

CTS Electronics Manufacturing Solutions

November 2005



CTS & EU Directive 2002/95/EC— Restriction of Hazardous Substances (RoHS)

EU Directive 2002/95/EC—Restriction of Hazardous Substances (RoHS) is one of a number of European Directives on the horizon aimed at reducing the effect of waste electrical and electronic equipment on the environment. Specifically, for all products placed on the EU market, from 1st July 2006, the RoHS directive limits to maximum concentration values (MCVs) the use of six substances commonly used in electronic products:

W Lead

W Mercury

W Cadmium

W Hexavalent Chromium

W Polybrominated Biphenyls (PBB)

W Polybrominated Diphenyl Ethers (PBDE)

The MCVs allowable in homogenous materials along with typical applications of the substances within electronic products is shown in the table below.

Banned Substance	RoHS MCV Limits	Use in Electronics
Lead	1000 ppm	Solder and interconnects, batteries, piezoelectric devices*, discrete components, CRT glass*, PVC cables
Cadmium	100 ppm	Batteries, pigments (yellow), additives in plastics (PVC), detectors, LEDs
Hexavalent Chromium	1000 ppm	Metal finishes for chassis, fasteners, other alloys
Mercury	1000 ppm	Switches, paints, polyurethane materials, lamps, bulbs, displays
PBB/PBDE	1000 ppm	Used as flame retardants (plastics, housings, cables, connectors, fans, components)

* Exempt under RoHS Directive

The Directive applies to all electrical and electronics equipment which could be categorized as— large or small household appliances, IT and telecommunications equipment, consumer equipment, lighting equipment, electrical and electronic tools (with the exception of large-scale stationary industrial tools), toys, leisure and sports equipment and automatic dispensers. Medical devices and monitoring and control devices are currently exempt from the requirements of the Directive. Also exempt are the applications of the six banned substances listed in the Annex to the Directive. On top of this, further exemptions are currently under consideration by the Technical Adaptation Committee (TAC) established to ensure the Directive was workable.

A thorough analysis of the requirements imposed by the Directive is required throughout the industry and CTS strongly recommends that every company understands their obligations and addresses both the risks and opportunities posed by the Directive.



RoHS Readiness - CTS Global Lead-Free Manufacturing Process Qualification

As an Electronics Manufacturing Services (EMS) Provider, CTS supplies services rather than products. Our customers retain full design authority over their products, CTS buys to customer-supplied Bills of Material (BoMs) and assembles products in accordance with customer generated documentation. As a result, CTS EMS is most concerned with ensuring that we have a RoHS compliant (and particularly lead-free) manufacturing process capable of producing RoHS compliant products.

We are currently installing lead-free soldering compatible process equipment in all facilities worldwide, enabling CTS to continue to provide product manufacturing portability across three continents.

Once equipped with lead-free soldering capability, each facility will undertake the **CTS Global Lead-Free Manufacturing Process Qualification**—an exercise which has been designed to demonstrate to customers CTS' competence in the use of lead-free manufacturing equipment, process chemistries and components. Full details are available under cover of NDA (non-disclosure agreement), however, in general, the exercise comprises the build of a complex mixed technology assembly (IPC Class Y) and subsequent quality and reliability analysis including visual inspection to IPC-A-610D & J-STD-001D, x-ray inspection for solder bridging, solder joint x-sectioning and scanning-electron microscopy inspection, dye and pry analysis of BGA solder joints and cleanliness evaluation through surface insulation resistance (SIR) testing.

Target Dates for Completion of the Qualification Exercise at each CTS Location is:

¥ UK, Moorpark & Singapore	Q4 2005
¥ New Hampshire & Thailand	Q1 2006
¥ China & Santa Clara	Q2 2006

CTS will also maintain a non-lead free manufacturing process at each facility to support the manufacture of customer products exempt from the requirements of RoHS. The requirement to maintain this capability extends to the foreseeable future

CTS RoHS Compliance Customer Value Proposition

CTS' adoption of a pro-active strategy in addressing RoHS compliance issues has allowed CTS to demonstrate compliance with the directive with minimal expenditure and minimal disruption to existing operations. We are keen to support customers in their desire to do the same.

As such, CTS are currently engaged with a number of customers, providing support through the transition to RoHS compliance.

An OEM transition plan generally comprises three major stages:

1. Analyse BoMs and obtain 'Material Composition Declarations (MCDs)
2. Perform build of RoHS-compliant product samples and conduct performance and reliability testing
3. Purge non-compliant inventory from the supply chain and schedule production cut-in of compliant product

CTS has contracted with **i2 Technologies** to provide customers with a cost-effective means of analyzing BoMs & obtaining MCDs. Where components are found to be non-compliant, CTS will identify manufacturer's RoHS compliant alternatives. Where no alternative is available from the existing manufacturer, CTS component engineering resources will endeavour to identify an alternative source. Where no alternative source can be found CTS development engineering resources can be consulted to identify potential design modifications. In addition, CTS are also able to perform compliance testing on components the customer identifies as critical or high risk.

By the end of Q1 2006, all CTS EMS' global manufacturing facilities will have completed the CTS Global Lead-Free Manufacturing Process Qualification. This provides confidence that the quality and reliability of the soldering on qualification assemblies meets recognized industry standards enabling customers to focus on verifying that the transition to RoHS compliant components has not resulted in any performance degradation.

Finally, CTS' team of talented production planning and supply chain specialists are on-hand to support customers in purging non-compliant inventory in the supply chain and scheduling a RoHS compliant production cut-in date. This disciplined approach is proven to ensure any costs associated with obsolete inventory are minimized or eradicated altogether

Want to Find Out More?

The transition to RoHS compliance presents many challenges to EMS Providers and OEMs alike. CTS have spent considerable time analyzing the implications of the transition and believe our guidance represents the lowest risk compliance strategy for our customers. Should you wish to discuss your specific requirements with CTS please contact your local Account Manager or use the following number for your region:

USA: Moorpark, CA: (T) 805-532-2800, Santa Clara, CA: (T) 408-988-6404, Londonderry, NH: (T) 603-421-2546

EU: Glasgow, Scotland: (T) +44 (0)1698 505050

ASIA: Tianjin, China (T) 0086-10-65-886398, Thailand (T) 0066-3522-1570, Singapore (T) 0065-6481-4634



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