

What You Need To Know About RoHS Compliance

Why Any Company Without A Program In Place Is Already Behind Schedule

What Is RoHS?

The “Restriction of Hazardous Substances” (RoHS) Directive is a legal document issued by the European Economic Union (EEU) in February, 2003. The directive bans new electronic equipment from being sold in Europe after July 1, 2006 if it contains more than trace levels of lead (Pb), hexavalent chromium (Cr6), cadmium, mercury (Hg) or certain brominated flame retardants.

RoHS initiatives have also spread beyond Europe to the rest of the world. The government of China has passed similar legislation with the same implementation date; 95% of South Korea’s electronics companies recently adopted a voluntary program to comply with the RoHS initiatives. Japan, currently the world’s largest consumer of lead-free solder paste, has had voluntary lead-free initiatives in place for many years. In the USA, California and Maine have already enacted laws which require goods sold in those states to comply with RoHS. Similar legislation has been proposed in Massachusetts, Vermont, Hawaii and Connecticut.



The goal of RoHS is to protect human health and improve the global environment by restricting the use of these dangerous materials. Almost all discarded electrical and electronic equipment eventually winds up in landfills – approximately six million tons of waste each year in Europe alone. The EEU acted out of concerns that emissions from this electronic refuse pose significant health and environmental risks.

Plans have not been finalized for a specific RoHS compliance application mark and there is no present requirement for independent third party auditing. Instead, manufacturers, importers and distributors who place their products in affected markets after the July 2006 deadline will be “self-declaring” that they have met the requirements of the legislation. Authorities within each EEU country will likely conduct market surveillance, carry out product inspections and request documentation to verify compliance. Shipments which lack compliance documentation may be stopped at the border.

In response to the RoHS initiatives, a massive, industry-wide effort to research and document the compliance status of hundreds of thousands of electronic parts is underway. Non-compliant parts are being replaced, non-compliant components are rapidly being modified, and non-compliant products are being re-designed or completely replaced.

What Products Are Affected?

The RoHS initiatives are currently estimated to cover 100,000 different products. Since lead (Pb) is present in nearly every solder joint and lead finish, virtually every electronic product will be affected. In addition, the initiatives strictly regulate the use of five other hazardous chemicals. Cadmium is currently used in cable sheathing; hexavalent chromium is found in enclosure plating; mercury is found in various types of energy-saving lamps; polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) are flame-retardant chemicals added to printed circuit boards. With few exceptions, products which contain any of the above materials will be severely restricted by the initiatives.

The list of affected products includes large household appliances such as refrigerators, washing machines, electric stoves, microwave ovens, electric heating appliances and air conditioners, as well as vacuum cleaners, irons, coffee machines, hair dryers, clocks, scales and other small appliances. The initiatives will cover IT and telecommunications equipment such as computers, copiers, calculators, fax machines, telephones; consumer equipment including radio, television, CD players and video gear; lighting equipment; toys, leisure and sports equipment; automatic dispensers and medical equipment

which is not implanted. Current exceptions are made for large scale industrial tools, and equipment used for national security or strictly military purposes. Other exceptions have yet to be finalized.

Although the RoHS initiatives specifically apply to products sold in designated geographic areas, in reality their impact is virtually global. Manufacturers who ship materials around the world are reluctant to produce and inventory two versions of their lines and will gradually cease production of non-compliant versions. As a result, manufacturers may not be able to order non-compliant components even if their end product will not be sold in an RoHS-affected area. Manufacturers of military products, though exempt from RoHS compliance, may find that they can no longer build from their old bills of material because the original components have been discontinued.

How much impact will RoHS really have?

RoHS presents serious logistical, technical and management challenges to the entire electronics industry AND to any manufacturer of products that include electronics. Component modification, early component and/or product obsolescence, inventory management, significant investment in resources to research and document compliance, and new product design are among the major issues which must be addressed.

