

RoHS & REACH

An Overview

Presented by:
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EU RoHS Directive 2002/95/EC

Background

- *Restriction of Hazardous Substances Directive*
- Implemented February 2003
- Took effect 7/1/2006
- EU Member states required to enact laws to implement the directive.
- Targets only certain types of electronic equipment
- Tied to EU WEEE Directive 2002/96/EC

EU RoHS Directive 2002/95/EC

Scope

- **EEE as defined in Annex 1A/1B of EU WEEE directive 2002/96/EC considered in scope.** “Equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents” and “designed for use with a voltage rating not exceeding 1000 Volt for alternating current and 1500 Volt for direct current”
- **Certain types of electronic equipment, including...**
 - **Consumer electronics, Tools, Lighting**
 - **Sports equipment, Toys**
 - **Computers, servers, workstations, peripherals**
 - **Household appliances**
 - **Telecommunications equipment**
 - **and more....**

EU RoHS Directive 2002/95/EC

Scope

- **Not currently in scope....**
 - **Medical, Industrial monitoring and control equipment. (Product categories 8 and 9)**
 - **Fixed Installations and large scale industrial tools**
 - **100% Military or National Security related items**
 - **Spare parts for the repair of products placed in the market before July 1, 2006**
 - **Forms part of equipment not covered in product categories list**
 - **Is not listed on the product categories list**

EU RoHS Directive 2002/95/EC

Scope

The EU commission and EU parliament are currently working on a new RoHS Recast that is expected to significantly impact currently exempted products such as medical devices, fixed installations, etc.

If you are not in scope now – be advised – that could be changing very soon!

EU RoHS Directive 2002/95/EC

Restricted substances

- The following substances are currently restricted under the EU RoHS Directive:
 - Lead – 1000 PPM limit
 - Mercury – 1000 PPM limit
 - Cadmium – 100 PPM limit
 - Hexavalent Chromium – 1000 PPM limit
 - PBBs (Polybrominated Biphenyls) – 1000 PPM limit
 - PBDEs (Polybrominated Diphenyl Ethers) – 1000 PPM limit
- Limits (Thresholds) applied at the homogeneous level not part, product, or component level.
- There are exemptions available for applications of the above substances where the removal of the substance has been deemed not technologically viable. (more on this later)

EU RoHS Directive 2002/95/EC

Homogeneous Materials

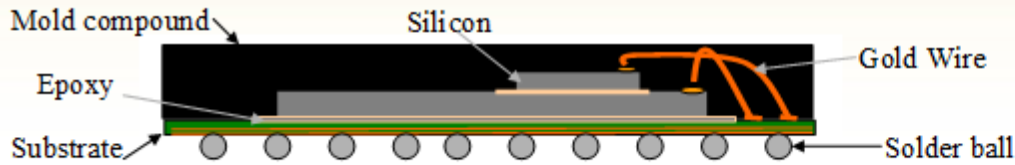
- All products must be validated that the six substances are not present in the subject product above stated thresholds, applied at the **HOMOGENEOUS Material level**.
- “Homogenous Material” means a material that cannot be mechanically disjointed into different materials. The term homogeneous is understood as “of uniform composition throughout”, e.g., individual types of plastics, ceramics, glass, metal, alloys, paper, board, resins and coatings.
- The term "mechanically disjointed" means that the materials can, in principle, be separated by mechanical actions such as unscrewing, cutting, crushing, grinding, and abrasive processes.

EU RoHS Directive 2002/95/EC

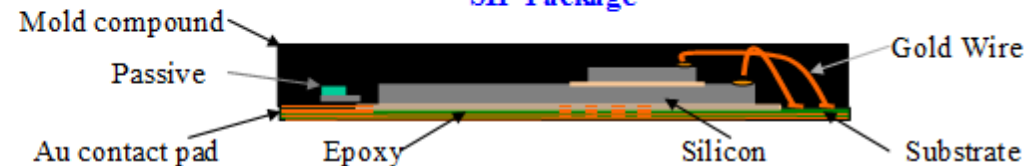
Definition of Homogenous Materials

- Components such as capacitors, transistors and semiconductors packages are not “homogenous materials” but contain several different materials

BGA Package



SIP Package



- Multiple homogeneous materials in:
 - **Substrate:** solder mask, BT core etc...
 - **Solder paste:** solder powder alloy, flux mixture
 - **Gold finger:** copper, nickel, gold
 - **Resistor:** substrate, conductive layer, glass layer, termination layer etc...
 - **Capacitor:** inner electrode, ceramic body, conductive layer, barrier layer etc...

EU RoHS Directive 2002/95/EC

Exemptions

- Certain application-specific exemptions are defined in cases where the commission has determined that meeting the stated threshold is not viable .
- The exemption list is reviewed and updated every 4 years.
- Many exemptions have defined expiration dates, that could be extended at the next review.
- Exemptions are listed in the Annex of the RoHS Directive
- Currently, the annex lists 39 exemptions, however, several are broken up into sub-exemptions

Exemptions – some examples

(2010/571/EU)

Exemption 7(c)-i: Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound.

