

对于电子业，通往RoHS2006年7月前在欧盟销售的全部产品除铅截止期的道路上，仍面临很多挑战。RoHS法规的正式名称为“在电气和电子设备中某些危险物质的使用限制”，对整个电子业供应链都会产生影响。事实上，整个供应链都已经感受到这种影响，有些公司已经为此努力准备了多年。加利福尼亚州宣布，将从2007年1月1日起实施这些相同的要求。其它地区也在考虑较严格的法规。本文说明电子业在2006年7月前的预备阶段所面临的问题。哪些元件会从生产中逐步消失？制造商会继续提供含铅和无铅产品，还是仅仅提供无铅装置？是不是所有的元件制造商都要变更零件号码？买方如何分辨零件号码相同的含铅和无铅零件？

BEING GREEN Can Make You See Red

But not if you start getting ready for lead-free now, while July 2006 is still a year away. **by JIM SMITH**

Kermit the Frog once said, “It’s not easy being green.” Truer words were never spoken.

For the electronics industry, there are many challenges on the road to being green, or more environmentally friendly. Time is of the essence; the July 2006 deadline is quickly coming upon us. There is much to do, many issues to decide, and procedures to be mapped, so that the electronics supply chain can correctly respond to legislative requirements. Those who don’t react might find themselves losing another kind of green and that could lead to a lot of red on the balance sheet.

Officially known as Restriction of the use of certain Hazardous Substances in electrical and electronic equipment, the RoHS directive places strict limits on lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl and polybrominated diphenyl ethers. These chemicals are limited to a maximum of 1,000 parts per million, with the exception of cadmium which is restricted to a maximum of 100 parts per million. The RoHS legislation will impact the entire electronics supply chain. In fact, the impact can already be felt throughout the supply chain and some companies have been working in preparation of this event for many years.

What’s behind this legislation? The chemicals that are banned by RoHS have significant environmental and health consequences when discarded into landfills. These chemicals can leach into the soil and contaminate drinking water. Brain and neurological problems as well as compromised immune and damaged organ systems are direct effects of exposure to these chemicals. Everybody is at risk, but children are susceptible to the greatest harm. Governments everywhere have begun to respond to these risks.

All products placed on the European marketplace on or after July 1, 2006 must be compliant with the limits outlined by RoHS. But that’s not all. California has announced that it will implement these same requirements effective January 1, 2007. Other regions are also looking at stricter regulations.

The RoHS directive goes hand-in-hand with another European directive that impacts end-use products. The Waste, Electrical and Electronic Equipment (WEEE) directive’s first phase is being implemented in 2005. With few exceptions, WEEE requires the take-back and recycling of most electronic equipment, essentially anything with an electric plug or batteries.

The exceptions apply to the military, security equipment, high-voltage

equipment, implantable medical devices and some communications equipment. The European Commission is considering other exemptions.

Although the European Union is still working out legislative and enforcement details, companies can’t wait if they are going to be prepared for the July 2006 deadline. Component manufacturers are modifying their production processes and eliminating or dramatically reducing the banned chemicals. Some components will be phased out of production and made obsolete by the manufacturer. Others may be phased out over time. Some manufacturers will continue to offer both RoHS-compliant and non-RoHS-compliant products, while some have chosen to offer only RoHS-compliant devices. Confused yet?

These different approaches result in confusion and delays that are reverberating throughout the supply chain. There is no standard procedure to address these needs and there are myriad approaches to the same problems. The most profound immediate challenge results from the elimination of lead. Traditional tin-lead solders melt at a lower temperature than do the replacement RoHS-compliant solders. Board assembly production processes must change to accommodate the higher reflow temperatures.



A HOT TIP The demand for RoHS-compliant product is already significant, and will continue to increase as the July 2006 deadline approaches.

Although some RoHS-compliant product is considered backward-compatible (meaning that it can be used in both lead-free and leaded production processes), many RoHS-compliant products are not backward compatible. Design engineers who switch out lead-free parts for leaded parts will have to keep that in mind as they go forward with new designs.

From a supply chain perspective, companies must use great care to make sure they're not introducing the wrong product into their RoHS-compliant production processes. This problem is further complicated by the fact that some component manufacturers have chosen not to use new part numbers when they introduce their RoHS-compliant product versions. Instead, these companies have chosen to use a date code or lot code designator to differentiate between the RoHS- and non-RoHS-compliant product.