With regard to component modification, the most serious issue is the removal of lead content. Leaded component termination finishes must be replaced with lead-free versions. The two main alternatives for lead-free, general assembly soldering – Tin(Sn)/Silver(Ag)/Copper(Cu) and Sn/Cu – are relatively new alloys and data is still being gathered about their process limits. Both have higher melting temperatures than leaded solder, wet metal surfaces more slowly, and produce less-reflective joints. Manufacturers who have selected one of these alternative solders have discovered that they have only seen “the tip of the iceberg”; each component’s internal raw materials, plastics, and other encapsulation materials must be analyzed for compatibility with the required increase in soldering temperature. Boards manufactured at the higher temperatures are also more susceptible to moisture. Flux chemistries that worked well with leaded processes are not necessarily the best choice for lead-free soldering.



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Despite all these issues, the deadline for the removal of these hazardous materials remains inescapable. By working the implementation timeline backwards, it becomes immediately clear that a company without a compliance program in place is already behind schedule. Although the official legislation does not take effect until July 2006, OEM manufacturers will need to eliminate their non-compliant inventories AND have their “green” designs in production by January 2006 to meet the needs of their customers. To achieve this, all design and conversion efforts will need to be completed three to six months prior, in the second half of 2005. That leaves the first three to six months of 2005 for the completion of all part identification, compliance analysis and product transition planning efforts.

It takes only a quick glance through a multi-page bill of materials for a typical circuit board to appreciate the effort required to verify compliance for each component. Some companies have already mounted significant hiring programs (although the need for these resources is not permanent) to handle the increasing documentation work load. Distributors are working hard to respond to massive customer inquiries regarding the compliance status of components on their individual line cards, but compliance data from manufacturers changes frequently so databases require frequent updating. Other independent companies are offering compliance verification assistance to OEMs, component manufacturers and distributors.

Who is affected by RoHS?

OEM manufacturers, contract manufacturers, distributors, and designers are all affected by these new regulations. Their most significant common problem is how to obtain comprehensive, accurate RoHS compliance information in a cost-effective manner.

If you are an OEM manufacturer:

OEM manufacturers must verify that the components used in their end products are RoHS compliant, replace non-compliant parts as needed, or redesign the product if that is more cost-effective. Documentation of compliance must be available for each component. If documentation is not available, the only viable alternative may be to have the component in question analyzed for the restricted material content. A number of testing labs are offering this service, but the time delays and costs involved will make this option less attractive as the deadlines grow closer. Products with non-compliant components may instead be discontinued earlier than planned and replaced with new “green” products.

If you are a contract manufacturer:

Component availability issues are inevitable. Without a uniform timetable for distributors to establish compliance, there is no ideal point in time for a contract manufacturer to make the transition without some disruption. Since an entire circuit board must be transitioned at once, a conversion date cannot be scheduled until all on-board components have been verified. Documentation of compliance may be requested for each component, but it has been difficult to find one reliable source of data for the compliance status of numerous components purchased from a variety of distributors and component manufacturers.

Purchasing and materials management systems must be updated to accommodate an influx of new part numbers and different packaging. Manufacturing processes must be changed to accommodate the characteristics of lead-free parts; this may at least temporarily require dual manufacturing lines to deal with exceptions which will reduce throughput and lengthen lead times.

If you are a distributor:

Distributors face an increasing number of customer inquiries about the compliance status of a long list of parts. To answer these questions, thousands of parts must be traced back to their source. Once the compliance status of each part has been verified, potential replacements for non-compliant parts must be defined. To find all this information and make it available to their customers, distributors must invest in additional information systems hardware, increased manpower and/or outside assistance.

Another serious issue for distributors is inventory management. As the compliance deadline approaches, both the National Electronic Distributors Association (NEDA) and the National Electronic Manufacturers Initiative (NEMI) have recommended that new part numbers should be issued for compliant “green” versions of existing components. However, a recent survey of component suppliers revealed that nearly half had no intention of issuing new part numbers. Their alternative plan is to modify their components and indicate compliance on packaging and by manufacturing date range. This potentially could create problems when returns of non-compliant parts flow back to distributors without the original packaging. In instances where new part numbers are issued, distributors may be faced with managing dual inventories for compliant and non-compliant materials.

