

Sept 7th, 2015

Information on Substances in TE Connectivity (TE) Products

Dear Customer,

This document describes TE Connectivity's assessment regarding substances in our products, which are either subject to current legal restrictions or are of interest to our customers. The information contained in this document is generic information about the hundreds of thousands of products sold by TE globally. Given ever-changing regulatory and customer requirements, combined with TE's efforts to use alternative materials in select applications, and to the extent that specific information on a particular product or particular substance is critical, please refer to the TE Statement of Compliance (SoC) and/or Material Declaration by searching the TE part number on the [TE Product Compliance Support Center](#).

Compliance with RoHS 2 (Directive 2011/65/EU)

Regarding TE's activities and product assessment with respect to RoHS, please refer to the dedicated [customer letter](#).

Compliance with REACH (Regulation EC No 1907/2006)

Regarding TE's activities and product assessment with respect to REACH (Substances of Very High Concern, Annex XVII Restrictions), please refer to the dedicated [customer letter](#).

Compliance with other regulated or industrial concerned substances

To the best of our knowledge, all products manufactured and sold by TE meet or exceed all currently applicable legal requirements regarding the presence of substances in products. Information regarding specific substances can be found in Appendix I of this letter.

Should you have any further questions, do not hesitate to contact your TE Sales Engineer.

Guy Degriecq

A handwritten signature in black ink, appearing to read 'G. Degriecq', written over a light blue horizontal line.

Product Sustainability
TE Connectivity

This information is provided based on reasonable inquiry of our suppliers and represents our current actual knowledge based on the information provided by our suppliers. This information is subject to change. This information does not in any way modify existing purchase specifications or existing contractual or other agreement terms between TE Corporation (or its affiliated companies) and its customers.

APPENDIX I SUBSTANCES IN TE PRODUCTS

Assessment on Asbestos	
Regulatory references: <ul style="list-style-type: none"> - Annex XVII restriction item 6 of EU REACH Regulation (EC No 1907/2006); - US Toxic Substance Control Act; - Swiss Ordinance on Reduction of Risk from Chemical Products. 	
Substances	Use of substances in TE products
Asbestos fibers	Asbestos fibers are neither intentionally added to TE products, nor found as residue or impurity.

Assessment on BPA	
Regulatory references: <ul style="list-style-type: none"> - Health Canada has requested on May 1st, 2008 (file number: 08-111801-312) that all manufacturers of licensed Class II, III and IV medical devices to inform Health Canada by 1 June 2009 whether any of their devices which come into contact with the patient or patient fluids and are manufactured from raw materials containing or derived from BPA. 	
Substances	Use of substances in TE products
Bisphenol A (BPA)	While TE does not directly use Bisphenol A (BPA) it may be found as a residual in some TE products manufactured from certain materials. BPA is used primarily as a key monomer to manufacture polymers that TE may use such as Polycarbonate (PC) plastic and Epoxy resins. It is also used in the synthesis of Polysulfones (PSU), Polyether ketones (PEEK) and Polyphenylene oxide (PPO). BPA is also a precursor to the flame retardant tetrabromobisphenol A (TBBPA) and may be found at residual levels in resins that use TBBPA as a flame retardant. Furthermore, BPA can be used as an antioxidant in plasticizers and as a polymerization inhibitor in Polyvinyl chloride (PVC). Some examples of TE products which are manufactured from materials which may contain BPA include connector housings, cable assemblies, gasket and printed wiring boards. Please refer to the material declaration for the specific TE product for detailed information.

Assessment on Ozone Depleting Substances	
Regulatory references: <ul style="list-style-type: none"> - Montreal Protocol on Substances that Deplete the Ozone Layer (ODS), ISBN 92-807-1888-6; - Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer. 	
Substances	Use of substance in TE products
Ozone Depleting Substances (ODS)	TE has eliminated the use of ODS (as defined by the Montreal Protocol) in all products and manufacturing process. TE has placed a ban via our TEC-138-702 supplier specification to prohibit the use of any ODS in the products supplied to TE and the manufacturing process of any TE component.

Assessment on Radioactive Substances	
Regulatory references: <ul style="list-style-type: none"> - Council Directive 96/26/EURATOM of 13 May 1996 laying down basic safety standards for the protection of the health of workers and the general public against the dangers arising from ionizing radiation; - Japan Laws for the Regulation of Nuclear Source Material, Nuclear Fuel Material, and Reactors, 1986. 	
Substances	Use of substance in TE products
Radioactive Compounds	Radioactive compounds (such as Cobalt 60) are not intentionally added to TE products.

