Lead-Free/RoHS Compatible Materials

Lead is used in solder paste and wave solder. Lead is also used as the most common surface finish on electronic components and as a PCB surface finish called hot air solder level (HASL). Several countries have enacted legislation that will restrict the use of these materials starting August 2004 and a complete ban by July 2006.This is known as the RoHS European Directive. Several countries have indicated that they will enact legislation that will reduce use of the following specific compounds:

- Brominated compounds, PBB (PolyBrominated Biphenyl) and PBDE (PolyBrominated Diphenyl Ether)
- Cadmium
- Mercury
- Hexavalent Chromium
- Lead

They have been deemed as hazardous materials because of the dioxins that are emitted as combustion gas during incineration. The standard FR-4 materials that are used by HI-Tech Corp. do not contain PBB or PBDE. Thus the existing standard materials are compliant with this new regulation.

There are two PCB impacts. The first is the surface finish. The second is a 30 - 40° C higher assembly reflow and rework temperature. There are several high volume and reliable lead free surface finishes currently available. It is too early to assess which finishes will dominate. Contact us for current information. All of the existing soldermask and legend inks are compatible with the elevated reflow environments.

The degradation temperature of the PCB material must be elevated and the thermal expansion properties must be enhanced to ensure the same performance and reliability as the current material. Many materials may not reliable survive the elevated assembly temperatures. These include cured FR-4 materials. Caution should be exercised when switching to lead-free materials because in some instances the dielectric constants may change which could have an effect on the electrical performance of the circuit.