

Restriction of Hazardous Substances

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Introduction and Overview

Over the past several years, increased attention has been placed upon the environmental impact of electrical and electronic products relative to their manufacture, use and disposal. To address some of these concerns, both voluntary and regulatory measures have been declared.

Already in place are four directives: The State of California's Proposition 65, the European Union Waste Electrical and Electronic Equipment (WEEE) Directive, the European Union End-of-Life Vehicle (ELV) Directive and the European Union Brominated Flame Retardant (BFR) Directive. A fifth piece of legislation, The Restriction on Hazardous Substances (RoHS) Directive, will be in force as of July 2006.

A brief overview of three EU directives follows since they are more limited in scope; California Proposition 65 and the RoHS Directive are outlined in more detail. Belden's compliance information on all directives is also presented.

WEEE Directive

The EU WEEE Directive (Waste Electrical and Electronic Equipment) requires producers to take back and recycle, at no cost to consumers, nearly anything that uses a battery or an electric cord. The equipment covered under this Directive is as follows:

1. Large household appliances
2. Small household appliances
3. IT and telecoms equipment
4. Consumer equipment
5. Lighting
6. Electrical & electrical tools
7. Toys, leisure and sports equipment
8. Medical devices
9. Monitoring and control instruments
10. Automatic dispensers

This directive contains various implementation dates — extending from August 2005 through December 2008.

ELV Directive

The End of Life Vehicle (ELV) Directive was legislated in the European Union in July of 2003. Concerned with cars, vans and certain three-wheeled vehicles, the Directive's main requirements for Member States are to ensure that:

- > producers limit the use of lead, mercury, cadmium and hexavalent chromium in the manufacture of new vehicles and automotive components

- > producers promote the recyclability of their vehicles
- > treatment facilities operate to higher environmental standards
- > particular recovery and recycling targets are met by January 1, 2006 and January 1, 2015
- > by 2007, producers pay all or a significant part of the costs of treating negative or nil-value ELVs at treatment facilities

BFR Directive

The EU Restriction of Brominated Flame Retardants (BFR) restricts the use of Penta-BDE and Octa-BDE as of August 2004. Brominated Flame Retardants (BFRs) are widely used in plastics, foams and textiles as well as electrical appliances, cables, television sets, computer circuit boards and casings and in building materials. BFRs are used to protect combustible materials against initiating fires, enhancing the safety level of combustible materials.

Of all the flame retardants used in electrical and electronic equipment, BFRs are the most common, primarily because BFRs are often the most cost and performance effective flame retardant.

There are four basic types of BFRs:

- > polybrominated diphenyl ethers (PBDEs)
- > polybrominated biphenyls (PBB)
- > tetrabromobiphenol a (TBBP-A)
- > hexabromocyclododecane (HBCD)

There is increasing evidence that shows that these compounds are building up in human and animal tissue and the consequences for human health and the environment are uncertain. As a result, the European Union adopted the Brominate Flame Retardants Directive, which gives its member states until 2007 to ban the sale in their countries of new electrical equipment containing some types of PBBs and PBDES. PBB is no longer used in European electrical and electronic equipment and production ceased in May 2000.

California Proposition 65

California is the first (and only) state in the United States that has currently adopted a mandatory piece of environmental legislation geared towards the hazardous substances used in the production of various consumer products. The electrical and electronic products industry is one of the targets of this piece of legislation — fueled by a series of lawsuits originated in San Francisco against representative defendant companies that manufacture or sell jacketed wire and cable products and products containing wire and cabling alleging violations of Proposition 65.

History Behind California's Proposition 65

California is known for trailblazing programs to reduce pollution and exposure to hazardous substances. These actions begin with the scientists who work in the Office of Environmental Health Hazard Assessment (OEHHA), the risk assessment arm of the California Environmental Protection Agency (Cal/EPA). The responsibilities of these scientists include identifying the most significant pollutants, assessing the impact they can have on human health and the environment, and determining levels of these pollutants that pose a significant threat.

The idea behind Proposition 65 sprouted from opinion polls conducted in California in 1986. In response to the

poor record of federal regulatory action on potential human carcinogens and reproductive toxicants, the residents of California wanted a guarantee that scientifically identified hazards were automatically regulated. These polls showed growing concern among California's citizens regarding toxic waste levels and contamination. Drafted by a coalition of environmentalists to directly address this concern, Proposition 65 was quickly approved by voters and became the first and only law of its kind in the nation.

