

RoHS

The Restriction of Hazardous Substance (RoHS) directive was adopted by the European Union in February of 2003 and went into effect in July of 2006. Six substances are deemed hazardous by this directive and their use in electrical and electronic devices is banned for most applications. Europe is joined in its efforts by several other nations and in the United States some states have enacted laws with similar restrictions. The impact on the electronics manufacturing community has been huge. Companies that do business internationally have met these requirements for several years but many companies with national markets are only now beginning to make the necessary changes. Horizon Printed Circuits employs experts who can help you to meet these requirements.

RoHS has an impact on the fabrication of the circuit board, the components that are used and the interconnect technology used to assemble them. Wrong choices in any of these areas could result in non-compliance, circuit failures, or poor durability.

When writing specifications for fabricating boards that must meet RoHS standards there are two primary considerations; the substrate must be able to withstand the increased temperatures used to process lead-free boards and the pad treatment must be compliant.

Boards are often subjected to several iterations of reflow temperatures during the manufacturing process and some substandard boards will delaminate during this process. Check with the board fabricator to find out the maximum number of passes their boards can be subjected to at lead-free temperatures. Nine passes is a good number to look for.

A few years ago nearly all boards had pads that had HASL treatment. HASL stands for Hot Air Solder Levelled which means that solder is waved onto the board and then forced hot air blows the majority of it off. HASL leaves a coating of solder to protect the copper pads from corrosion. This process has become much less popular partly because the solder on the pads has a raised pillowed effect preventing many fine pitch components from sitting correctly on the pads prior to reflow. The other reason that this technology has been slipping in popularity is that most boards with HASL pad finishes have lead in the solder that is used for the finishing and won't meet RoHS standards. More modern choices for plating pads are immersion gold (enig), immersion silver, and OSP. These technologies provide a flat surface for the component to rest on and meet RoHS requirements. Each of these finishes has its own set of strengths and weaknesses and you should make your choice cautiously.



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Components which are used in RoHS compliant circuit boards must be specifically stated, by the manufacturer, as "RoHS" compliant. These components may differ from non-RoHS parts in several ways. The biggest difference is likely to be the components ability to withstand the higher reflow temperatures used to solder the components onto the circuit board. Other differences include different plating for contacts and composition differences to remove traces of mercury and other banned substances.

Non-RoHS parts may be used in leaded applications but the circuit boards will not meet RoHS standards. Using mixed technology can often create manufacturing problems and should be avoided if possible. Some parts are less likely to create problems than others. RoHS BGA's can never be used on boards that are assembled with a solder containing lead. The balls on the bottom of the component are lead-free and require reflow temperatures that are higher than leaded reflow temperatures in order to collapse as designed.

The selection of RoHS parts to replace non-compliant parts must be done carefully. Component manufacturers often make components, one compliant and the other non-compliant, that have the same part number but a different suffix. This gives the impression that the two parts will work identically but this often isn't the case. It is very common to find small, unexpected differences that impact the operation of an existing design.

Horizon Printed Circuits can help you find RoHS compliant components that work in your design. We can provide you with engineering data indicating the performance of the suggested components in your application. Contact us and we will explain how we can help you to convert your existing design to a RoHS compliant design.

