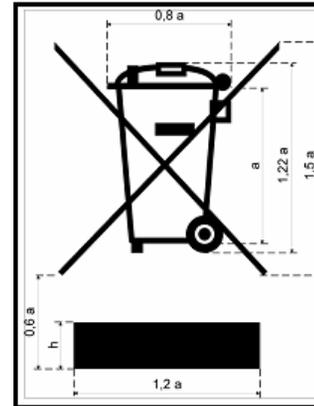
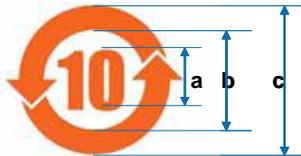


# RoHS / WEEE Product Compliance 2007



Presented by Geoffrey Bock  
RoHS/WEEE Program Manager

TUV Rheinland of North America  
Detroit, Michigan USA



weee



**Geoffrey Bock**



# WELCOME



 **TÜVRheinland®**  
Precisely Right.



## Global Network

- over 50 Countries
- over 300 Locations

# Business Streams/Business Units

## Industrial Services

Pressure Vessels and Materials Technology  
Elevator, Conveyor and Machine technology  
Electrical Engin. and Building Technology  
Industrial Engineering Safety  
Civil Engineering  
Environment and Energy Technology  
Occupational Health and Safety  
Certification of Management Systems

## Mobility and Transport

Vehicle Inspection  
Driver Licences and Traffic-Related Psychology  
Garage and Car Dealer Services  
Value and Damage Appraisal, Fleet Management  
International Vehicle Type Approval  
Automotive and Aviation Technology  
Railway Technology  
Traffic Telematics and Traffic Consulting, Project Management

## Product Safety and -Quality

Electrical Services  
Mechanical and Machinery Services  
Medical products  
EMC and Telecommunication Services  
Ergonomic Services  
Chemical Services  
International Approvals/FEMAC  
**Life-Cycle Management**

## Education and Consulting

Training for Job Applicants  
Education for Management and Technical Professionals  
Private Schools  
Business Process Consultancy  
Management Systems Consultancy  
Publishing

