

Hazardous Materials Concerns and Tyco Electronics Products

May 2004

General Information

Introduction

The document describes the extent to which Tyco Electronics Products may or may not contain lead, cadmium, flame retardants, mercury, PVC and various other substances that are subject to current or future legal restrictions or that are otherwise of interest to our customers.

The information contained in this document is general information about the hundreds of thousands of products sold by Tyco Electronics around the world. Given ever-changing customer requirements and product formulations, to the extent that specific information on a particular product or particular substance is critical, please contact the product engineer or other Tyco Electronics representative to verify the latest information.

Compliance with Currently Applicable Legal Requirements

To the best of our knowledge, all products manufactured and sold by Tyco Electronics meet or exceed all currently applicable legal requirements regarding the presence of hazardous substances in products, including the European Union (EU) End of Life Vehicle (ELV) Directive¹ (with respect to products sold directly into the automotive market), the EU ban on use of octa and penta bromodiphenyl ether,² the Montreal Protocol on ozone depleting substances, California Proposition 65 and other currently applicable laws and regulations. For legislation relating to specific products or markets, (e.g., the ELV Directive¹) Tyco Electronics has available a range of fully compliant products.

Compliance with RoHS and WEEE.

Regarding the EU Waste Electrical and Electronic Equipment (“WEEE”)³ and Restriction of Hazardous Substances (“RoHS”)⁴ Directives, effective on or after July 1, 2006, Tyco Electronics is engaged in a comprehensive, company-wide effort to make available products that meet the RoHS limits on the presence of the substances banned or restricted by RoHS: lead; cadmium, mercury, hexavalent chromium and certain brominated flame retardants (PBB and PBDE). (Of course, many Tyco Electronics products do not contain these substances at present.)

1 EU Directive 2000/53/EC (18 September 2000) on end-of-life vehicles (including Annex II as amended 27 June 2002)

2 EU Directive 2003/11/EC (6 February 2003 [amending Directive 76/769/EEC] [relating to octa and penta-DBE]

3 EU Directive 2002/96/EC (27 January 2003) on waste electrical and electronic equipment

4 EU Directive 2002/95/EC (27 January 2003) on the restriction of the use of certain hazardous substances in electrical and electronic equipment

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Additional detail regarding Tyco Electronics' plans regarding product conversion, identification of compliant parts, and related information is available on the Tyco Electronics "Lead-Free" website at: <http://www.tycoelectronics.com/environment/leadfree/default.stm>. Tyco Electronics' goal is to offer the majority of our products in production quantities in RoHS-compliant versions by late 2004 or early 2005.

Availability of RoHS Compliant/Lead Free Products.

Many Tyco Electronics products are already available in RoHS compliant versions. Information regarding a product's compliance and lead free processing compatibility can be found in the Tyco Electronics Electronic Catalog located at <http://catalog.tycoelectronics.com/> As customer process parameters may vary, please contact TE with any specific requirements.

Tyco Electronics' Environmental Management System

As of May 2004, forty-five (45) of our manufacturing plants are certified to the ISO 14001 environmental management system standard. As to all of its operations, Tyco Electronics Corporation maintains an environmental management system to ensure conformance with applicable requirements and to ensure our products are manufactured in a manner that minimizes environmental impacts. Tyco Electronics provides "Design for Environment" resources to our product design engineers to facilitate design of environmentally friendly products, and we are continuously seeking to accommodate our customers' and market demands by providing alternative materials and processes such as, for example, lead-free products.

Meeting Specific Customer Needs Regarding Product Content and Design

To the extent that you are interested in pursuing reduction or elimination of certain materials, we encourage you to contact our product design engineer.

Minimizing the burden.

This document is intended to answer most customers' questions about most of our products. We would be happy to work with you to provide information regarding the content of specific products. At the same time, however, given the very large number of parts we manufacture, and given the great variety of customer inquiries we receive, responding to requests for detailed specific information can require a great deal of time. If more specific information is needed, please let us know and work with us to devise the most efficient and least burdensome means of obtaining the needed information.

