



## RoHS and WEEE Directives

Frequently Asked Questions  
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### THE BASICS

#### What is RoHS?

Often referred to as the European Lead Free directive, the RoHS (*Restriction of Hazardous Substances*) directive 2002/95/EC restricts the use of six hazardous materials found in electrical and electronic products. All applicable products in the EU (European Union) market after July 1, 2006 must pass RoHS compliance.

#### What is WEEE?

WEEE (Waste from Electrical and Electronic Equipment) directive 2002/96/EC mandates the treatment, recovery, and recycling of electric and electronic equipment (90% ends up in landfills). All applicable products in the EU (European Union) marketed after August 13, 2006 must pass WEEE compliance and carry the "Wheelie Bin" sticker.

#### How are RoHS and WEEE related?

WEEE compliance aims to encourage the design of electronic products with environmentally-safe recycling and recovery in mind. RoHS compliance dovetails into WEEE by reducing the amount of hazardous chemicals used in electronic manufacture.

#### What are the restricted materials mandated under RoHS?

The substances mandated under RoHS are lead (Pb), mercury (Hg), cadmium (Cd), hexavalent chromium (CrVI), polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE).

#### What's the intent of the mandate?

It has been determined that the restricted materials are hazardous to the environment and pollute landfills, and are dangerous in terms of occupational exposure during manufacturing and recycling.

#### Who is affected by the RoHS directives?

Any business that sells applicable electronic products, sub-assemblies or components directly to EU countries, or sells to resellers, distributors or integrators that in turn sell products to EU countries, is impacted if they utilize any of the restricted materials.

#### What countries and communities are involved with RoHS and WEEE directives?

RoHS 2002/95/EC was originated in the European Parliament, and applies to all countries within the European Union. WEEE 2002/96/EC was also originated in the European Parliament, and also applies to all countries within the European Union.

Countries within the European Union include Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom. The directive extends to the European Economic Area (EEA) which also includes Iceland, Liechtenstein and Norway.

Other locations working on their own versions of RoHS include:

1. RPCEP (Regulation for Pollution Control of Electronic Products), China, goes into effect July 1, 2006
2. JGPSSI (Japan Green Procurement Survey Standardization Initiative), Japan, Goes into effect July 1, 2006
3. SB20/SB50 (Electronic Waste Recycling Act of 2003-EWRA), California, USA, Goes into effect January 1, 2007
4. Australia, Canada, Korea, Taiwan are also adopting, or working on their own versions of the European Union RoHS directive

## **WHAT IS COVERED UNDER RoHS and WEEE DIRECTIVES?**

### **What products are included under RoHS and WEEE?**

By definition, the following products are included, or impacted, by RoHS 2002/95/EC:

1. *Large household appliances*: refrigerators, washers, stoves, air conditioners
2. *Small household appliances*: vacuum cleaners, hair dryers, coffee makers, irons
3. *Computing & communications equipment*: computers, printers, copiers, phones
4. *Consumer electronics*: TVs, DVD players, stereos, video cameras
5. *Lighting*: lamps, lighting fixtures, light bulbs, household luminaires
6. *Power tools*: drills, saws, nail guns, sprayers, lathes, trimmers, blowers
7. *Toys and sports equipment*: videogames, electric trains, treadmills
8. *Medical devices* (with the exception of all implanted and infected products (RoHS Exempt, WEEE Included)
9. *Monitoring and control instruments* (RoHS Exempt, WEEE Included)
10. *Automatic dispensers*: vending machines, ATM machines

### **What products are exempt under RoHS and WEEE?**

By definition, the following products are exempted by RoHS 2002/95/EC:

1. Large stationary industrial tools
2. Control and monitoring equipment
3. National security use and military equipment
4. Medical devices
5. Some light bulbs and some batteries
6. Spare parts for electronic equipment in the market before July 1, 2006

### **How are exemptions defined under RoHS?**

Great question!