## IT Services and Innovation

IT and Communication Systems  
Security

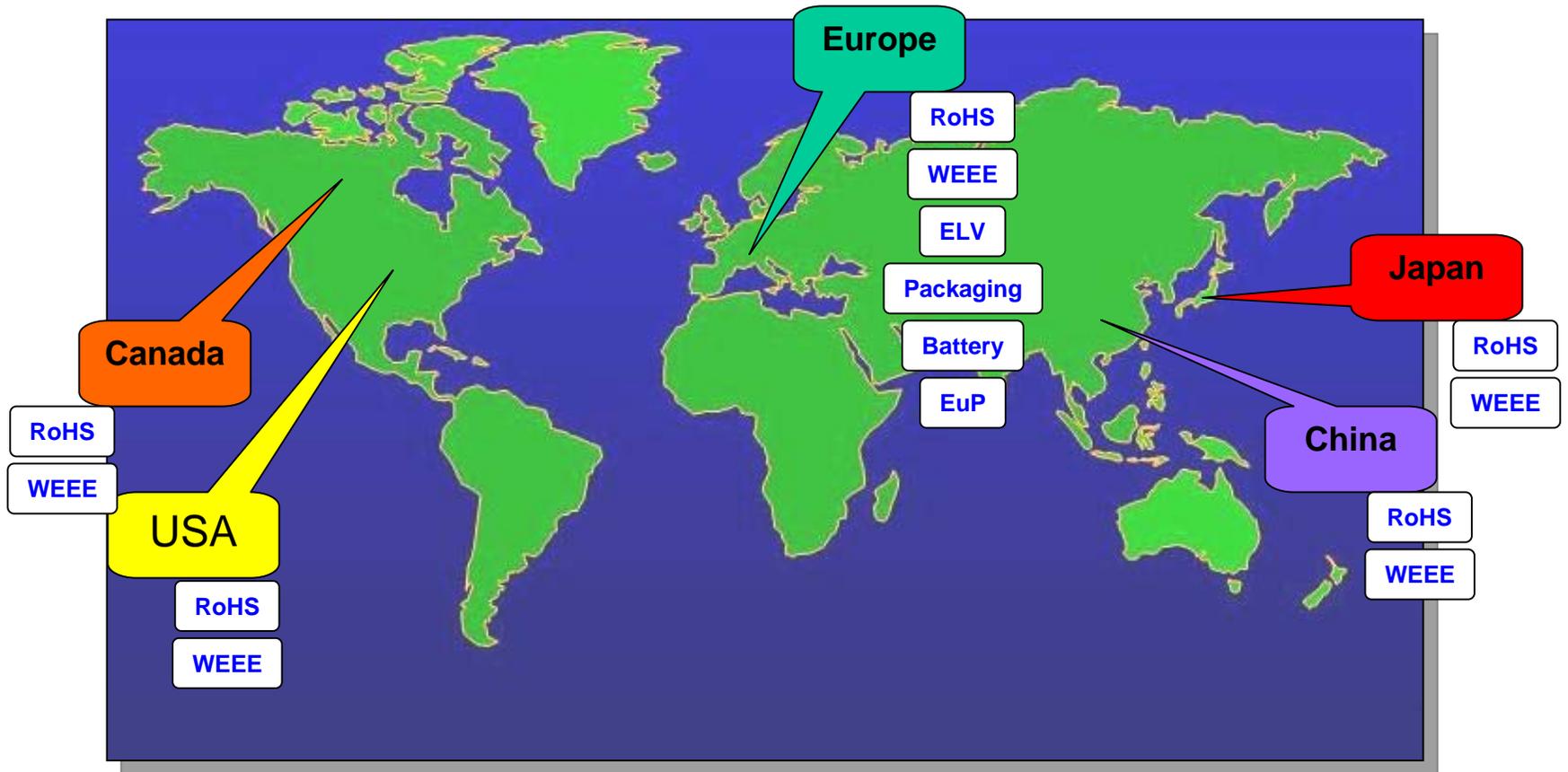
## ■ RoHS - TÜV Rheinland Group Overview



### Global Network

- over 50 Countries
- over 300 Locations

## ■ Global Environmental Product Compliance



World Map <http://www.us.tuv.com/map/map.swf>



## Introduction

# on the Implementation of “China RoHS”



formally known as

<Management Methods for Controlling Pollution by  
**E**lectronic **I**nformation **P**roducts>



**(March 2007)**

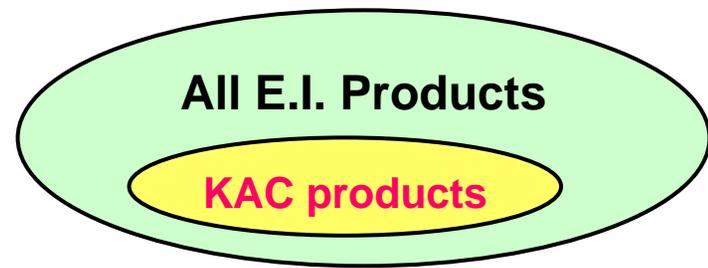
## ■ EU-RoHS vs. China-RoHS Comparison table

Item	China RoHS	EU RoHS
Type of Documents	Legal	
Purpose	Restriction of use / reduce of haz. substance	
Trade activities	Involved	
List of 6 restrictions	Same	
Implementation	directly	Transform to national law
Scope	Electronic information products	<1000V ac or <1500V dc
Categories	A list of products in "key administrative catalogue"	8 categories with exemption
Promulgation date	28 Feb 2006	13 Feb 2003
Entry into force	01 Mar 2007	01 Jul 2006
Technical Doc.	Catalogue, Standard	Standard
Approval Approach	Phase I: self-declaration Phase II: CCC approval	Self-declaration

