

E-spec

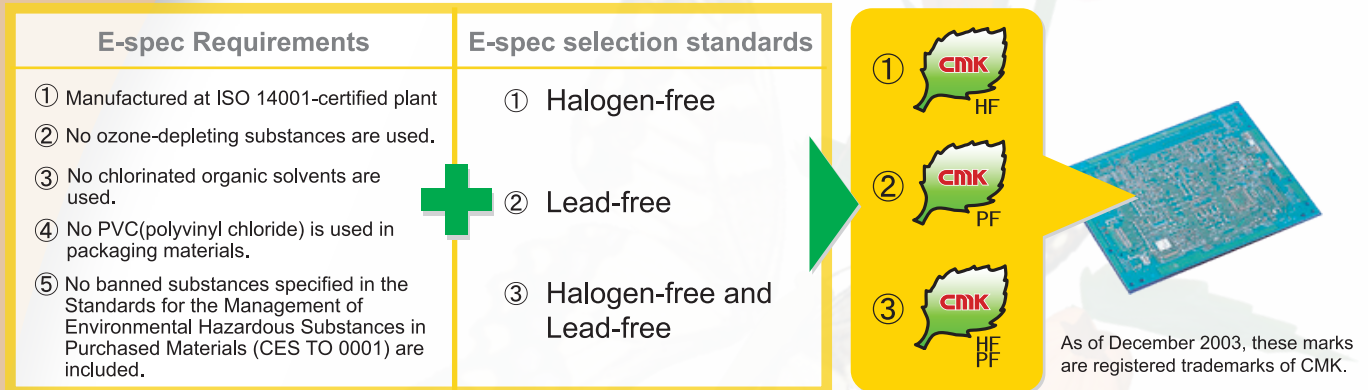


<http://www.cmk-corp.com>

CMK's E-spec products meet the original environmental standards established by CMK. CMK thus contributes to the reduction of environmental load through the supply of eco-products.

Concept of E-spec Standards

The E-spec standards consist of E-spec requirements and selection standards. In compliance with customer wishes, products meeting requirements may display the E-spec marks.



Concept of E-spec Standards

1. Halogen-free products



Because the PWBs we produce must be flame-resistant, they contain halogenated substances (brominated flame retardants). There is some concern that these flame retardants may release dioxins when the PWBs are incinerated. We can prevent the release of dioxins by switching to halogen-free base materials that use non-halogen-derived flame retardants. Note that we do not use brominated flame retardants such as PBB or PBDE, which are banned under the RoHS Directive; our products have always been free of these substances.

JPCA Halogen-free Standards

Chlorine content	0.09wt or less
Bromine content	0.09wt or less
Combined chlorine and bromine content	0.15wt or less

Halogen content of halogen-free products

FR-1 Grade	0.15wt or less
CEM-3 Grade	0.15wt or less
FR-4 Grade	0.15wt or less

By using base materials that meet the JPCA halogen-free standards, we reduced the halogen content of products to 1/60 (compared to previous products).

2. Lead-free products



PWBs with surface finishing incorporating lead solder (from a solder labeler) are subject to the RoHS Directive. If PWBs containing lead are disposed of inappropriately and subjected to acid rain, the lead can leach out and pollute the soil or groundwater. As a superior alternative, CMK recommends switching to surface finishing with water-soluble preflux.

(1) PWB Heat Resistance in Products with Lead-Free Packaging*1 (Reflow Heat Resistance)

NEMA Grade	Peak temperature	Reflow temperature/Reflow time	Reflow cycles
CEM-3	250 °C	230°C higher/50±5 seconds	2
FR-4	260 °C	230°C higher/60±5 seconds	2

*1: Assessed in accordance with CMK heat resistance standards
 Fluges assume CMK standard test patterns, thickness of 1.6t, drying conditions, and hot air reflow chamber conditions.

(2) Lead-free surface finishing

(Relative comparison based on internal data and market surveys)

Surface finishing		Wettability	Thermal resistance	Smoothness	Environmental load	Cost	Storage limit
Heat-resistant preflux	Water soluble	○	○	◎	◎	○	3 months
	Resin	○	○	○	△	○	3 months
Gold plating		○	◎	◎	○	△	6 months
Lead-free solder labeler (Sn-3Ag-0.5Cu)		◎	◎	×	○	×	6 months

CMK recommended VOC-free