
Impact of the RoHS Directive on Electronic Products Sold in the United States

A new directive adopted by the European Union (EU) in February of 2003 has caused leading companies in the electronics industry to begin a significant shift in the materials they use in their products. The Directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS Directive) states that, by July 1, 2006, no new electrical and electronic equipment put on the market may contain lead, mercury, cadmium, or hexavalent chromium. Polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) — two types of flame retardant — are also prohibited. There are exemptions for some uses of mercury in fluorescent bulbs, and for lead in glass used in CRTs and in solder used in servers and other network infrastructure.

The RoHS Directive is bringing about changes in products manufactured and sold not only in the European Union, but in the United States and worldwide. This fact sheet addresses the directive's impact on the design of consumer electronic products sold in the US, especially televisions and computers. While INFORM's research did not address large appliances, the findings that follow do apply to a whole range of smaller electronic products such as DVD and CD players, personal digital assistants (e.g., Palm Pilots), and printers, scanners, and other computer peripherals.

INFORM chose to focus on the major electronics companies because they tend to anticipate and respond quickly to changes in the marketplace or new legislation, and they often set industry standards in product design. Other companies tend to lag behind in making design changes. They are examined toward the end of this fact sheet.

Design Changes on a Global Scale

Theoretically, electronics manufacturers could develop product lines exclusively for the European market to comply with the restrictions of the RoHS Directive, while manufacturing products for the US that continue to contain lead, mercury, cadmium, hexavalent chromium, and brominated flame retardants. Panasonic, for example, like other television manufacturers, has production facilities in North America (in Tijuana, Mexico, and Vancouver, Washington), where products could be manufactured exclusively for the North American market.

The reality, however, is that the major electronics manufacturers generally make design changes and adopt new technologies on a global scale, affecting all of their products regardless of where they are manufactured and sold. This means that, by July 2006, most electronic products sold in the US will meet the same standards as those sold in Europe. Panasonic, which like other companies in the industry foresaw the coming changes during debate over the RoHS Directive, converted all its television production facilities worldwide to the use of lead-free solder by March 2003, ensuring that televisions with lead-free solder will become available to US consumers at the same time they become available in Europe.

Most of the major electronics companies have set their own targets for meeting the RoHS deadline ahead of time. An industry leader in converting to lead-free solder, Panasonic plans to meet the requirements one year in advance of the deadline. Sony intends to use lead-free solder in all its products by 2005, and to stop using brominated flame retardants in plastic parts by

January 2004. Computer giants Dell and Hewlett-Packard have already eliminated PBBs and PBDEs from their product lines, including personal computers, servers, and printers, and both companies also plan to meet the deadline for lead, mercury, cadmium, and hexavalent chromium before July 2006.

A Shift to Product Policy

The RoHS Directive and its far-reaching consequences are the culmination of a shift toward the creation of “product policy,” which has come about largely because of government efforts in Western Europe and Japan. Dell’s manager of environmental affairs notes that 10 years ago, little attention was being paid to the possible environmental ramifications of the materials contained in products. The directive’s global impact highlights a cultural change in the electronics industry, bringing product issues to the forefront and requiring companies to shift resources, undertake new research, and rework their relationships with suppliers.

Strength of the European Market

One reason the RoHS Directive is having such a global impact, stimulating the development of major environmental technologies and changing the products available to consumers worldwide, is the size and strength of the European market. Compared to the US population of 289 million, 377 million people live in the 15 member states of the EU — all of Western Europe except for Norway and Switzerland — and the EU’s gross domestic product of \$8.6 trillion is very close to the US GDP of \$10 trillion. Hewlett-Packard’s environmental business manager describes the European market as extremely important, and the RoHS Directive as having an enormous impact on companies’ use of resources.

One purpose of the RoHS Directive is to address the disparities in laws adopted by EU member states to restrict the use of the specified materials. The directive supercedes the laws of individual nations regarding the use of these substances in electronic products,

establishing the July 2006 ban throughout the EU. However, individual countries are free to enact their own laws addressing substances other than those covered by the RoHS Directive.

If one or a few countries representing smaller markets were to adopt a particular material restriction, companies would be likely to make a case-specific decision as to whether to make the investment required to comply. If the standard was difficult to meet and the market small, electronics manufacturers might opt to forgo sales in that country. Manufacturers would also consider, however, the extent to which one nation’s restrictions could be a bellwether for more widespread material bans. For example, Panasonic has taken notice of restrictions on the use of formaldehyde in the Netherlands and Germany, and has responded by adding formaldehyde to the list of substances that the company will work to eliminate from its products.

Efficiency a Key Driver

Efficiency is another reason why companies are likely to convert all the products in a product line to comply with the requirements of RoHS, regardless of where they are assembled. Once a company tests and adopts a new technology, such as lead-free solder, standardizing equipment and processes throughout its manufacturing facilities is much more efficient and cost-effective than maintaining separate production lines to make products slated for different markets. For example, a company that changes the solder used in its circuit boards will outfit every one of its circuit board assembly facilities with the new soldering equipment. When Hewlett-Packard chooses a new resin with different flame retardant properties for its computer chassis, that resin becomes the standard used in all HP computers.