## ■ EU-RoHS vs. China-RoHS Comparison table

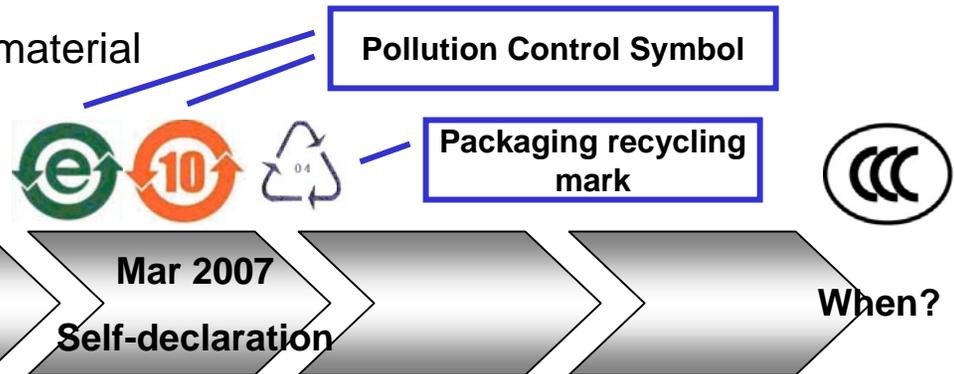
Requirement	EU-RoHS	China-RoHS	Comments
Label Requirements	No	Yes – All EIP	EIP as defined in Article 3: and illustrated in the MII explanatory Note published 16 March, 2006
Information Disclosure	On request	Yes – All EIP	EIP as defined in Article 3: and illustrated in the MII explanatory Note published 16 March, 2006
Substance Restriction	10 Product Categories	Only products listed in the Product Catalog	China's Catalog for Priority Prevention of Pollution by Electronic Information Products has not yet been published in draft or final form.
Pre-Market Certification/Testing	No - But post market testing possible	Only products listed in the Product Catalog	China's "Catalog for Priority Prevention of Pollution by Electronic Information Products" has not yet been published in draft or final form.
Products Covered	Electronic and electrical equipment (EEE)	Electrical Information Products (EIP)	in addition to EEE, EIP includes such items as CDs, DVD media, quartz products and the industry favorite – "other"
Effective Date (s)	01 July 2006	01 March 2007 for label and disclosure requirements	Implementation dates for restricted substance, certification, and testing requirements will be determined upon publication and subsequent updates of the Catalog for Priority Prevention of Pollution by Electronic Information Products

## ■ Implementation of China RoHS



Phase I -> effective date: 01 Mar 2007

- All Electronic Information Products (with hazardous substances)
  - No CCC marking / approval process, self-declaration only
  - List the name, concentration, location, recyclability of hazardous substances
  - Declare environment-friendly use period
  - Hazardous substances free packaging material
  - name of material on packaging



Phase II -> effective date: to be confirmed

- Products within the scope of key administrative catalogue (KAC)
  - fulfill limits of 6 hazardous substances
  - CCC approval 

## ■ Scope of China RoHS (List of E. I. Products)

1. Radar Equipment and Products
2. Communications Equipment and Products
3. Broadcast and Television Equipment Industry Products
4. Computer Industry Products
5. Household Electronic Products
6. Electronic Measuring Instrument Products
7. Electronic Industry Dedicated Equipment and Products
8. Electronic Element Products
9. Electronic Device Industry
10. Electronic Application Products
11. Electronic Dedicated Material Products

## ■ Status of China RoHS

Three standards are published.

