

## RESTRICTED SUBSTANCES MATERIAL MANUFACTURERS -IT'S UP TO YOU

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### Introduction to RoHS

Regulatory restrictions established by the European Union (EU) are in place and will be imposed effective the beginning July 2006. This provides that all manufacturers, retailers, exporters and consumers of electronic and electrical equipment to be sold in Europe comply with EU's Restriction of Hazardous Substances (RoHS) Directive.

This Directive mandates the maximum concentration levels of six hazardous materials:

Cadmium, mercury, lead, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame-retardants. The specified RoHS limits have been designated as follows:

- Cadmium (Cd) 100ppm
- Lead (Pb) 1000ppm
- Mercury (Hg) 1000ppm
- Hexavalent Chromium (CrVI) 1000ppm
- Brominated Flame Retardants 1000ppm

### Complexity of Testing

Industry representatives throughout the world continue discussions on the various test methods needed to comply with the RoHS requirement. While most methods present fairly routine analytical procedures, the difficulty lies in 1) obtaining a representative sample establishing a homogenous specimen and 2) providing a means to extract or digest the specimen for analysis. The key lies in distinguishing what is a truly a "Homogeneous Material." It is defined as a single unit that cannot be mechanically disjointed in single materials, of uniform composition throughout. This sounds simple, but consider the infinite combinations of compounds and materials that comprise the "End Products" we use everyday.

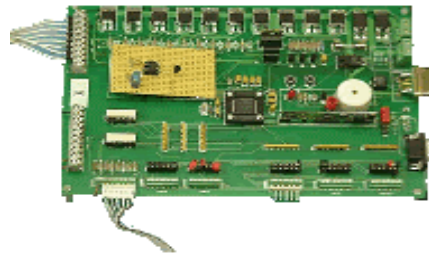


Image 1 – Populated PCB

For example, a cellular phone or printed circuit board containing a simple semiconductor chip package can contain a minimum of six different materials all that need to be evaluated individually.

Mechanically separating these materials can be a difficult and time-consuming procedure. This only enforces the necessity for material manufacturers to address these issues on the material level and eliminate the difficulties of achieving a homogenous material. If the material manufacturer assumes this responsibility, this will certainly minimize the costs that will be placed upon the end product producer.

## Testing Guidelines

Proven and reliable analytical equipment has been determined through extensive round robin and correlation test programs performed by various labs throughout the world. This equipment, expensive to procure, is another step to align industry with uniformity concerns. Inductive Coupled Plasma (ICP) is being used to analyze for Cadmium (Cd), Lead (Pb) and Mercury (Hg). Hexavalent Chromium (CrVI) has been evaluated using Ultra Violet/Visible Spectrophotometry and Ion Chromatography and Gas Chromatograph/Mass Spectroscopy (GC/MS) for brominated Flame Retardants.

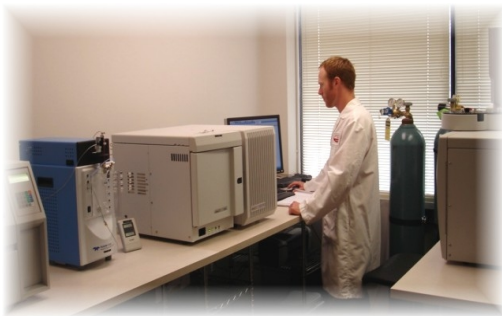


Image 2 – Gas Chromatograph/ Mass Spectrophotometer

The analytical test procedures have been developed through the adaptation of existing EPA methods used primarily for testing soils. These procedures provided a starting point for the basis of the analytical tests and have been expanded to address the possible interference issues involved with processing the diverse range of materials we are faced with.

## Material Processing

The difficulty in handling this vast variety of materials requires special sampling and digestion procedures in order to accurately analyze for the six materials keyed by the RoHS directive. Some materials provide for easy digestion techniques thus simplifying the analysis process. Others, such as complex compounds require special processing techniques, expensive equipment and the expertise to correctly perform the analysis.

## Compliance Documentation

Another problem faced by manufacturers lies with providing the formal compliance documentation applicable to their materials or end products. As of March 2005, the European Union governments have not provided a standard format that manufacturers must follow. This situation can only provide for more inconsistencies and variations on the analytical approach utilized throughout the various industries. At some, standardization of formatting will need to occur. Whether this is provided by the EU or not, uniformity to address the compliance issues is key to streamlining the requirement.



# Technical Spotlight

TRACE LABORATORIES-EAST

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## Trace Laboratories East

Trace Laboratories East continues to stay abreast of developments by involvement with technical committees and groups addressing the issues of the quickly approaching deadlines of July 2006. Our technical staff are members of or consistently monitor the activities associated with IPC, IEC T111 and the recently formed ASTM F40 Committee focused solely on the issues of Restricted Substances.

In addition, Trace-East has been invited to participate in UL's Restricted Substances Compliance Solutions (RSCS) Program as a qualified third party laboratory. This certification will provide Trace-East the ability to perform testing services as an extension of UL's laboratory, thus providing clients an alternative source to evaluate for RoHS Compliance. As a Certificated Agent for UL servicing the plastics and printed wiring board industry, we expect this additional credential to further enhance the services we can provide to our existing clients. Our goal is to combine the UL formal recognition test program along with the RoHS test program in presenting the "complete package" to our clients.

**For more information concerning these topics or any other testing needs, please contact us at (410) 584-9099 (skeller@tracelabs.com) or our Western Office at (303) 683-4806 (jradman@tracelabs.com). Visit us on the web at [www.tracelabs.com/east](http://www.tracelabs.com/east).**