Information on specific substances appears on the pages below.

Information Regarding Specific Substances.

Antimony - Antimony compounds are used as part of the flame retardant package in some plastic materials to meet non-flammability standards required by customers. When so used, the concentration of antimony compounds ranges from 1% to 15%.

Arsenic - Arsenic is used in fiber- optic and microwave communication applications as part of silicon or gallium arsenide wafers. In addition, trace quantities of arsenic (<100 mg/kg) may be present in commercially available grades of base metals (copper, brass, bronze, etc.).

Asbestos - Tyco Electronics products do not contain asbestos.

Azo Dyes - Most Tyco Electronics products do not contain azo dyes. A limited number of existing products contain azo dyes used as a colorant or pigment.

Beryllium - A limited number of Tyco Electronics products may contain beryllium copper alloys. These alloys contain 0.6% to 2% by weight of beryllium.

Biphenyls/Diphenyls and Terphenyls - Tyco Electronics products do not contain polychlorinated biphenyls (PCBs), polychlorinated terphenyls (PCTs) or polychloroterphenyl ether (PCTE).

Brominated Flame Retardants (see “Halogens”)

Cadmium - Cadmium plating is used only in a limited number of military/aerospace products to provide corrosion resistance and strength. Silver Cadmium Oxide coatings are also used in a limited number of relays and contactors to prevent arc erosion. Cadmium is also present in some solder sleeve heat shrink devices and in High Strength Copper Alloy conductors used in certain small gauge wire conductors. Tyco Electronics does not use Cadmium as a pigment in polymers. Based upon our review of most of Tyco Electronics PVC suppliers, to the best of our knowledge, Tyco Electronics products do not contain cadmium as a stabilizer in PVC.

Chromium - A limited number of Tyco Electronics products contain stainless steel /aluminum or copper alloys which may contain chromium metal (chromium (O)). These alloys may be present in terminals; housings, screws and springs. Non hexavalent chromium may be found as a colorant for use in polymers.

Cobalt - A limited number of Tyco Electronics products contain beryllium copper alloys which also contain cobalt. These alloys contain 0.35% to 0.6% cobalt. Cobalt may be found as a pigment for use in polymers.

Deca- BDE (see description under “PBBE” under “Halogens”, below).

Dioxins/Furans - Tyco Electronics products do not contain pentachlorophenol (PCP), polybromodibenzo dioxin (PBDD), polychlorodibenzo dioxin (PCDD), polybromodibenzo furan (PBDF), or polychlorodibenzo furan (PCDF).

Halogens (including brominated flame retardants, PBBE, PBDE and other materials) Various thermoplastics used in some Tyco Electronics products currently use brominated and other halogenated flame retardant systems. Some Tyco Electronics products use halogenated

flame retardant systems that do not include materials banned by the RoHS, ELV and WEEE legislation. Tyco Electronics continues to investigate and adopt where feasible non-halogenated and RoHS compliant alternatives. Information regarding specific classes and types of halogens and flame retardants is set forth below

- Brominated flame retardants. Typical Tyco Electronics products which may contain brominated flame retardants include UL-approved connectors and cable assemblies. In many cases, the halogenated flame retardant systems enable us to achieve various flame retardant standards including UL94-V0, 5VA and various glow wire requirements. Where technically possible, non-halogenated products are offered. Please contact the product engineer or other Tyco Electronics contact to verify whether a non-halogenated alternative exists. See also information below regarding PBBE, PBDE and PBBO.
- Halogens not in flame retardants - Halogens such as Br and I, other than those found in Flame retardants, can also be found in a limited number of stabilizer packages used in polymers. These are typically in extremely low concentrations. Non-halogen alternatives are normally available
- PBBs -- Tyco Electronics products do not contain polybrominated biphenyls (PBBs).
- Polybrominated BiPhenyl Ethers (PBBEs/PBBOs/PBDE) – This is a family of flame retardants that covers a wide class of individual substances. Some Tyco Electronics cable products contain PBBE/PBBO, in order to conform with non-flammability standards. Tyco Electronics products do not contain penta BDE or octa-BDE. Deca-BDE is used in a limited number of products manufactured primarily with thermoplastic elastomers, thermosets, and olefins in order to conform with non-flammability standards. In some cases, there are technical alternatives available.