Specific products are seldom named in the exemption categories. "Medical devices" above is broken down into products that the category is considered to include:

- Radiotherapy equipment
- Cardiology
- Dialysis
- Pulmonary ventilators
- Nuclear medicine
- Laboratory equipment for in-vitro diagnosis
- Analysers
- Freezers
- Fertilization tests
- Other appliances for detecting, preventing, monitoring, treating, alleviating illness, injury or disability

In addition, RoHS 2002/95/EC included Annex IA and Annex IB which listed examples of exemptions. There have been additional amendments to the exemption lists. The current list of exemptions, known to us to date, is as follows:

1. Mercury in compact fluorescent lamps not exceeding 5 mg per lamp.
2. Mercury in straight fluorescent lamps for general purposes not exceeding:
  - halophosphate 10 mg
  - triphosphate with normal lifetime 5 mg
  - triphosphate with long lifetime 8 mg.
3. Mercury in straight fluorescent lamps for special purposes.
4. Mercury in other lamps not specifically mentioned in this Annex.
5. Lead in glass of cathode ray tubes, electronic components and fluorescent tubes.
6. Lead as an alloying element in steel containing up to 0,35 % lead by weight, aluminium containing up to 0,4 % lead by weight and as a copper alloy containing up to 4 % lead by weight.
7. Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead),
  - Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission as well as network management for telecommunications,
  - Lead in electronic ceramic parts (e.g. piezoelectronic devices).
8. Cadmium and its compounds in electrical contacts and cadmium plating except for applications banned under Directive 91/338/EEC (\*) amending Directive 76/769/EEC (\*\*) relating to restrictions on the marketing and use of certain dangerous substances and preparations
9. Hexavalent chromium as an anti-corrosion of the carbon steel cooling system in absorption refrigerators.
  - 9a. DecaBDE in polymeric applications,
  - 9b. Lead in lead-bronze bearing shells and bushes,
10. Within the procedure referred to in Article 7(2), the Commission shall evaluate the applications for:
  - Deca BDE,
  - mercury in straight fluorescent lamps for special purposes,
  - lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission as well as network management for telecommunications (with a view to setting a specific time limit for this exemption), and
  - light bulbs,as a matter of priority in order to establish as soon as possible whether these items are to be amended accordingly.
11. Lead used in compliant pin connector systems.
12. Lead as a coating material for the thermal conduction module c-ring.
13. Lead and cadmium in optical and filter glass.
14. Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80 % and less than 85 % by weight.
15. Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit Flip Chip packages.
16. Lead in linear incandescent lamps with silicate coated tubes.
17. Lead halide as radiant agent in High Intensity Discharge (HID) lamps used for professional reprography applications.
18. Lead as activator in the fluorescent powder (1 % lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP (BaSi2O5:Pb) as well as when used as speciality lamps for diazo-printing reprography, lithography, insect traps, photochemical and curing processes containing phosphors such as SMS (Sr,Ba)2MgSi2O7:Pb).
19. Lead with PbBiSn-Hg and PbInSn-Hg in specific compositions as main amalgam and with PbSn-Hg as auxiliary amalgam in very compact Energy Saving Lamps (ESL).
20. Lead oxide in glass used for bonding front and rear substrates of flat fluorescent lamps used for Liquid Crystal Displays (LCD).

The following exemptions are currently under review but have not been formally adopted:

1. Lead in tin whisker resistant coatings for fine pitch applications.
2. Lead bound in glass, crystal glass, lead crystal or full lead crystal in general and Chromium (also in oxidation state (VI)) and Cadmium as colouring batch addition each form up to a content of 2 % in glass, crystal glass, lead crystal or full lead crystal used as decorative and / or functional part of electric or electronic equipment.
3. Solders containing lead and/or cadmium for specific applications.
4. Hexavalent chromium (CRVI) passivation coatings.
5. Lead in lead oxide glass plasma display panels.
6. Lead in connectors, flexible printed circuits, flexible flat cables.
7. Lead oxide in lead glass, bonding materials of magnetic heads and magnetic heads.
8. Cadmium as doping material in avalanche photodiodes (APDs) for the optical fiber communication systems
9. Lead in optical isolators.
10. Lead in sheath heater of Microwaves.
11. Cadmium pigments except for applications banned under Directive 91/338/EEC amending Directive 76/769/EEC relating to the restriction on the marketing and use of certain substances.
12. High Intensity Discharge (HID) lamps for professional U.V. applications, containing lead halide as radiant agent
13. Discharge lamps for special purposes containing lead as activator in the fluorescent powder (1% lead by weight or less)
14. Discharge lamps containing lead in the form of an amalgam.