Typically claimed by resistors due to high homogeneous concentrations of lead in glass frit.

Exemption 7(a): Lead in high melting temperature type solders (i.e. lead- based alloys containing 85 % by weight or more lead)

Typically claimed by some high-current / high-temperature power components such as inductors, transformers.

Exemption 15: Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages.

Typically claimed by Flip-chip integrated circuits due to use of leaded ball attachments.

EU RoHS Directive 2002/95/EC

Expected Changes

- **RoHS Recast in the works**
 - **Scope – pushing for open scope, with specific exemptions listed. Medical will be in scope.**
 - **Clarified and updated exemption process**
 - **No new substance bans are expected to be added at this review**
 - **Possible that RoHS compliance will be brought under the CE marking directive**
- **Exemption list was recently updated, no significant changes expected in the near term.**

EU REACH REGULATION

Background

- *REACH - Registration, Evaluation, Authorization and Restriction of Chemicals*
- Implemented December 13, 2006
- Entered into force June 2007, with phased in implementation over the next decade
- EU Regulation (Not Directive)
- Targets all substances, chemicals, and everything made with them
- 849 pages long, largest and most complex piece of legislation in the EU's history

EU REACH REGULATION

Scope

- All Substances, Preparations, and Articles produced or imported into the EU are in scope.
- Definitions:
 - **Substance:** a chemical element and its compounds in the natural state or obtained by any manufacturing process, including any additive necessary to preserve its stability and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition
 - **Preparation:** a mixture or solution composed of two or more substances
 - **Article:** an object which during production is given a special shape, surface or design which determines its function to a greater degree than does its chemical composition.
- All Electronic products and parts are considered **ARTICLES**.
- No exemptions provided
- Each piece of packaging is evaluated as a separate article
- If an article expels any kind of substance or preparation, that material should be investigated separately.

EU REACH REGULATION

The SVHC List

- SVHC = Substances of very high concern
- List maintained by ECHA (European Chemicals Agency)
- Currently 38 substances on the list
- New substances are added 2 times per year
- Once a substance is added, notification responsibilities are instant – no implementation period
- Threshold for all SVHC Substances is 1000 PPM at the Article level
- Products should be evaluated to determine if they contain any SHVCs in amounts greater than 1000ppm at the article level. If it doesn't, your work is done. If any SVHCs are found in amounts in excess of the threshold, then....

EU REACH REGULATION

Reporting and Obligations

- If no SVHCs are present in amounts >1000ppm by article weight, product is compliant.
 - Document your findings.
 - Make a declaration available to your customers – it should reference the actual substances reviewed.
- If any SVHC is present in amounts >1000ppm by article weight, your product is STILL COMPLIANT! However, you have some responsibilities that kick in.....
 - Provide the recipient of the article with sufficient information, available to the supplier, to allow safe use of the article including, as a minimum, the name of that substance.
 - On a request by a consumer, shall provide the consumer with sufficient information, available to the supplier, to allow safe use of the article including, as a minimum, the name of that substance. The relevant information shall be provided, free of charge, within 45 days of receipt of the request.

EU REACH REGULATION

Remember:

With REACH, a product needs to be validated against the latest SVHC list.

- Always require dated declarations from suppliers that specifically list the substances evaluated
- Always provide the dated declarations listing the substances evaluated
- Monitor the SVHC list for changes and additions
- Monitor the Registry of intentions for information on substances being considered for inclusion

STRATEGIES FOR COMPLIANCE

CoC Approach:

- One approach is to simply collect certificates of compliance from every supplier, then issue one for your product based on supplier CoCs.
- The good:
 - Quick and easy
 - Minimal paperwork and data to manage
 - Low Resource draw
- The bad
 - CoCs typically do not provide exemption details, you don't know what RoHS exemptions you are claiming.
 - Any change to exemption lists, RoHS legislation, etc., can require a complete re-poll of supply chain to update CoCs.
 - With REACH updates every 6 months, tracking CoCs can be a challenge
 - Fails to satisfy industry due-diligence standards
 - Does not provide any substance content data

STRATEGIES FOR COMPLIANCE

JIG 101 Substance content reporting:

- Another approach is to collect substance data from suppliers relating to specific reportable substances of interest, as defined in JIG 101 *“Material Composition Declaration for Electrotechnical Products”*.
- **The good:**
 - Much easier than full disclosure data to obtain
 - Most supply chains can support JIG 101 data requests
 - You now have a database of your product’s material substance content.
 - Will include RoHS substance content and exemption data.
 - Adequate to meet many large OEM reporting mandates (but not all)
- **The bad**
 - Does not guarantee coverage for REACH – REACH declarations will need to be chased separately.
 - Not full disclosure – May not be enough to provide customer required material data.
 - JIG 101 substance lists are subject to updates and changes over time, so data may need to be refreshed periodically

STRATEGIES FOR COMPLIANCE

Full Disclosure reporting:

- The final approach is to collect substance data from suppliers on all substances in every material of every part. (The mass of all the substances listed should add up to the mass of the part.)
- The good:
 - Complete data on every substance present in your product
 - Because you know every substance present, REACH is covered as well as RoHS
 - Data includes RoHS substances, amounts, usage, exemptions, as well as all JIG substances
 - Future-proofed, in the manner that as substances are added to various control lists, you can simply compare any new substances to your existing database.
 - Adequate to meet any large OEM reporting mandates
- The bad
 - Resource intensive – collecting full disclosure data on homogeneous materials of every part results in an enormous pile of data to manage.
 - Many points in some supply chains are unable or unwilling to supply the needed data.
 - Extends the time to collect and roll up supplier data considerably.