Lead – Typical Tyco Electronics products which may contain lead or lead compounds include soldered products and assemblies, solder-dipped and tin/lead plated terminals, screw machined terminals, and PVC-jacketed cable. In addition, trace quantities of lead (<500 mg/kg) may be present in commercially available grades of base metals (copper, brass, bronze, etc.). Tyco Electronics does not use lead as a pigment in polymers.

For more information about use of lead in Tyco Electronics products, and our efforts to use alternative materials in certain applications, see the Tyco Electronics lead-free website at <http://www.tycoelectronics.com/environment/leadfree/default.stm>

Mercury - Tyco Electronics products do not contain mercury.

Nickel – Typical Tyco Electronics products which may contain nickel include: nickel plated products; palladium nickel plated products; gold plated products with a nickel underplating; and tin/lead plated products with a nickel underplating. Nickel or nickel alloys may be present in terminals, housings, screws and springs. Nickel may also be found as a pigment in polymers.

Octa- BDE. Tyco Electronics Products do not contain octa-BDE.

Ozone Depleting Substances (ODS) - Tyco Electronics has eliminated the use of "Class I" and "Class II" Ozone Depleting Substances (as defined by the Montreal Protocol) in all

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manufacturing. Tyco Electronics has placed restrictions on purchase orders and contracts with its suppliers prohibiting the use of any Class I ODSs in the manufacture of any Tyco Electronics component.

PBBE See “Halogens”

PBDE See “Halogens”

Penta- BDE. Tyco Electronics Products do not contain Penta- BDE.

PCB/PCP/PCT/PCDE/PBDD/PCDD/PBDF/PCDF - Tyco Electronics products do not contain: polychlorinated biphenyls (PCBs), pentachlorophenol (PCP), polychlorinated terphenyls (PCTs), polychloroterphenyl ether (PCTE), polybromodibenzo dioxin (PBDD), polychlorodibenzo dioxin (PCDD), polybromodibenzo furan (PBDF), or polychlorodibenzo furan (PCDF).

Phenol (monomer) - Residual phenol monomer may be present at concentrations up to 1% in phenolic resins.

Phosphorus – Phosphorus-based flame retardants can be used in formulating non-halogenated flame retardant resins. Additionally, some of these compounds are combined with halogens to create a more effective system. Some Tyco Electronics products use specific phosphorus flame retardant systems. Certain base metals also contain phosphorus.

Phthalates – A limited number of Tyco Electronics products may contain certain phthalates used as a plasticizer. Tyco Electronics products which may contain phthalates are primarily products which include flexible plastic cable and flexible plastic strain reliefs.

PVC and PVC Blends - PVC is used in several Tyco Electronics product lines including: pre-insulated terminals; cable; cable assemblies; heat-shrink tubing, wire and strain relief interconnection system components.

Radioactive Compounds – Tyco Electronics products do not contain radioactive compounds.

Selenium - A limited number of Tyco Electronics products may contain selenium in trace quantities (<10 mg/kg) present in commercially available grades of base metals (copper, brass, bronze, etc.).

Styrene (Monomer) - limited number of Tyco Electronics products may contain styrene monomer in trace quantities (<10 mg/kg)

Tellurium - A limited number of Tyco Electronics products may contain tellurium copper alloys. These alloys contain 0.5 % of tellurium. In addition, trace quantities of tellurium (<10 mg/kg) may be present in commercially available grades of base metals (copper, brass, bronze, etc.).

Vinyl Chloride Monomer - Tyco Electronics products do not contain this substance above .001% (10 ppm).

Zinc - Almost all of Tyco Electronics terminals contain copper and copper alloys. Most copper and copper alloys contain <0.3% by weight of zinc. Terminals manufactured from brass alloys may contain up to 40% zinc. Zinc may be found in various polymers as a flame retardant package and/or as a part of a stabilizer or pigment package.