

How Green Are You?

The refuse from discarded electronics products, also known as e-waste, often ends up in landfills contaminating the land, water and air, instead of being recycled. The problem is that the materials used by the electronics industry includes toxic materials like lead, mercury, antimony, cadmium, and halogenated compounds. These toxic materials are found in most semiconductors, assembled printed wire boards (PWB's), plastic cases, and packaging. According to a report issued by American Electronics Association (AEA), the U.S. high-tech industry has less than two years to comply with two major environmental laws, which were adopted by the European Union (EU) Council of Ministers.

The European RoHS directive bans the use of certain materials such as lead, mercury and cadmium, in electronics products built anywhere in the world and sold on the EU market beginning July 1, 2006.

The WEEE directive requires companies that sell their electrical and electronic equipment in the EU to pay for collection and recycling of their electronics waste by Aug. 13, 2005.

In response to these directives the JEDEC Solid State Technology Association, defined lead-free solid-state devices as those containing no more than 0.2% by weight of elemental lead, but it is unclear that this will meet the intent of the RoHS directives. The JEDEC then introduced a revised standard (IPC/JEDEC J-STD-020B) to ensure that IC packaging meets the increased board assembly and reliability requirements that arose when lead content was cut back in terminations, solder balls, and plating finishes. As part of these initiatives, the devices must be marked to ensure that there is no chance of putting a non-compliant device (ie a device containing significant levels of lead, cadmium, and antimony) into a product, which would be sold after the deadline.

In response to these directives, the semiconductor and electronics industries have initiated testing programs to ensure their materials are compliant. Balazs has launched a series of services to help manufacturers monitor the elemental content of various components and packaging materials. The following tests are helpful in determining the levels of the toxic materials identified in the Directives:

- ICP Elemental Analysis, which measures the level of cadmium, lead, arsenic, and mercury at the 1000 ppm specification limit.
- Hexavalent Chromium by UV-VIS, which measures the level of hexavalent chromium at 1000 ppm specification limit.
- FTIR analysis of polymeric blends, which measures the level of PVC in PVC blend polymer materials at the 1000 ppm specification limit. Typically companies are simply checking for the presence of these bulk polymers so the specification limit does not need to be very low. Lower detection limits are available. GC/MS Analysis for Organic Bromine Compounds, which measures the level of a series of brominated volatile organic materials at the 1000 ppm limits.

Doing these tests is especially important when electronic devices, components, and the packaging materials they will be transported in are shipped to Europe or the Asia Pacific regions.