- [SJ/T 11363-2006:](#)

Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products (MCV)

- [SJ/T 11364-2006:](#)

Marking for Control of Pollution by Electronic Information Products

- [SJ/T 11365-2006:](#)

Testing Method for Hazardous Substances in Electronic Information Products

Existing standard:

- [GB18455-2001:](#) Packaging Material Recovery Symbol Requirement

**More standards are coming...**

## ■ 4 types of recycling marks in GB18455-2001

Mark Number	Mark Name	Mark Graphic	Scope of Application of Mark
1	Reusable		Applies to all types of packaging
2	Recyclable/renewable		
3	Contains renewable materials		
4	Green point mark		Applies to all types of packaging

## ■ Implementation of China RoHS

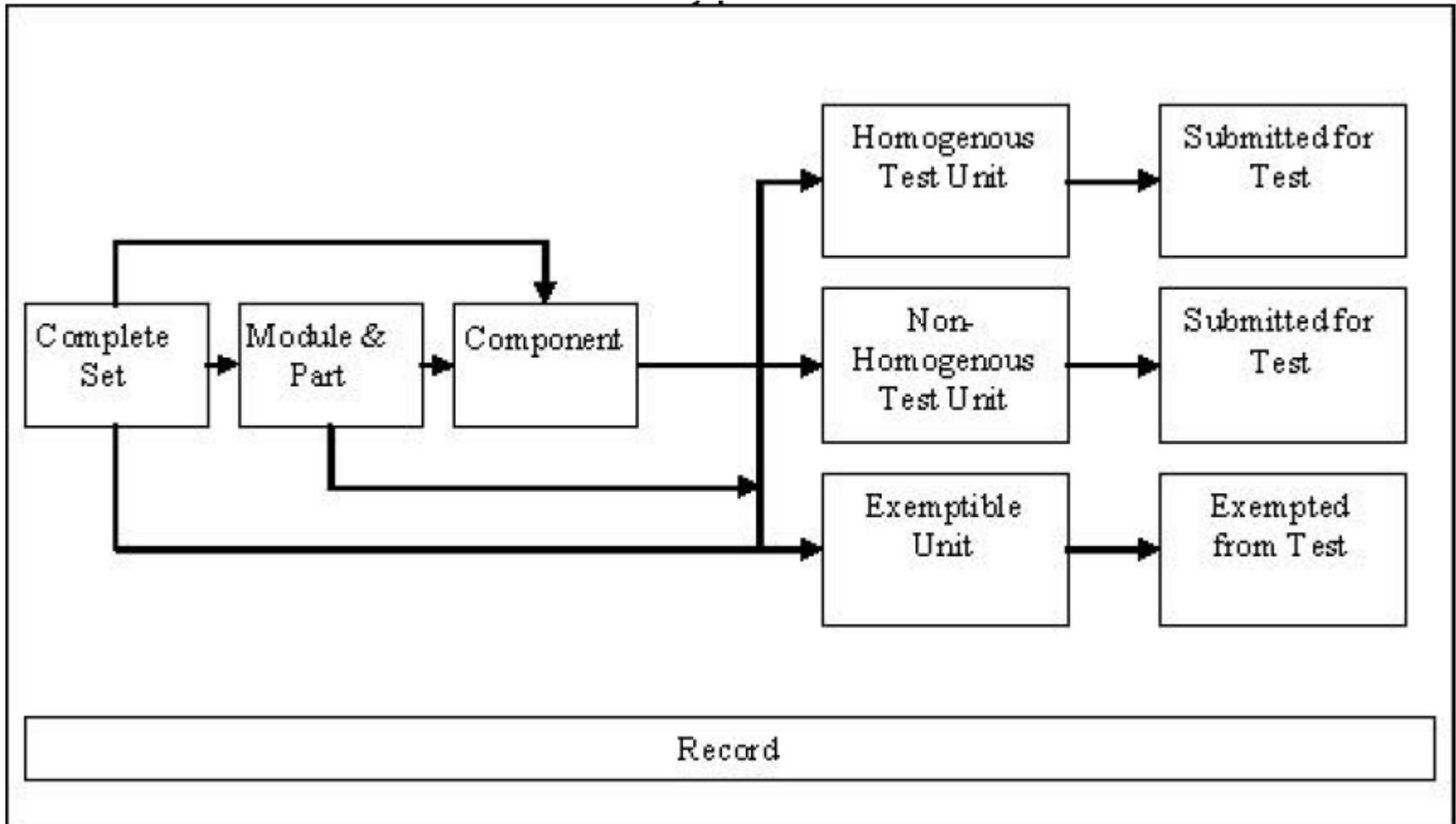
- Classification method is slightly different