If you are a designer:

You will quickly realize that RoHS initiatives will have a serious impact on both current product life cycles and new product designs. In many cases it will be possible and cost-effective to update existing products with compliant components. In other cases, there will be no replacement for non-compliant components and product redesign will become inevitable. Product redesigns and new product introductions must take into account the characteristics and assembly requirements of compliant components and soldering processes.

Conclusion

The entire electronics industry is already feeling the impact of the RoHS initiatives; OEM and contract manufacturers, distributors and electronic designers are being affected in different ways. Leading global corporations such as Sun Microsystems, Panasonic, Motorola, Epson, TDK and Toshiba have weighed their options and invested in substantial RoHS transition programs. These efforts are already affecting product life cycle decisions – some products are being discontinued rather than being modified – and new product development timetables are being accelerated to take up the slack.

Obtaining comprehensive, accurate RoHS compliance information in a cost-effective manner remains a serious issue. Yet it is clear that without immediate, substantial preparation for RoHS, electronics businesses – and manufacturers of products that include electronics – will face serious supply chain disruptions and subsequent loss of revenue to competitors who planned ahead more wisely.

RoHS Compliance Analysis Service

Fast, Professional Analysis Of Board Components For RoHS Compliance Status

- ◆ Includes Manufacturer's Documentation
- ◆ Identifies Alternatives For Non-Compliant Passive Components
- ◆ One-Week Typical Turnaround Time
- ◆ Supplied On Paper & CD Format
- ◆ Optional Analysis Of Transition Schedule For Non-Compliant Parts



Are you searching for a cost-effective way to obtain RoHS compliance information and documentation? Rochester MicroSystems now offers an RoHS Compliance Analysis Service for board level components. We'll investigate each line item of your BOM with the manufacturer to determine its current compliance status. If the component is RoHS compliant, we'll provide you with the manufacturer's documentation. We'll also highlight those components which present compliance issues. For non-compliant parts that have been or will be replaced by the manufacturer, we'll provide you with part numbers and documentation for the new versions. If your BOM has non-compliant passive components, we'll suggest compliant replacements and provide documentation.

Item	Manufacturer	P/N	RoHS Status	Replacement P/N	Alternate Manuf	Alt. Manuf. P/N	Filename(s)
1	AVX	0603ZD105KAT2A	Yes				RM0233-1.pdf
2	Jay	J69GH44-C	No				RM0233-3.pdf
3	Analog Devices	ADM708SAR	No	ADM708SARZ			RM0233-7.pdf
4	Symmax	Max33-1K4R22X	No		Detrol	D-4466-223	RM0233-2.pdf

Our color-coded spread sheet report will help you to make an informed decision about your board's overall compliance status.

We offer two levels of RoHS compliance analysis. Our Level One Analysis provides you with an overall compliance perspective by providing the current compliance status of each component. If you require a Level Two Analysis, we'll dig a little deeper to determine the transition schedule and replacement availability dates for non-compliant components.

RoHS Analysis Level	Information Provided	Cost
Compliance Analysis Level One	Current compliance status of each component (with manufacturer's documentation); alternative part numbers and/or manufacturers for non-compliant passive components (also with manufacturer's documentation).	\$35 per line item (for BOMs provided in Excel-compatible format; \$50 per line item for all other formats)
Compliance Analysis Level Two	Transition schedule and replacement availability dates for non-compliant component replacements.	\$25 extra per line item

We'll typically deliver our report to you within five business days on both paper and CD. The deadlines for RoHS compliance are approaching quickly – why wait? **CONTACT US TODAY AT 585-328-5850!**

Disclaimer: Rochester MicroSystems is providing an information gathering service and makes no warranty regarding the accuracy of the information supplied to us by component manufacturers. Identified replacement parts are only suggestions and must be reviewed by your engineering team for appropriateness to your design.