br) and chlorine (Cl) to be considered “BFR/CFR/PVC-free or halogen-free” when used in flame retardants and PVC in electronic components and assemblies.

A **device** must meet all of the following requirements to be considered halogen-free:

- 1) All printed board and substrate laminates shall meet Br and Cl requirements for low halogens as defined in IEC 61249-2-21:

**900 PPM maximum chlorine**

**900 PPM maximum bromine**

**1500 PPM maximum total**

and IPC-4101B per 1a) below.

- 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 of **900 PPM**.
- 2) For components other than printed board and substrate laminates:  
Each plastic within the component must contain **< 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.

**Plastic** is defined as 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.

Although the halogens fluorine (F) and iodine (I) may be present in some electronics, they are not included in this position statement. The halogen astatine (At) is also excluded as it is radioactive and has no functional use in electronics. Additionally, materials used in process (such as soldering fluxes), product delivery systems, and packaging are not considered within the scope of this definition.