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TECHNOLOGY



Development on Transposition of the RoHS Directive and how to comply

Electronics Environmental Legislation Update 2005


Dr Chris Robertson, ERA Technology Ltd
01372 367204, chris.robertson@era.co.uk



Summary

- RoHS Directive Overview
 - scope, exemptions, critical issues
- Compliance with RoHS
 - Self declaration
 - Materials declarations
 - Structured approach
 - Analysis
- Conclusions


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RoHS Directive Overview

- Restriction of certain Hazardous Substances Directive – RoHS
 - Comes into force on 1 July 2006
- National legislation
 - Was due by 13 August 2004
 - Spring 2005 now more likely
- Covers “equipment” “put onto the market”
 - Put onto the market implies transfer & available for sale
 - Imported into EU
 - Transferred to distributor or retailer
 - Transferred to warehouse ready for despatch to customers
 - May not include transfer to “warehouse” within factory but this is open to interpretation

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RoHS Directive Overview
- Substance restrictions

- Substance restrictions, with exemptions, for:
 - Lead *
 - Cadmium *
 - Mercury *
 - Hexavalent chromium
 - Polybrominated biphenyls (PBB)
 - Polybrominated diphenyl ethers (PBDE)

* includes metals and compounds
- Equipment producers’ main concern is the ban of lead solders

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Do products need to comply? - RoHS scope

- Electrical and Electronic Equipment (EEE)
 - Equipment that depends on electric current or electromagnetic fields to function
 - <1000 V AC or <1500V DC
- Electrical and electronic “equipment” within categories 1 – 7 & 10 of WEEE Directive
 - Equipment within scope of RoHS will need to be made with “RoHS compatible components and materials”
 - WEEE categories in Annex IA
 - Annex IB lists examples



Do products need to comply? - Scope

- WEEE Directive states:
 - “...provided that the equipment concerned is not part of another type of equipment that does not fall within the scope of this Directive”
 - This does NOT apply to RoHS
 - EEE for military and national security only is outside of scope
 - This also applies to RoHS
- Both Directives exclude “large scale stationary industrial tools”
 - Definition expected in March



Do products need to comply? - Original Exemptions

- Lead
 - Higher m.pt solders with >85% Pb
 - Glass (CRTs, fluorescent lamps, electronic components)
 - Ceramic devices (e.g. piezoelectric, some MLCCs)
 - In certain alloys, limited concentrations
- Mercury in various lamps
- Cadmium plating
 - Note banned by earlier Directive but with exemptions
- Chromium
 - Note that chromium metal and trivalent chromium are OK
- Batteries outside scope of RoHS
- Others have been requested (some in ERA study)



Do products need to comply? - Exemptions - formal review

- ERA reviewed 11 exemptions for EC
 - 3 from item 10 of annex (not Deca-BDE)
 - 8 new ones
 - More have been requested



Do products need to comply?
- New exemptions agreed by TAC

- Item 10 of Annex
 1. Deca BDE – not included in study
 2. Mercury in straight fluorescent lamps for special purposes
 3. Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission as well as network management for telecommunications
 4. Light bulbs –should these (filament lamps) be included?
- Amendments
 - Cadmium contacts (e.g. Ag-CdO) added
 - High melting point solder exemption amended to include all alloys with >85% lead
- Light bulbs and Deca-BDE – decision expected soon



Do products need to comply?
- New exemptions agreed by TAC

5. Lead in compliant pin connector systems
6. Lead as a coating material for the thermal conduction module C-ring
7. Lead and cadmium in optical and filter glass
8. Lead in solders consisting of more than 2 elements for the connection between the pins and the package of microprocessors with a lead content of 80 – 85%
9. Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit flip chip packages



Do products need to comply?
- Present status of exemptions

- ERA presented results to TAC on 22 October 2004
- TAC voted to accept amendment to Annex 10 December
 - Awaiting publication
- Stakeholder consultation of 22 new requested exemptions
 - just closed
- EC has received more exemption requests



Compliance with RoHS
- Areas of uncertainty

- RoHS Directive restricts the use of six substances but does not specify:
 - Maximum concentration limits
 - How producers can comply
 - Requirements for market surveillance



Compliance with RoHS - Background

- DTI, on behalf of the TAC, asked ERA to review four possible elements of compliance
 - Self-declaration
 - Standards for compliance testing
 - Standards for materials declarations
 - Information exchange networks
- All these rely on a clear interpretation of the “maximum concentration values”

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Compliance with RoHS - Maximum concentration values