Many within the industry are concerned the lack of a unique part number will lead to potentially mixed inventories, resulting in production and quality problems. Compounding this is a lack of consistent lead-free or RoHS labeling practices within the industry, which makes product identification difficult where the part number has remained the same. For distributors who stock these products, it is an equally daunting challenge, especially if part numbers don't change – we must figure out how to distinguish between the two types of parts with the same part number.

The Paperwork Problem

To demonstrate compliance with the WEEE and RoHS directives, product producers will need to provide documentation that they have taken reason-

able steps to preclude the introduction of banned chemicals into their products. Along with data on the other materials used, this documentation must include data on the electronic components themselves and should demonstrate each component's RoHS-compliance by stating the chemical threshold contained in each part, or by providing approved product exemption documents to the directive. This is a data aggregation effort that will include roll-ups of data from components to subassemblies to the finished product. Most firms will need to invest in IT solutions to manage the compliance requirements; those documents must move with the products as they go through the supply chain.

Two challenges come from the military/high-reliability sector: availability and cost. The lead in tin-lead solders mitigates the growth of naturally occurring "tin whiskers" which can cause electrical shorts. Without the lead, tin whiskers could be a huge problem. The engineering communities within the defense and aerospace industries are particularly concerned about this factor, although it is a concern for some other industries as well.

Electronic components exclusively made for military applications are excluded from the RoHS directive and will continue to be made with lead. However, for cost reasons many commercial components are used in military applications and in those cases where the component manufacturer has chosen to obsolete the leaded version of their product, the military product producer will need to requalify a substitute part or engage in a costly component replating process.

Many OEMs are restricting the usage of additional substances in the components they purchase beyond the six banned chemicals mandated by RoHS. In these cases, the OEM may be subject to other requirements from customers, or from another region's regulatory requirements with additional chemical reporting challenges. Unfortunately, no universally agreed-upon reporting format is in place to address this, making it difficult for all parties in the supply chain.

Some of our most frequent customer questions involve the details of how the RoHS and WEEE directives will be implemented and enforced, how compliance will be monitored and what the penalties will be for non-compliance. Unfortunately, this too is an area of confusion. Although the EU mandates both the RoHS and WEEE directives, details of implementation are up to the individual EU member states. And, by the way, much of this has not yet been determined. Individual member states are considering fines, import and sales restrictions, product confiscation, and possible prison sentences for repeated violations, but nothing has been firmly established. In addition, they generally agree that implementation and enforcement within the EU will initially be uneven at first, but over time common enforcement methodologies should be adopted.

Perhaps the biggest issue facing the electronics supply chain is transition timing. When will equipment producers transition to RoHS compliant manufacturing processes and need RoHS-compliant products? The answers vary from firm dates to unknowns. Aggressively changing over too earlier may result in unavailable RoHS-compliant components. Waiting too long may risk missing the July deadline.

Information from our suppliers and customers indicates that the demand for RoHS compliant products will be significant by July 2005 – a full year before the law goes into affect – and will steadily increase as July 2006 approaches.

Additional Challenges

For distributors, there are a number of challenges associated with these directives. The first challenge arises from the decision of component manufacturers who won't be changing part

numbers to distinguish RoHS-compliant products. So our customers will continue to order the same part they have in the past. However, with only part number information, we will not know what version of the product the customer actually needs. Clarification will be necessary when customers send their bill of materials, when they send forecasts and when they place orders.

A second challenge flows from the first. Some of those component manufacturers who are not changing part numbers have already started shipping RoHS-compliant products, before the supply chain has implemented necessary systems changes that allow tracking. To ensure customers get the correct product, RoHS-compliant parts will need to be separated out, and we must assign them unique internal part numbers.

Our next challenge comes from the customer side. Customers have started requesting RoHS-compliant product certifications. Since each component manufacturer controls his own manufacturing processes, distributors cannot certify the chemical content of any components. We will, however, pass along whatever RoHS chemical content information provided from our suppliers, but we'll have to add a disclaimer that this is not our own certificate of compliance.

Some customers need information on a wider range of chemicals than those covered by the RoHS directive. In all cases, the industry is rapidly moving and making changes that will impact the entire supply chain. All of our customers will be affected directly or indirectly to some extent by these changes.

Actual details of the RoHS and WEEE directives are still being legislated within the EU and further changes and clarifications are expected. Because of the July 1, 2006 deadline, companies cannot wait for these issues to be resolved before moving forward with their own compliance programs.

Take a look at your own business, and if you haven't already, put a plan in place to address these challenges. It's not easy being green, but we all can make it easier on ourselves by being prepared. **PCD&M**

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