

Restriction of Hazardous Substances Directive (RoHS)

The **Restriction of Hazardous Substances Directive (RoHS)** was adopted in February 2003 by the European Union. The RoHS directive took effect on July 1, 2006. As a directive rather than a law, European Union member states have a certain amount of leeway as to the exact rules to be adopted and the manner in which they will be enforced.

This directive restricts the use of six hazardous materials in the manufacture of various types of electronic and electrical equipment. It is closely linked with the Waste Electrical and Electronic Equipment Directive (WEEE) which sets collection, recycling and recovery targets for electrical goods and is part of a legislative initiative to solve the problem of huge amounts of toxic waste.

The materials whose use is restricted under RoHS include:

1. Lead
2. Mercury
3. Cadmium
4. Chromium VI (Also known as hexavalent chromium or Cr6+)
5. PBB, PBDE (PBB and PBDE are flame retardants used in some plastics)

The maximum concentrations are 0.1% (except for Cadmium which is limited to 0.01%) by weight of homogeneous material. This means that the limits do not apply to the weight of the finished product, or even to a component, but to any single substance that could (theoretically) be separated mechanically — for example, the sheath on a cable or the tinning on a component lead.

As an example, a radio comprises a case, screws, washers, a circuit board, speakers etc. A circuit board comprises a bare PCB, ICs, resistors, switches etc. A switch comprises a case, a lever, a spring, contacts, pins etc. The contact might comprise a copper strip with a surface coating.

Everything that can be identified as a homogeneous material must meet the limit. So if it turns out that the case was made of plastic with 2300 ppm (0.23%) PBB used as a flame retardant, then the entire radio would fail the requirements of the directive.

Who is Affected?

While RoHS is a European Union directive, its principles and reach are global. The directive indicates that any product under the purview of RoHS entering the European Union must be in compliance– that includes cables made in China, parts molded in the U.S. and PCB's made in Japan. If it's destined for the EU, it is impacted by RoHS.

RoHS Around the World

Environmental legislation is here to stay. In addition to the European (EU) version of RoHS, there are several other versions that are in development world-wide: China, Korea, Australia, Canada, Malaysia, Taiwan, Thailand, and state-specific US versions. For example, California's Electronics Waste Recycling act of 2003 (SB 20, Chapter 526) echoes the RoHS directive and takes effect January 1, 2007. In total, more than half of US states are in the process of enacting legislation that will limit the use of hazardous materials in manufacturing processes. Some of these new laws will take effect within the next year.

RoHS Compliance

RoHS compliance is the responsibility of the company which puts the product on the market, as defined in the directive; components and sub-assemblies are not responsible for product compliance. Of course, given the fact that the regulation is applied at the homogeneous material level, data on substance concentrations needs to be transferred through the supply chain to the final producer.

The directive applies to equipment as defined by the WEEE directive. This includes:

Items Controlled	Electrical equipment or electronic devices with power supplies less than 1000VAC or 1500VDC
Category 1	Major appliances/refrigerator, washing machine, microwave, air conditioner, cooking equipment
Category 2	Small home appliances/cleaner, toaster, shaver, electric or electronic watch etc.
Category 3	Communication tool / PC, Copy machine, calculator, telephone, cellphones, etc.

- Category 4 Consumer products/radio, TV, VCR, Electric musical instruments etc.
- Category 5 Lighting equipment/dim bulb, discharge lamp, sodium lamp, optical control devices.
- Category 6 Electric or electronic tool/electric drill, saw, sewing machine, welding machine, etc.
- Category 7 Toys, leisure, sports goods/video game, slot machine etc.
- Category 8 **Medical devices/ cardiac electro gram, cardiac electro gram, dialysis equipment**
- Category 9 **Monitor and control equipment/smoke detector, measuring instrument, instrumentation.**
- Category 10 Vending machine/Can or bottle beverage vending machine, Cash dispenser, etc.

Categories 8 and 9 are not currently under RoHS regulation. Additionally, RoHS does not apply to fixed industrial plant and tools. Note that batteries are not included within the scope of RoHS, therefore NiCad, Lead-acid and Mercury batteries are permitted despite the use of restricted substances.

RoHS applies to these products in the EU whether made within the EU or imported. Certain exemptions apply, and these are updated on occasion by the EU.

RoHS Enforcement

Each European Union member state will adopt its own enforcement and implementation policies using the directive as a guide. Therefore, there could be as many different versions of the law as there are states in the EU.

Proof of compliance can be furnished by the manufacturer. Please consult us for further information.

RoHS Resources

[Restriction of Hazardous Substances Directive \(RoHS\) 2002/95/EC](#)
[Waste Electrical and Electronic Equipment Directive \(WEEE\)2002/96/EC](#)