15. Mercury free flat panel lamp.
16. Special purposes Black Light Blue (BLB) lamps, containing lead in the glass envelope
17. Low melting point alloys containing lead.
18. Galvanised steel containing up to 0.35% lead by weight and aluminium with an unintended lead content up to 0.4% lead by weight in electrical and electronic equipment.
19. Cadmium sulphide photocells.

The following exemptions are proposed and still pending a formal review:

1. Linear incandescent lamp.
2. Mercury in switches.
3. Special ICs having tin-lead solder plating on leads used in professional equipment.
4. Specific modular units including tin-lead solder being used in special professional equipment.
5. Solders containing lead and / or cadmium for specific applications where local temperature is higher than 150 deg C and which need to work properly more than 500 hours.
6. Lead in solder for printed circuit boards for emergency lighting products.
7. Hexavalent chromium (Cr-VI) in chromate conversion coatings as surface treatment.
8. Lead in gas sensors.
9. Concerning of PbO (Lead in Seal Frit) used for making BLU (Back Light Unit) Lamp.
10. Cadmium in opto-electronic components.
11. Non-consumer mechanical power transmission systems including speed reducers and mechanical couplings which rely on electrical / electronic components for safe control and operation.
12. Electrical and electronic components contained in heating ventilation and air conditioning building systems, commercial refrigeration systems and transport refrigeration systems.
13. Cadmium-bearing copper alloys.
14. Electrical / electronic components contained in mobile and stationary air compressors and vacuum systems, compressed air contaminant removal systems and pneumatic contractor's air tools.
15. Electrical / electronic equipment that are: used in transport-aviation, aerospace, road, maritime, rail; installed into the fabric of buildings – elevators, escalators, moving walks, dumb waiter, and heating, cooling and ventilation systems, and fire and security systems; used in the energy generation and transmission; used in mining and mineral processing; used for non-consumer mechanical power transmission systems; industrial process pumps and compressors; used in industrial refrigeration; and used in military applications.
16. Lead alloys as electrical / mechanical solder for transducers used in high-powered professional and commercial loudspeakers.
17. Cadmium oxide.
18. Solder tin of the thermo fuse with a defined low melting point.
19. Lead in lead oxide glass used in plasma display panel (PDP).
20. Lead in solder on small PCB and tinned legs of primary components.
21. Use of the not lead free component NEC V25 in the Memor 2000.
22. Lead used in shielding of radiation for Non Medical X-ray equipment.
23. Lead based solders sealed or captured within heat-shrinkable components and devices.

The following exemptions are proposed and still pending a formal review:

1. On-Semi MCR265-10 SCR.
2. Components NEC V55.
3. The use of lead in solder applications for electronic components of musical instruments having an average lifespan in excess of 10 years.
4. Lead solder alloy in Surge protective devices (SPDs).
5. Inventory of Special ICs having tin-lead solder on/in leads/balls, used in specialist/professional equipment.
6. Lead alloys as electrical/mechanical solder for transducers used in high-powered professional and commercial loudspeakers.
7. Solder containing lead for applications where the local temperature exceeds 150 C and reliable operation for a minimum of 30,000 hours is required.
8. Tin-lead solder in the manufacture of professional audio equipment.
9. Specific modular units including tin-lead solder being used in special professional equipment.
10. Lead in electronic vacuum tubes.
11. Lead in aluminium used in gas valves for domestic cooking appliances.
12. Cadmium and its compounds in electrical contacts except for applications of one-shot operation function such as thermal links and cadmium plating except for the applications banned under Directive 91/338/EEC amending Directive 76/769/EEC relating to the restriction on the marketing and use of certain dangerous substances and preparations.
13. Lead in solder of parts recovered from gaming/amusement machines put on the market before 1/07/06 and reused for the same purpose within a manufacturer's closed loop until July 2014.
14. Lead in solders in components and assemblies used in non-consumer products, provided that: - such components and assemblies were purchased or are subject to a proven last-time buy contract placed before 1 July, 2006; and - such components and assemblies are used in models of EEE that were already available on the market before 1 July 2006.
15. Cadmium plating as defined in Directive 91/338/EEC except for applications banned under Directive 91/338/EEC amending Directive 76/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations.