Assessment on PFOS and PFOA Substances	
Regulatory references: <ul style="list-style-type: none"> - Commission Regulation (EU) No. 757/2010 amending 850/2004 of the European Parliament and of the Council on persistent organic pollutants as regards Annexes I and III Text with EEA relevance (PFOS); - Norwegian Ministry of Environment Regulation No. 550 amending Product Regulation No. 922 of 2004, on consumer products that contain perfluorooctanoic acid (PFOA). 	
Substances	Use of substance in TE products
Perfluorooctane sulfonates (PFOS) C ₈ F ₁₇ SO ₂ X (X = OH, Metal salt (O-M+), halide, amide, and other derivatives including polymers)	PFOS compounds are neither intentionally added to TE products, nor found as a residue or impurity.
Perfluorooctanoic acid (PFOA) and some salts and esters of PFOA	PFOA and its salts and esters are neither intentionally added to TE products, nor found as residue or impurity above 1000ppm per homogeneous material.

Assessment on Volatile Organic Compounds	
Regulatory references: <ul style="list-style-type: none"> - Directive 2004/42/CE with the specific aim of reducing emissions of VOC into atmosphere resulting from the use of organic solvents in certain paints, varnishes and vehicle refinishing products; - USA EPA promulgated regulations limiting the VOC content of architectural coating and automobile refinish coatings; - China GB/T 27630-2011 Guideline for air quality assessment of passenger car which specified the VOC concentration in the interior environment of a complete vehicle. 	
Substances	Use of substance in TE products
Volatile Organic Compounds (VOC)	None of the above mentioned regulations have a requirement for components such as TE's products, which are not directly exposed to the vehicle interior, but always under a form of cover. TE products are not the main source of VOC for the interior environment of vehicle and VOC has not been a mandatory regulation for TE products, to date. Paints, coatings, cleaners and lubricants used in felt, leather, fabric/cloth backing, garnishing and assemblies are the largest source of VOC in a vehicle. No such paints, coatings, cleaners and lubricants were used in the TE products we provide to automotive industry. Based on above assessment, we hereby confirm that TE products sold to automotive industry are low risk for VOC. For more information, please refer to IMDS reports available for TE products.

Assessment on Halogenated Substances

Regulatory references:

- Canada Prohibition of Certain Toxic Substances Regulations
- Stockholm Convention on Persistent Organic Pollutants (POPs) by United Nations Environment Program (UNEP)
- US TSCA; 29 CFR 1910.1001-1052
- Regulation (EC) No 850/2004 of the European Parliament and of the Council of 29 April 2004 on persistent organic pollutants and amending Directive 79/117/EEC (PCBs)
- Regulation (EU) No 519/2012 of 19 June 2012 amending Regulation (EC) No 850/2004 of the European Parliament and of the Council on persistent organic pollutants as regards Annex I
- Regulation (EU) No 517/2014 of the European Parliament and of the Council of 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) No 842/2006

Industrial specifications:

- The use of halogenated substances in electronic and electrical products is not restricted by any regulation, but could be restricted by certain industries and customers for specific applications;
- IEC 61249-2-21, Materials for printed circuit boards and other interconnecting structures - Part 2-21: Reinforced base materials, clad and unclad - Non-halogenated epoxide woven E-glass reinforced laminated sheets of defined flammability (vertical burning test), copper-clad;
- Joint JEDEC/ECA Standard JS709A, Defining “Low-Halogen” Electronic Products (Removal of BFR/CFR/PVC).

