



Restriction of Hazardous Substances

The European Union's (EU) Restriction of Hazardous Substances (RoHS) restricts the use of hazardous materials found in electrical and electronic equipment (EEE) products in the EU market. The restrictions include ten substances over 11 categories of products. The original directive was placed in effect in 2006, with two revisions (RoHS 2 and RoHS 3) under which compliance was required by July 22, 2019.

Who Must Comply

Any business that sells or distributes EEE products, sub-assemblies, components, or cables directly to EU countries, or sells to resellers, distributors or integrators that in turn sell products to EU countries must comply if they use any of the restricted materials.

Restricted Substances

RoHS specifies maximum levels for the following substances:

- Cadmium (Cd): < 100 ppm
- Lead (Pb)*: < 1000 ppm
- Mercury (Hg): < 1000 ppm
- Hexavalent Chromium: (Cr VI) < 1000 ppm
- Polybrominated Biphenyls (PBB): < 1000 ppm
- Polybrominated Diphenyl Ethers (PBDE): < 1000 ppm
- Bis(2-Ethylhexyl) phthalate (DEHP): < 1000 ppm
- Benzyl butyl phthalate (BBP): < 1000 ppm
- Dibutyl phthalate (DBP): < 1000 ppm
- Diisobutyl phthalate (DIBP): < 1000 ppm

* RoHS 0.1% lead amounts are exempted when used as an alloying element in steel, aluminum, copper; in specific solders; and in specific glass and ceramic applications up through 2024.

Product Categories

RoHS applies to all products in the following categories as well as all wire, cables and associated connectors, both internal and external.

- Category 1: Large household appliances - refrigerators, washers, stoves, air conditioners
- Category 2: Small household appliances - vacuum cleaners, hair dryers, coffee makers, irons

- Category 3: Computing & communications equipment - computers, printers, copiers, phones, satellite TV, cell tower equipment, antennas
- Category 4: Consumer electronics - TVs, DVD players, stereos, video cameras
- Category 5: Lighting - lamps, lighting fixtures, light bulbs (some fluorescents are exempt)
- Category 6: Power tools - drills, saws, nail guns, sprayers, lathes, trimmers, blowers
- Category 7: Toys, leisure and sports equipment - videogames, treadmills, talking dolls, Fitbits
- Category 8*: Medical devices and equipment - includes in-vitro diagnostic medical devices (IVDs)
- Category 9*: Monitoring and control equipment - thermostats, smoke detectors, fire alarms, including industrial applications
- Category 10: Automatic dispensers - vending machines, ATM machines
- Category 11: Catch-all - all other electronic and electrical equipment not covered under the other categories. Included are 2-wheeled electric vehicles; electronic nicotine delivery systems (ENDS) such as e-cigarettes, cannabis vaporizers and vape pens; electrical cables that are less than 250V working voltage.

* The compliance date for phthalate restriction in products in Categories 8 & 9 is July 22, 2021.

Exempted Product Categories

The following product categories are currently exempted from RoHS compliance:

- Military - equipment used for defense or national security
- Space - equipment sent into space such as satellites, telescopes, spacecraft
- Transportation - vehicles used for transport (except 2-wheeled electric vehicles)
- R&D - equipment used for professional research and development
- Non-road mobile machinery (NRMM) - agricultural, railway, waterway, construction machinery
- Large-scale fixed installations (LSFI) - electrical distribution, HVAC, robotic equipment and lines
- Large-scale stationary industrial tools (LSSIT) - CNC, milling, metal-forming, testing machines; cranes

- Fixed-location photovoltaic panel (PV) installations
- Active Implantable Medical Devices (AIMDs) - pacemakers, implanted defibrillators, insulin pumps
- Sub-equipment for out-of-scope equipment
- Batteries - just the cells, not external wiring
- Compact fluorescent light bulbs/lamps
- Spare parts for equipment in the market before RoHS took effect - applies to all except for Category 11 products

Compliance

RoHS requires that manufacturers carry out compliance checks, prepare the declaration documentation, and append CE markings on their finished products to show they are compliant. RoHS also requires recordkeeping to show compliance from everyone in the supply chain.