The following exemptions are under consultation and are pending:

1. Cadmium and cadmium oxide in thick film pastes used on beryllium oxide substrates until January 1, 2008.
2. Gaskets of butyl rubber material vulcanised with chinondioxim and lead tetraoxide, for use in Aluminium Electrolytic Capacitors.
3. Sharp LQ104X2LX11 (formerly Fujitsu FLC26XGC6R-01).
4. Quartz Crystal Resonator and in Fine Pitch Electronics Systems used in the Swiss Watch Industry.
5. Cadmium in opto- electronic components.
6. Transducers used in professional loudspeaker systems, using tin-lead solder.
7. Tin-lead solder in the manufacture of professional audio equipment.
8. Components used in the manufacture of the Hog1000, Hog500, Event416, Event408, ESP2-24 and ESP2-48 lighting control consoles.
9. Specific modular units, including tin-lead solder, being used in special professional equipment.
10. Inventory of special ICS having tin-lead solder on/in leads/balls, used in specialist/professional equipment.
11. Cadmium Mercury Telluride.
12. Lead contained in Babbit lined bearings.
13. Cadmium alloys as electrical/mechanical solder joints to electrical conductors located directly on the voice coil in transducers used in high-powered loudspeakers.
14. Thermal cutoff with a fusible element that contains lead (and possibly cadmium, mercury and hexavalent chromium) for applications where normal operating temperature exceeds 140 C and reliable, predictable, operation for a minimum of 30,000 hours is required.
15. Mercury free flat panel lamp.
16. Electronic equipment where the reliability, durability and longevity of the equipment is paramount.
17. Semi Red Brass C84400, 81-3-7-9 or a similar Brass material. Used on radio frequency line sections.
18. Lead is used as an alloy to the copper in 6 to 8 % by weight. Needed for casting and machinability characteristics.
19. Lead in solders for electronic equipments used for the monitoring, the protection and the safety of people in healthcare, telecare and emergency calls domains in professional and private sectors.
20. FPGA devices manufactured by Xilinx (XC5202-6VQ100C, XC4003E-3VQ100C and XC4013E-3PQ240C) containing lead solder (Pb) used in the plating of the device terminations.
21. Lead oxide in seal frit used for making window assemblies for argon and krypton laser tubes.
22. Smart card readers (product: GemSelf700-MS2, GCR700-3ZS, Vodafone D2 , GCR760 and GemSelf750 SV).
23. Use of mercury in Babcock's DC plasma displays and use of Lead Oxide (PbO) in Babcock's DC plasma displays frit seal.

**Are Do-It-Yourself Kits included in RoHS included directives?**

No, components do not fall within the scope of RoHS, so kits of parts do not apply. See Ramsey Questions below for further information.

**Is there any difference between professional and consumer equipment?**

No, both are included under the RoHS directive.

**Are there minimal levels of the restricted materials mandated under RoHS?**

Yes. There is a maximum level for the six restricted materials as follows:

- **Cadmium (Cd):** 100 ppm
- **Mercury (Hg):** 100 ppm
- **Lead (Pb):** 1000 ppm
- **Polybrominated Biphenyls (PBB):** 1000 ppm
- **Polybrominated Diphenyl Ethers (PBDE):** 1000 ppm
- **Hexavalent Chromium (CrVI):** 1000 ppm

**How are products tested to be in compliance with these maximum RoHS limits?**

RoHS compliance testing can be carried out using portable RoHS analyzers known as x-ray fluorescence or XRF metal analyzers, such from Niton and Innov-X Systems.

**Does a product need to be labeled that is in compliant with RoHS?**

No. However for product identification manufactures are urged to provide their own RoHS compliant label on their respective products.