- Proposed definition
 - Pb, Hg, Cr(VI), PBB and PBDE = 0.1% by weight of “homogeneous materials”
 - Cd = 0.01% by weight of “homogeneous materials”
- Material examples
 - Tin-plated coating
 - Plastic
 - Solder

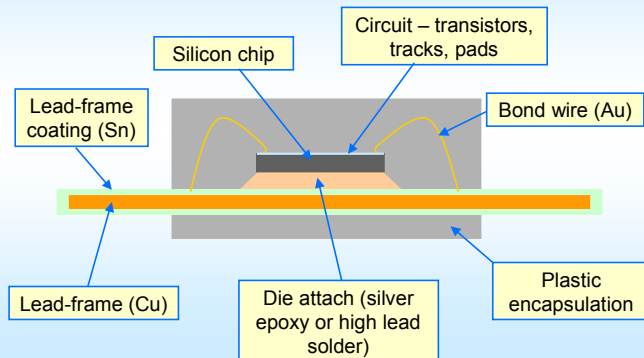
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Compliance with RoHS - Homogeneous materials within IC



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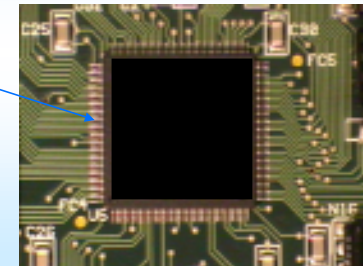
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Compliance with RoHS - Homogeneous materials definition

- Quad-flat-pack IC
 - Tin/lead alloy (a material) with 15% lead is used as coating on lead-frame
 - Lead is 0.09% by weight of component
- Aim of RoHS
 - to restrict the use of these substances
 - 0.1% in components would not achieve this



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ERA TECHNOLOGY *Self declaration*
- National legislation

- Detailed proposals for legislation in UK published
 - other Member States should be very similar
- All Member States agree that self-declaration is appropriate
 - Based on materials declarations
 - Analyse only where there is doubt or to audit supplier
 - But will prevent sale if restricted substance found
- No legal requirement to do anything
 - but due diligence defence acceptable where non-compliance found

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ERA TECHNOLOGY *Compliance requirements*

1. Do products need to comply?
 - Scope, exemptions, will supply chain force changes?
2. Self declaration
 - Obtain declarations
 - Maintain technical compliance file
3. Any doubt about information from suppliers
 - Use decision tree
 - Analyse where necessary
4. Part numbers may not change so need to segregate
5. Respond to customers requests for information
6. Develop RoHS compatible components and sub-assemblies and RoHS compliant products
 - “lead-free” transition needs most work, but other changes not all straightforward

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ERA TECHNOLOGY *Self-declaration*

- Used for many EU New Approach Directives
 - Products placed on market presumed to comply with the RoHS Directive
 - Enforced by market surveillance
- If challenged - producers will need to demonstrate that they have taken “reasonable steps” to comply
 - Analysis of every “material” would be unrealistic
 - Due diligence defence is appropriate but “reasonable steps” are never defined
- No requirement for third party testing

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Building a Technical Compliance File

Tracking materials declarations

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ERA TECHNOLOGY *Materials Declarations*

- No standards yet
 - Keep these simple – only the six RoHS substances
 - Downloadable from websites
 - One for a range of components OK
 - Compositions based on “homogeneous materials”
 - Analysis data not essential
 - use in areas of doubt or high risk
- Any doubt over declaration?
 - Use decision tree
 - Design to be appropriate for business

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ERA TECHNOLOGY *Analysis of components - MLCC*

Lead is used occasionally in ceramic of these components (this is exempt)

Tin alloy surface coating. This should contain <0.1% lead

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ERA TECHNOLOGY *Analysis of components*

The only material likely to contain a restricted substance is the lead-frame coating

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lead

cadmium

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Compliance – Conclusions

- The 6 banned substances must be absent in components and materials
- Products placed on the market will be presumed to comply with RoHS
- No standard for demonstration of compliance
- Use declarations from suppliers plus selected random analysis
- Selected analysis of some components and materials
 - If in doubt or no information
 - To audit suppliers
 - Materials and components with high risk (e.g. PVC, red/orange plastics, etc.)



Sources of information

- DTI website
 - ERA report on www.dti.gov.uk/sustainability
- Standards
- ERA Guide to RoHS Compliance
- ERA Course on RoHS Compliance –14 April
- ERA RE⁴view Newsletter
- Envirowise



Any questions.....

- chris.robertson@era.co.uk
- 01372 367221
- www.era.co.uk/rfa.htm