Impact on Suppliers

The drive to standardize parts and processes permeates the supply chain for electronic products. While the brand owners are the parties directly responsible for meeting the requirements of the RoHS Directive, the new law has immediate and long-term ramifica-

tions for hundreds of companies throughout the world that supply components to these manufacturers.

The RoHS Directive is spurring initiatives at the procurement stage of the design and production process, as companies strive to integrate the directive's material restrictions into their purchasing specifications. Thus, the new requirements are becoming part of the design process, included in the diagrams for parts and in supplier contracts. RoHS pushes suppliers to convert their production lines if they want to avoid losing their big corporate customers. And since different production lines for parts made to different standards quickly become inefficient and expensive, the directive hastens a complete conversion to new materials and technologies.

In addition to establishing new standards and procedures for their suppliers, the major manufacturers are creating more rigorous review and compliance mechanisms. Sony, based in Japan, has established the Global Green Partnership, which for the first time requires suppliers to do their own lab analysis of materials and parts and provide the results to Sony. Sony has also begun conducting supplier audits. Other computer and consumer electronics makers are taking similar steps to ensure that they know precisely what is in every single component of the products that bear their names.

Development of New Technologies

The RoHS Directive is driving design and technological innovation, with companies shifting millions of dollars into research and development to meet the new standards. While production takes place at facilities located throughout the world, each computer and consumer electronics company tends to conduct its R&D in a few designated locations. As companies grapple with new technologies and chemistries, basic research occurs where the most sophisticated equipment and expertise are located.

Panasonic's parent company, Matsushita, began its conversion to lead-free solder with R&D at the com-

pany's facilities in Japan, followed by tests and market trials of televisions containing the new solder (a mix of silver, copper, and tin), also in Japan. Matsushita spent \$43 million to convert its manufacturing facilities worldwide to the new soldering equipment, starting in Japan and ending with a television factory in Brazil. By March 2003, the company had converted 12,500 of its 14,000 product categories to the new technology.

Sony's research center is also located in Japan, but the company encourages engineering innovation at its manufacturing facilities around the world. For example, work on lead-free solder has taken place for the past year at a Sony facility in Mexico. For Hewlett-Packard, based in California, all R&D takes place in the US, while production can take place anywhere — often at factories in Asia.

Some Companies Not Yet Making Changes

Regardless of differences in design strategy, all the leading electronics manufacturers agree that once a design change is made that eliminates a particular metal or other substance, every product in the product line is converted, regardless of where it ends up being sold.

There are several possible exceptions to this approach. Some manufacturers devote fewer resources to R&D and are less progressive than the market leaders, whether because of a different corporate philosophy, a smaller market share, or both. Some companies have yet to start adopting new technologies, such as lead-free solder or plastics that eliminate the two banned flame retardants. While the RoHS Directive impacts any company that wants to sell its products in Europe, some companies will lag behind the industry in making changes to their product lines, continuing to use the restricted substances for a longer time.

In other cases, a company may decide to meet customer demand outside the EU by offering a cheaper product containing a substance that is restricted or is slated to be phased out within the EU. For example,

while Dell has already eliminated the use of PBBs and PBDEs, the company still produces a low-end computer monitor that uses a different brominated flame retardant. Dell plans to stop using brominated flame retardants altogether, but there are other companies that may be slower to change course.

It remains to be seen whether California RoHS will have any real meaning in light of the RoHS Directive's global impact, and whether other states will follow suit and start developing "product policy" of their own.

Impact of "California RoHS"

Some of the leading manufacturers suggest that new electronics legislation in California, which includes measures referred to as the California RoHS, may compel industry laggards to speed up their compliance with the EU's material restrictions. Passed in September 2003, this legislation will place a fee on the purchase of new televisions, computer monitors, and other products containing cathode-ray tubes (CRTs), as well as on televisions and computers that use flat-screen or LCD displays. The fee revenues will be used to fund electronics recycling programs throughout the state.

The new law also contains "RoHS-equivalency" measures, which prohibit the sale of any electronic product in the state that would be prohibited from sale in the EU because of the presence of heavy metals. This law makes California the first state to legislatively address the toxicity of electronic products. The deadline for compliance is January 2007, rather than the EU deadline of July 2006.

California RoHS will have very little impact on the major electronics manufacturers, which are already redesigning their products in response to the RoHS Directive. And just as these companies are not producing different products for sale in the US and Europe, they will not differentiate a California product line from the products they sell in the rest of the country. However, the California legislation could make a difference for smaller companies planning to offer an EU product line and a US product line containing the restricted materials. Some suppliers that do not do business in Europe and do not have to comply with the RoHS Directive may have to comply with the California requirements.