Type of Composing Unit	Definition of Composing Unit
EIP-A	Homogenous materials that compose an electronic information product
EIP-B	Metal coating on parts in an electronic information product
EIP-C	Small parts or materials that cannot be further disassembled with existing conditions in an electronic information product and generally a product specifications smaller than equal to 4 mm <sup>3</sup>

Type of Unit	Requirements in Concentration Limit
EIP-A	The content of hexavalent chromium, lead, mercury, polybrominated bi-phenyl (PBB), and polybrominated diphenyl ether (PBDE) may not exceed 0.1% and the content of cadmium may not exceed 0.01%
EIP-B	Lead, mercury, cadmium, and hexavalent chromium may not be intentionally added
EIP-C	The content of hexavalent chromium, lead, mercury, polybrominated bi-phenyl (PBB), and polybrominated diphenyl ether (PBDE) may not exceed 0.1% and the content of cadmium may not exceed 0.01%

## ■ Implementation of China RoHS

- Disassembly procedure



## ■ Implementation of China RoHS

Text must be in Chinese!

Informational Table*						
Part Name	Toxic and Hazardous Substances or Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium	PBB	PBDE

O: indicates that the content of the toxic and hazardous substance in all the homogenous material parts is below the concentration limit requirement as described in SJ/Txxxx-xxxx

X: indicates that the content of the toxic and hazardous substance in all the homogenous material parts exceeds the concentration limit requirement as described in SJ/Txxxx-xxxx

## **TUVRNA China RoHS Services Offered:**

### **Full China RoHS Phase 1 Management including:**

- **Marking Requirements for Equipment and Packaging**
- **XRF RoHS analysis to identify materials/components that are above or below the China RoHS MCV values**
- **Creating Clause 6.2 of Marking for Control of Pollution Caused by Electronic Information Products (SJ/T11364: 2006) Component Declaration Format in English.**
- **Translation of component declaration into Chinese (required by Chinese Law and Standard SJ/T11364: 2006**

Questions?

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## ■ China EFUP

- **E**nvironmentally **F**riendly **U**se **P**eriod (SJ/Z XXXX-XXXX)  
“General Guidelines of Environment-friendly Use Period of Electronic Information Products”

### A.2 Communications Equipment Products

A.2.1 network communications equipment	20 years, 25 years, 50 years
A.2.2 cell phone	10 years
A.2.3 switching system/equipment	10 years
A.2.4 telephone sets and system	7 years

### A.3 Broadcasting and Television products

### A.4 Computer Industry Products

A.4.1 workstations	10 years
A.4.2 desktop computers	10 years
A.4.3 notebook computers	8 years
A.4.4 printing equipment	10 years
A.4.5 scanners	10 years
A.4.6 projectors	10 years

## ■ China EFUP

- **E**nvironmentally **F**riendly **U**se **P**eriod (SJ/Z XXXX-XXXX)  
“General Guidelines of Environment-friendly Use Period of Electronic Information Products”

### A.4 Computer Industry Products contd.

A.4.7 digital cameras	10 years
A.4.8 LCD monitors	10 years
A.4.9 storage equipment	10 years
A.4.10 floppy disk drives	10 years
A.4.11 POS system	7 years

### A.8 Electrical Application Products

A.8.1 medical machinery, system and equipment	50 years
A.8.2 medical appliances and consumables	5 years

### A.9 Others

A.9.1 electrical light sources	10 years
A.9.2 batteries	5 years

## ■ JAPAN ROHS/WEEE



Law for ban of chemical substances in EEE in Japan (so-called J-RoHS) is under preparation (the name of law is " Law for the Promotion of Effective Utilization of Resources". It will be issued in July this year.

However this law only bans hazardous chemical substances for a select group of products.



JIS standard, JIS C0950, has been issued in Dec 2005, and English version is under preparation (will be issued soon).