STRATEGIES FOR COMPLIANCE

Data Exchange Trends

- In order to meet environmental requirements, data must be exchanged up the supply chain
- No one exchange format has been adopted
- Some common formats:
 - Trading CoCs
 - IPC 1752 version 1.1
 - References obsolete JIG and RoHS exemption lists
 - PDF based
 - Class 1/2 = RoHS yes/no, Class 3/4 = RoHS + Jig101, Class 5/6 = full disclosure
 - IPC 1752 version 2.0
 - References current JIG and RoHS exemption lists
 - Improved over weaknesses in previous version
 - No PDF form – XML based. Must have a tool capable of working with IPC 1752 XML files. This is slowing adoption
 - Modular format – different structure from old ‘class’ system.
 - Most substance control software vendors currently support or plan to support version 2.0.

STRATEGIES FOR COMPLIANCE

Data Exchange Trends

- **Some common formats - continued:**
 - **JGPSSI (Japan Green Procurement Survey Standardization initiative)**
 - **Similar data set to IPC 1752 Class 3 (RoHS, JIG 101 substances)**
 - **Customer Specific Forms**
 - **IBM PCD**
 - **Dell SDoC**
 - **HP GSE confirmations**
 - **Etc....**
 - **MSDS – not really valid for RoHS and REACH data exchanges**
- **IPC 175x series currently being developed as the de-facto data exchange format. However, adoption of latest version so far has been slow.**

STRATEGIES FOR COMPLIANCE

Take a basic approach

- **1. Determine your needs. Who are your customers? What type of information do they require? Who are your suppliers? What type of information are they capable or willing to provide?**
- **2. Make a plan based on customer needs and supply chain readiness. Utilize expert help if needed.**
- **3. Determine the services and tools needed based on budgetary limitations and industry/customer needs. It's easy to overspend, make sure you have the understanding to apply the dollars where they matter most!**
- **4. Monitor industry and customer requirements and stay in front of them. Catching up is very difficult!**

STRATEGIES FOR COMPLIANCE

Resources

- EU RoHS Links

- EU RoHS Directive 2002/95/EC – consolidated version:
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2002L0095:20100925:EN:PDF>
- EU WEEE Directive 2002/96/EC – consolidated version:
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2002L0096:20080321:EN:PDF>
- EU exemptions update – Commission Decision 2010/571/EU:
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:251:0028:0034:EN:PDF>
- Amendment to EU exemptions update – Commission Decision 2010/571/EU:
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:254:0048:0048:EN:PDF>
- Frequency asked questions on the RoHS and WEEE Directives:
http://ec.europa.eu/environment/waste/weee/pdf/faq_weee.pdf

- EU REACH Links

- ECHA REACH SVHC Candidate List:
http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp
- Guidance Fact Sheet for Articles
http://guidance.echa.europa.eu/docs/fact_sheets/articles_en.pdf
- REACH Guide for Article producers
http://guidance.echa.europa.eu/docs/guidance_document/articles_en.pdf
- UK government's "REACH BiteSize":
<http://www.hse.gov.uk/reach/bitesize.htm>
- REACH Terms and Definitions:
<http://www.reach-compliance.eu/english/REACH-ME/engine/sources/definitions.html>

STRATEGIES FOR COMPLIANCE

Resources

- Other useful links:

- IPC 175x material declaration standards (free):
<http://www.ipc.org/ContentPage.aspx?PageID=Materials-Declaration>
- JIG 101 Ed. 3.1:
http://www.db1.co.jp/jeita_eps/green/greendata/JIG2010/JIG-101-Ed_31_eg_final_20100913.pdf
- JGPSSI Survey Tool V. 4.11 and Manuals:
http://www.db1.co.jp/jeita_eps/green/green/JIG_V411-eg.html
- IBM's environmental supplier specification:
http://www.ibm.com/ibm/environment/products/46g3772_sep2010.pdf
- IBM Product Content Declaration form:
<http://www.ibm.com/ibm/environment/products/productcontentdeclaration.xls>
- RTF Compliance – Provides assistance, consulting, and guidance to companies struggling with RoHS, REACH, and other product compliance issues. From single product analysis and reporting, to establishment of complete in house material substance management systems.
<http://www.RTFComp.com/>

Thank you!

Please contact the author at any time with any questions

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