## **RAMSEY ELECTRONICS RELATED QUESTIONS**

### **HOBBY PRODUCTS**

#### **Are Ramsey Hobby Kits included under the RoHS directives?**

No. Electronic components do not fall within the RoHS directives, therefore, do-it-yourself kits do not apply. However, many Ramsey Kits already include RoHS compliant components and PC Boards. As each respective Ramsey Kit becomes 100% RoHS compliant, it will be identified as such as a convenience to both the distributor and end use.

#### **Are Ramsey Factory Assembled and Tested Hobby Kit products included under RoHS directives?**

Yes. Factory assembled and tested hobby kit products are undergoing RoHS conversions. These products will be identified on an individual basis, and will be available to distributors and end users. Non RoHS compliant factory assembled hobby kits cannot be sold to European Union distributors and customers after July 1, 2006.

#### **Can distributors and dealers continue to sell non RoHS compliant hobby kits currently in stock after July 1, 2006?**

Yes, as long as the products are in place on the market, warehouse, or distribution prior to July 1, 2006.

#### **Can non RoHS compliant hobby kit products be repaired and serviced after July 1, 2006?**

Yes, all non RoHS compliant products may continue to be maintained and repaired using either non RoHS components or RoHS components.

#### **Can distributors within the European Union sell non RoHS compliant products to customers outside the European Union?**

Yes, as per current legislation. Check with each Country directives and regulations.

#### **How do I assemble and solder a lead free RoHS compliant hobby kit?**

Great question and quite the mystery and it shouldn't be! RoHS compliant hobby kits, as well as other RoHS soldering simply required lead free solder and a soldering iron or soldering station compatible with lead free solder. Normal wire solder is typically composed of a Tin/Lead combination, typically 60/40 Sn/Pb. Melting temperature of this solder is typically 190°C.

RoHS compatible wire solder is typically composed of a Tin/Silver/Copper combination, typically 96.5/3/0.5 Sn/Ag/Cu. Melting temperature of this solder is typically 217°C. Other RoHS solder alloys are available that also contain Bismuth, Indium, Zinc and Gold that vary in performance, applications, and melting point temperatures.

Higher temperature melting points require higher temperature soldering irons or stations that can specifically maintain that temperature without any degradation throughout the duration of the solder joint. RoHS soldering irons, stations, and de-soldering stations are available that are designed to maintain their higher temperatures accordingly. Likewise RoHS compliant PC Boards, and components must be designed to withstand this higher heat during soldering procedures.

RoHS compatible wire solder, soldering irons, soldering stations, and de-soldering stations are already available at Ramsey Electronics.

## **RF SHIELDED TEST ENCLOSURES**

### **Are your RF Shielded Test Enclosures included under RoHS directives?**

No by definition. Equipment for measurement, monitoring, testing is not included at this time. It has been proposed, but not approved, that such equipment will be included within the scope of the RoHS directive, but that is not likely before 2009/2010. However, all Ramsey Shielded Test Enclosures are currently RoHS compliant in advance of future RoHS directives of both the European Union and future directives of other jurisdictions.

### **Will your RoHS compliant RF Shielded Test Enclosures be identified or marked as such?**

Yes, any Ramsey product that is RoHS 2002/96/EC compliant will be identified with the Ramsey RoHS compliant logo.

## **PROFESSIONAL TEST EQUIPMENT**

### **Is your professional test equipment (RF Signal Generators, Communications Service Monitors) included under RoHS directives?**

No by definition. Equipment for measurement, monitoring, testing is not included at this time. It has been proposed, but not approved, that such equipment will be included within the scope of the RoHS directive, but that is not likely before 2009/2010.

## **BROADCAST TRANSMISSION EQUIPMENT**

### **Are your Professional FCC Certified FM Stereo Broadcast Transmitters included under RoHS directives?**

No by definition. Equipment for broadcast transmission is not included at this time.

## **ADDITIONAL RESOURCES**

Original directives and other supporting PDF's are available at [www.ramseyelectronics.com/rohs](http://www.ramseyelectronics.com/rohs).

*Note: This FAQ is an overview of the RoHS and WEEE directives provided by, and based on the interoperations of, Ramsey Electronics, and is, by no means, considered absolute, complete, or binding. Please check your countries regulatory authorities for the most current updates that may apply to your jurisdiction.*