

Understanding RoHS

What it Means to U.S. Manufacturers

With the Restriction of Hazardous Substances (RoHS) regulations scheduled to take effect in July 2006, there is ongoing concern regarding the readiness of American companies to meet new European standards. Initiated by the European Union, RoHS is a direct response to growing calls for the regulation of materials deemed hazardous (including lead, cadmium, and mercury) in consumer electronic equipment.

Potentially packing the greatest global impact of any single environmental regulation over the past 25 years, RoHS will affect all electronics manufacturers in some way, across the EU, the United States, and beyond.

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As consumer and environmental concerns gain more and more momentum and political traction, RoHS seems likely to be the beginning of a global trend. Some of the world's other prime economic regions, including China, Japan, and Taiwan are already working on similar laws (China calls its the Regulation for Pollution Control of Electronic Products), and the geographic market for non-compliant products is shrinking.

In today's global economy, wide ranging regulatory measures such as these have an often profound impact on the operations of affected organizations. We operate in a wide open, ultra-competitive environment where it is imperative to be attuned to new regulations, and essential to be equipped with information that can help preserve a company's growth potential. By knowing how RoHS impacts a company and learning what is required for compliance, companies can stay one step ahead of the game and one step ahead of the competition.

To help you and your organization do that, this paper will touch on the three key questions:

- What is RoHS?
- How will RoHS affect my company?
- How can I comply?



What is RoHS?

In 1998, the European Union (EU) began to turn its attention to the large amounts of hazardous material being dumped into landfills throughout Europe. With waste accumulating rapidly, concerns were raised about the existence of a large and growing possibility of environmental contamination.

Responding to vocal and continuing calls for action, the WEEE (Waste Electrical & Electronic Equipment) directive was enacted by the EU – a move that in turn spawned the Restriction of Hazardous Substances (RoHS) directive. Both of these measures are meant to reduce the amount of hazardous materials that ultimately end up in landfills throughout the EU.

Despite heavy lobbying against these directives and amendments made to them, these regulations demonstrate a collective socio-political focus on environmental concerns. Indicating both the growing influence of “green

thinking” on the part of governments and a desire to move responsibility for compliance up the food chain to manufacturers and suppliers, RoHS is forcing alterations in the current operating standards of a multitude of companies.

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RoHS directly regulates the concentration levels of substances considered hazardous in electrical and electronic equipment. The substances regulated include:

- Cadmium
- Hexavalent Chromium
- Lead
- Mercury
- Polybrominated Biphenyls (PBBs)
- Polybrominated Diphenyl Ethers (PBDEs)

Maximum allowed concentration values are:

- Up to 0.1% by weight (1,000ppm) in homogeneous materials for lead, mercury, hexavalent chromium, PBBs and PBDEs
- Up to 0.01% by weight (100ppm) in homogenous materials for cadmium.



But Wait... There's More

Just in case you thought that was all relatively straightforward, not all electronic equipment falls within the scope of the regulations. Batteries, for instance, are considered to be a "gray area" product and are not currently covered by the regulations. Similarly, electronic equipment intended to protect national security, or with a military purpose, is exempt.

Beyond these, products where electricity is not the main power source (when the electric current is switched off the equipment cannot fulfill its main function), products where the electrical or electronic components are not needed to fulfill the primary function, and electronics that are part of another type of equipment are all considered to be beyond the scope of RoHS regulations.

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So it can all seem rather vague and confusing. And along with these gray areas, there are further exemptions that address situations where higher concentrations of regulated materials are necessary to the function of electronic equipment. These exceptions include the manufacture of large-scale

stationary industrial tools, parts for the repair/upgrade of electronics placed on the market before 1 July 2006, and the reuse of electronics introduced before the regulations took effect.

Finally, there exist specific applications where higher concentrations of mercury are allowed - including some varieties of fluorescent lamps - and lead has a wide range of exceptions, including higher allowed levels in the glass of cathode ray and fluorescent tubes, as an alloying element in steel, aluminum, and copper, in an array of solders, and in electronic ceramic parts (including capacitors, magnets, and integrated circuit packages).