The law applies to a list of agents "known to the State to cause cancer or reproductive toxicity" established by California's Governor. At its inception, the list included substances already identified as carcinogens by the National Toxicology Program (NTP) and the International Agency for Research on Cancer (IARC) and as reproductive toxicants by the Occupational Safety and Health Administration (OSHA).

Passage of Proposition 65 proved to be a milestone in our nation's path towards environmental enlightenment. The results of this legislation can be seen today in many forms, the most common of which are warning labels on gasoline pumps and alcoholic beverages as well as public notifications by facilities using toxic chemicals.

Stipulation of Consent Judgement for Wire and Cable (San Francisco Superior Court Nos. 312962 and 320342)

Products which are covered under the Consent Judgment include products which are manufactured, distributed, marketed and/or sold by a firm either under its own name or brand or under the name or brand of another in the state of California. Some examples include Thermoset/Thermoplastic and Thermoplastic elastomer coated wires, cables and cords and their plugs and connectors, as well as any associated products. All of which are collectively referred to as "Covered Products."

There are a number of products that are exempt from the stipulations provided under Proposition 65. The

following products are deemed to be exempt for Proposition 65:

- > Products which because of their size, weight or function are handled infrequently (not typically plugged or unplugged)
- > Products manufactured before September 1, 2003
- > Products distributed outside the state of California
- > Products used only as internal components not normally accessible during ordinary use
- > Products containing a Proposition 65 chemical only as part of the inner conductor(s) or other component not normally accessible during ordinary use

As of September 2003, the surface contact layer of a non-exempt Covered Product shall have no lead as an intentionally added constituent and may have lead content by weight of no more than 0.03%, or 300ppm (parts per million).

Implications for Wire and Cable Producers and Manufacturers

Under the consent judgement, producers must provide "Clear and Reasonable" warnings for products containing unacceptable amounts of lead. Specifically, a firm is required to provide a warning before knowingly and intentionally exposing a person to a listed chemical. The warning may take the form of:

- > A label affixed to the covered product or unit package
- > A letter sent each year to the employer — customer (non-retail covered product)
- > Or other allowed forms of warnings such as invoice printing and signs

Firms that are in violation of Proposition 65 face strict civil penalties, which range up to \$2,500 fines per day for each violation.

The RoHS Directive

History Behind the RoHS Directive

The Restriction on Hazardous Substances (RoHS) Directive is the European Union's answer to what it perceives to be a growing concern: *the accumulation of hazardous wastes resulting from consumer products*. The seed for what would later become the RoHS Directive was planted in 1988 when the European Union (EU) Council instituted a resolution and invoked a community action program to combat cadmium pollution.

Almost a decade later, in 1996, a review of the EU's strategy for waste management identified the need to reduce certain hazardous substances and to create community-wide rules regarding waste management. In the year 2000, the first draft of the RoHS Directive was born. A common position text was published late in 2001 and the proposition re-entered the European Parliament during April of 2002 for a second reading. These discussions yielded significant amendments to the original directive proposal.

After the completion of the 'conciliation process', the directive was published on February 13, 2003. Currently, the responsibility belongs to the governments of individual EU member-states to implement the Directive by passing appropriate legislation in their own countries by August 13, 2004.

As of now, the EU's timeline for the RoHS directive is as laid out in Figure 1 below.

Stipulations of the RoHS Directive

The main principle behind RoHS is that the Producer – Polluter – is responsible. The Directive defines a "Polluter" or "Producer" as:

"Any entity that manufactures electronic equipment which it sells, by whatever means, including 'distance' selling, under its own Brand(s)

Any entity that re-sells, under its own Brand(s), equipment produced by other

suppliers, irrespective of global source of manufacture

*Any entity that imports or exports electronic equipment on a professional basis into, or from, ECC Member States."*²³

Resellers, distributors, and integrators who market product *not* marked with their own brand as well as financial institutions providing exclusive financing for projects or programs are exempt any liability, providing that they do not breach other criteria defining "Producer" or "Polluters."²³

The RoHS Directive applies to the following categories of equipment:

- > Large household appliances
- > Small household appliances
- > IT and telecoms equipment
- > Consumer equipment
- > Lighting
- > Electrical and electrical tools
- > Toys, leisure and sports equipment
- > Automatic dispensers

As of now, a proposal to apply the requirements of the Directive to equipment in two additional categories – medical devices and monitoring and control instruments – is expected in 2008.