Substances	Use of substances in TE products
PCB, PCT, PCN, SCCP, Chlorinated or Brominated Dioxins or Furans, Hexachlorobenzene	Polychlorinated biphenyls (PCBs), polychlorinated terphenyls (PCTs), Chlorinated or Brominated Dioxins or Furans, Polychlorinated Naphthalenes (PCN), Hexachlorobenzene (CAS No 118-74-1) and Short Chain Chlorinated Paraffins (SCCPs) are neither intentionally added to TE products, nor found as a residue or impurity.
Fluorinated Greenhouse Gases Compounds , (except for SF6)	Fluorinated Greenhouse Gases Compounds (except for SF6) are neither intentionally added to TE products, nor found as a residue or impurity.
Sulfur fluoride (SF6) (CAS No 2551-62-4)	SF6 is neither intentionally added to majority of TE products, nor found as a residue or impurity. SF6 is only used as an isolation and extinguishing gas in limited industrial signal mini-relay products, which are used for telecommunication applications. TE confirms our products comply with global regulations of SF6 ban in such products, while certain customers may have additional requirements. For such products, please refer to material declaration for further details.
Brominated flame retardants (other than PBB or PBDE) Chlorinated flame retardants	Typical TE products which may contain brominated / chlorinated 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.
PVC	PVC is used in several TE product lines including: pre-insulated terminals; cable; cable assemblies; heat-shrink tubing; wire and strain relief interconnection system components.
Halogens not in flame retardants (Br, Cl, F, I, At)	Halogens such as Bromine and Iodine (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. Chlorine could be contained in certain polymer structures such as PPS resin, but is not added as flame retardant. Fluorine could be contained in fluoropolymers and fluoroelastomers, such as polytetrafluoroethylene (PTFE), polyvinylidene fluoride (PVDF), fluoroelastomers (FKM), perfluoro-elastomers (FFKM) and tetrafluoro ethylene/propylene rubbers. Bromine and Fluorine compounds could also be found in certain types of lubricants. Astatine (At) is neither intentionally added, nor found as a residue or impurity in any TE products.

Assessment on Flame Retardant Substances

<p>Industrial specifications:</p> <ul style="list-style-type: none"> - The use of the flame retardants listed below, in electronic and electrical products, is not restricted by any regulation, but could be restricted by certain industries and customers for specific applications. - White Paper - Red Phosphorus Induced Failures in Encapsulated Circuits, by DfR Solutions 	
Substances	Use of substances in TE products
Antimony and its compounds	<p>Antimony compounds are used as portion 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% and it is disclosed in Material Declaration by ISO codes "Aliphatic/Alicyclic Chlorinated flame retardant with Antimony - ISO 1043-4 code #FR(11)", "Aliphatic/Alicyclic Brominated flame retardant with Antimony - ISO 1043-4 code #FR(15)", "Aromatic Brominated flame retardant with Antimony - ISO 1043-4 code #FR(17)" and "Antimony(III) Oxide flame retardant - ISO 1043-4 code #FR(62)". Antimony could also be contained as an impurity in some base metals, such as stainless steel, brass, phosphor bronze, etc.</p>
Organic phosphorus based flame retardant	<p>Organic phosphorus-based flame retardants are increasingly used to formulate non-halogenated flame retardant resins. In a few cases, some of these compounds are combined with halogens to create a more effective system. Some TE products use specific organic phosphorus flame retardant systems and usually this information is disclosed in Material Declaration by ISO1043-4 codes, such as "Halogen-free organic phosphorus flame retardant - ISO 1043-4 code #FR(40)".</p>
Red Phosphorous (RP)	<p>Red phosphorous (RP) is intentionally used as flame retardant only in a few TE products (such as heat shrink tubing products), primarily in polyamide nylon family materials, both glass filled and unfilled. RP is also found as a flame retardant in a few other polymers such as Poly(thio-1,4-phenylene), Acetic acid ethenyl ester, polymer with ethene, and Poly(oxy-1,4-butanediylloxycarbonyl-1,4-phenylenecarbonyl). Note that the phosphorous contained in certain base metals (such as phosphor bronze) is not RP even though it shares the same CAS Number with RP, 7723-14-0, because the purpose of phosphorous in metals is for reasons other than flame retardancy, i.e. mechanical properties. A part number screen is needed if the customer wants to know if RP is in any product. If RP is used, it's disclosed in Material Declaration by CAS Number 7723-14-0 or ISO code "Inorganic Red Phosphorus flame retardant - ISO 1043-4 code #FR(52)". TE does not routinely provide analytical test data for our parts. With over 500,000 sellable items, we are not in a position to provide independent test data for all products. Please refer to the material declaration for the specific TE product for detailed information on RP.</p> <p>TE is aware that use of RP in some designs is not prudent when used in combination with certain heat stabilizers and fine magnet wire applications such as in relays, or when used in epoxies and in PCB's or when bare copper is in direct contact with a RP bearing material, or any specific application requirements to be achieved for sensor, over-molding for electronics. Therefore RP is not used in the products under these applications. Up till now, we are not aware of any corrosion issues of materials or reliability failures of TE product that are caused by RP. For any given product the product specification can be referenced, and it shows the qualification test program that was done for the product. These test programs are designed to stress the product and should screen end use products from reliability concerns.</p>