However, nobody should believe that they are exempt – these regulations will affect every company in the electrical and electronic industry. The best way to illustrate this is simply to point out that over 25 states in the U.S. are considering similar types of legislation, and California will adopt the EU’s RoHS standards lock, stock, and barrel beginning in 2007. So even for companies that have never exported product, preparing now for compliance is the only responsible action.

While all this appears difficult to navigate, there are some simple assessment tests you can do to see if your products are likely to be affected by these new regulations. These tests will be discussed further on.



How will RoHS affect my company?

When RoHS goes into effect, manufacturers of electronic equipment for the EU marketplace must be compliant. The regulations do not recognize or grant any leeway to foreign manufacturers or suppliers – the bottom lines of companies everywhere may well be affected.

According to TradeStats Express¹, the U.S. alone exported over \$124 billion worth of electronics overseas in 2004, with \$18 billion of that total coming from areas that will fall under the RoHS purview beginning the second half of 2006.

American companies currently selling to Europe, either directly or through distributors, will certainly find that without RoHS compliance, their ability to compete will be adversely affected.

And while compliance may mean a change in business operations and impose a substantial cost, losing sales across the EU because of non-compliance with what are being touted as 'consumer focused' and 'green' regulations may affect a company's operations in the US as well.

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Furthermore, companies that choose to ignore RoHS regulations, or that don't take the issue of compliance seriously, are granting unnecessary and valuable opportunities in the marketplace for compliant competitors to earn key advantages as they effectively abandon customers.

Whether you don't want to give market share to a competitor, or you want to gain an edge for yourself, complying with RoHS will impact your bottom line. Complying can also provide organizations with increased chances to demonstrate how much they value consumer and environmental concerns.

Ultimately, if companies take the initiative to do so, "RoHS compliant" has the potential to become a selling point as Americans realize the value of tightened European regulations.

¹ <http://tse.export.gov/>



What Does Compliance Mean?

Complying with RoHS basically means that a producer may not place new electrical and electronic equipment that contains hazardous materials exceeding the maximum concentrations allowed on the EU market. Sounds pretty straightforward, right?

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Bear in mind though, that in this instance a “producer” includes those manufacturing and selling under their own brand, reselling under their own brand, or importing/exporting electrical and electronic equipment into the EU on a professional basis.

And these producers - of all descriptions - must at all times be able to provide technical documentation or other information proving compliance upon request by enforcement authorities, and must retain such documentation for four years after their electrical and electronic equipment is placed on the market.

In addition, the fact that the modern electronics industry is so heavily reliant on material and product outsourcing to keep costs under control only serves to further complicate efforts at compliance. Original equipment manufacturers (OEMs) have no choice but to bear the full weight of compliance responsibility along the full length of their supply chain, greatly increasing their exposure to the risks of non-compliance.

To try and limit their risk exposures, and provide them with at least some avenue for redress, many OEMs have already insisted that their parts suppliers submit RoHS compliance certificates. Wisely, they are seeking to ensure that those they partner with do not negatively impact their market competitiveness.

At the same time this broadens the impact of the regulations and pulls in companies who may have imagined they would not be affected. And of course, any OEM who thinks that shifting the burden of responsibility will eliminate their risk is laboring under a significant delusion.



How can I comply – and what if I don't?

To comply with RoHS is, put simply, to stay under the maximum levels for the hazardous materials.

Of course, that alone is not enough. A company must further be prepared to submit proof of compliance to authorities upon request. So, while enforcement has not yet gone into effect, both manufacturers of parts and producers of goods will soon need to be able to demonstrate their ongoing commitment to RoHS.

As with many European regulations, enforcement is the responsibility of each individual country in the EU, as is deciding upon the preferred methods of enforcement. In the UK, for example, the Secretary of State for Trade and Industry has appointed the National Weights and Measures Laboratory (NWML) - an executive agency of the Department of Trade and Industry - to act on its behalf as the source of RoHS enforcement.

In the UK, producers must demonstrate RoHS compliance by providing satisfactory evidence upon request of the NWML in the form of technical documentation or information. The

UK intends to accept self-declaration as an acceptable means of compliance; however market surveillance will also be conducted to detect non-compliant products.