By July 1, 2006, all electrical and electronic equipment produced in the European Union must contain no more than the permitted percentage trace levels of the following substances:

- > Lead
- > Mercury
- > Cadmium
- > Hexavalent Chromium
- > Polybrominated Biphenyls (PBB)
- > Polybrominated Diphenyl Ethers (PBDE)

The list of materials will be under constant review. It will be added to and permitted trace levels will be changed on the basis of best scientific advice. There are exemptions for specific applications which are listed in the Annex to the Directive.

Implications for Producers and Manufacturers

The RoHS Directive brings numerous challenges to the electrical and electronic devices industry.

One of the biggest challenges companies are facing with RoHS is proving that their products are compliant. The testing, documentation and certification processes that will be required to prove compliance with RoHS have many companies scrambling to find a cost-efficient plan of action. The RoHS Directive currently requires that producers provide some sort of certification that their products are RoHS compliant but it provides no direction or guidance on how to go about doing it. The Directive simply states that producers "must have IT systems and audit trails in place to be able to prove conformity" throughout the entire supply chain and manufacturing cycles.

Thus, beyond the obvious challenges of actually reducing or eliminating the materials listed under the Directive from their products, companies must spend resources:

- > Auditing all component suppliers and expediting certificates of conformity and statements of pollutants
- > Designing, testing and implementing IT system modifications to track pollutants and roll up aggregate percentages at Bill of Material (BOM) subassembly and whole-unit levels.

Figure 1: Timetable of the RoHS and WEEE Directives

2005	Regulations for WEEE and RoHS to be made
August 13, 2005	Producer responsibility for financing commences alongside retailer take-back.
July 1, 2006	RoHS substance ban commences
December 31, 2006	Collection and recycling targets to be achieved

- > Populating and maintaining databases
- > Gearing up for global roll outs of their compliant product

Belden's Environmental Position

At Belden, we pride ourselves on being an environmentally friendly and aware producer and manufacturer. Many of our products are already compliant with these noted regulations. Product disclosures are available upon request. Please check the Belden Electronics Division website for product information to minimize the need for formal product disclosures. Specific requests should be directed to Belden Electronics Division Customer Service Department for consideration.

Belden plans on being well ahead of the government and standards regulations being currently set in the European Union. It has set the following time line for its operations:

- > September 2003: Fully compliant with the California Proposition 65 Consent Judgement

- > January 2004: Compliant to EU ELV by customer request; 50% compliant RoHS
- > January 2005: Fully compliant with EU BFR; 80% compliant RoHS
- > July 2005: 99% compliant RoHS
- > 2006: Fully compliant by the 2006 RoHS and WEEE Directive deadlines

Currently, BeldenCable™ products do not contain:

- > Asbestos
- > Mercury
- > "di-(2-ethylhexyl)phthalate" (DEHP)
- > Hexavalent chromium
- > PBB
- > PBDE

Furthermore, Belden does not use "endangered species products" in any of its products or processes.

Belden Electronics Division is working diligently toward compliance in all product areas. Given our current success to date — and the anticipation of meeting all regulatory deadlines by July 2005 — Belden Cable will be identified as RoHS Compliant by a green label affixed to either the box or the

reel rather than a change in part number. Details for each product will be made available on the company website — including compliance markings and date of compliance.

To meet global environmental product requirements, Belden Electronics Division has developed a restricted materials specification to encompass all raw materials, parts, components or products that are ultimately incorporated into the product that Belden markets. Belden Electronics Division will continue to monitor regulations and initiatives around the world to continue providing high quality, "best in class," solutions to customers for years to come.

Look for the following logo to appear on Belden's literature to identify RoHS-compliant products.



Disclaimer:

The information provided in this Product Disclosure, and the identification of materials listed as reportable or restricted within the Product Disclosure, is correct to the best of Belden Electronics Division's knowledge, information and belief at the date of its publication. The information provided in the Product Disclosure is designed only as a general guide for the safe handling, storage, and any other operation of the product itself or the one that it becomes a part of. This Product Disclosure is not to be considered a warranty or quality specification. Regulatory information is for guidance purposes only. Product users are responsible for determining the applicability of legislation and regulations based on their individual usage of the product.

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¹ http://www.greenstart.org/efc9_old2/bfrs/background.htm

² The European Union Restriction of Hazardous Substances Directive nil-value ELVs at treatment facilities

For More Information:

www.belden.com

Belden Technical Support

1-800-BELDEN-1 or 1-800-BELDEN-3