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Non-compliant products sold on the EU market after the deadline will be considered to be in breach of the RoHS Directive. The responsibility for compliance lies with the agent introducing or otherwise making available for the first time a product. This is a responsibility that must be taken seriously, if not for the reputation of your company, then for the penalties. The UK imposes a £5,000 (approx. \$8,700 U.S.) maximum fine for a summary conviction and unlimited fines upon conviction. Those failing to submit compliance documentation at the request of authorities may face up to a £5,000 fine as well.

Furthermore, where an offence is shown to have been committed with the consent or neglect of any manager, supervisor or person in a similar corporate role, they could be regarded as having committed the offence – just as much as the corporate entity they work for.

There is really only one defense, and that is one of “due diligence.” By taking all of the necessary steps, a company can produce products that are compliant, and in the case that they are not, have at least a manageable defense. Still, this defense should not be relied upon.



What Constitutes Compliance Documentation?

One of the main methods of documenting your compliance is through a materials declaration.

This means that producers must:

- Obtain written, verifiable assurance from suppliers that materials, components, assemblies or equipment provided do not contain more than the permitted level of any of the six restricted substances.
- Keep appropriate records for a period of up to four years after the product was placed on the market.

Currently, a variety of documentation materials are being developed in the various industries, with some manufacturers already publishing such data on their websites. However, bear in mind that while suppliers should provide documentation for parts, it is ultimately the seller's responsibility to ensure compliance, and so some method for checking both parts from suppliers and the complete final product ought to be instituted to ensure compliance.

“Only complete and comprehensive product testing will ensure that RoHS regulations are met.”

Documenting and organizing information about parts from suppliers as well as any in-house parts manufacture should help earn compliance, though only complete and comprehensive product testing will ensure that RoHS regulations are met.

Clearly, when a producer undertakes their own analysis of the components or materials used in their products, they can quickly assure themselves that compliance is achieved – they have their own records, and they are not dependent on vendors or other suppliers to manage their compliance for them.

Producer analysis is most appropriate when materials declarations are unavailable or when the reliability of declarations is questionable. Producers may also employ other analytical techniques to establish compliance, though they must ensure that they understand any limitations of the analytical technique they use. For this reason, it is important to establish that the method is proven, reliable, and cost- and time-effective. Appropriate product testing methods include wet chemical digestion and X-Ray fluorescence spectroscopy, both accurate methods for determining the composition of product components.



The Value of Testing

The value of appropriate, properly performed testing is that it provides objective, quantitative data showing that the materials, components, or products in question either do or do not contain levels of restricted substances above the regulatory limits. Analytical instruments and the specific techniques/methods used (when followed properly) can give assurance to manufacturers that their products – and their business – will not be affected by the directive. If nothing else, the testing and appropriate record keeping ensures that “due diligence” was followed.

Conclusion

July 2006 will be the time to truly test the readiness of American companies to comply with RoHS regulations. Regulations such as these surely demonstrate the degree to which we live in a global marketplace, where impacts are far-reaching and business depends on solid commitments to countries, companies, and consumers around the world.

RoHS is the beginning of a global trend. Around the world, other important economic regions are already working on similar laws, meaning that the geographic market for non-compliant products is shrinking.

“It is imperative to think globally, essential to be informed, and crucial to take the necessary steps to apply that knowledge.”

In today’s world, it is imperative to think globally, essential to be informed, and crucial to take the necessary steps to apply that knowledge. Knowing how RoHS impacts your company and what is required for compliance is important for companies that want to stay in the game, if not ahead of it.

As the clock ticks down to July 2006, it’s clear that the magnitude of change that could result from the European Union’s new RoHS regulations is matched only by the magnitude of confusion that seems to exist in across the electric and electronic goods sector.

Aside from difficulties in getting to grips with EU regulatory changes, manufacturers, suppliers and resellers need to start preparing for issues further out – China, Taiwan and Japan are all at various stages in the implementation of their own regulatory mandates, and there is no indication that the trend will stop with them.

And even if it did, it would still mean that many of the largest markets in the world for electrical and electronic goods have signed up to a set of restrictions that impose greater responsibility, and a significant, but by no means homogeneous, body of new laws that materially impact your organizations ability to compete.

In this case, knowledge truly is power.