The substances and threshold level, whether contained or not, is the same as EU RoHS (Cd: 100ppm, Hg, Pb, CrVI, PBB, PBDE: 1000ppm).

Applicable products are PC, TV, Refrigerator, Wash machine, microwave oven and air conditioner.

## ■ The rest of the World



**South Korea** (Act on The Promotion of Saving and Recycling of Resources)



**Switzerland** (ordinance requires manufacturers, importers, and dealers of electrical and electronic appliances to take back EOL appliances)



**Taiwan** (Ministry of Economic Affairs G Plan)



**Australia** is expected to be the next country to join the list. Currently several industry and government initiatives are underway there to establish national collection and recycling schemes for televisions, computers, and peripherals such as printers and scanners.

# Existing Environmental Product Compliance



**ELV** = End of Life Vehicle Directive (2000/53/EC)

- Restricts certain hazardous substances
- Must recycle at end-of-life

**Packaging** = Packaging Directive (94/62/EC)

- Restricts certain hazardous substances
- Must recycle at end-of-life
- Recovery & Recycling Rates



**Batteries** = Battery Directive (91/157/EEC)

- Certain batteries collected separately
- Both hazardous & non-hazardous
- Labeling requirements



## ■ What is Restriction of Hazardous Substances ?

### ■ 2002/95/EC RoHS

From 1 July, 2006 producers will have to show that their products do not contain more than maximum permitted levels of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB's) and polybrominated diphenyl ethers (PBDE's)

Pb

Hg

Cd

CrVI

PBB's

PBDE's



## ■ RoHS Applicability

- **Applies to electrical and electronic equipment falling under the categories set out in Annex IA of the WEEE Directive, and electric light bulbs, and luminaries in households. Categories 8 and 9 excluded**
- **This Directive does not apply to spare parts for the repair, or to the reuse of electrical or electronic equipment put on the market before 1 July 2006.**

## ■ What is the MCV ?

Substance	MCV (%)	MCV (PPM)
• Cadmium (Cd) *	0.01%	100ppm
• Lead (Pb)	0.1%	1000ppm
• Mercury (Hg)	0.1%	1000ppm
• Hexavalent Chromium (CrVI)	0.1%	1000ppm
• PBB's	0.1%	1000ppm
• PBDE's	0.1%	1000ppm

Note that (ppm) is equivalent to (mg/kg)

- **In some countries, Cadmium must be reported, even if there are trace amounts present.**

## ■ Exemptions to the Restrictions for **Mercury (Hg)**

**Applications of lead, mercury, cadmium and hexavalent chromium, which are exempted from the requirements of Article 4(1)**

**Amended by:  
2005/717/EC,  
2005/747/EC**

1. Mercury in compact fluorescent lamps not exceeding 5 mg per lamp.
2. Mercury in straight fluorescent lamps for general purposes not exceeding:
  - halophosphate 10 mg
  - triphosphate with normal lifetime 5 mg
  - triphosphate with long lifetime 8 mg.
3. Mercury in straight fluorescent lamps for special purposes.
4. Mercury in other lamps not specifically mentioned in this Annex.

## ■ Exemptions to the Restrictions for Lead (Pb)

5. Lead in glass of : cathode ray tubes, electronic components and fluorescent tubes.
6. Lead as an alloying element in steel containing up to 0,35 % lead by weight, aluminum containing up to 0,4 % lead by weight and as a copper alloy containing up to 4 % lead by weight.
7. — Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead),  
— Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission as well as network management for telecommunications,  
— lead in electronic ceramic parts (e.g. piezoelectronic devices)

Amended by:  
2005/717/EC,  
2005/747/EC

## ■ Exemptions to the Restrictions for (Cd) & (CrVI)

Amended by:  
2005/717/EC,  
2005/747/EC

8. Cadmium and its compounds in electrical contacts and cadmium plating except for applications banned under Directive 91/338/EEC (\*) amending Directive 76/769/EEC (\*\*) relating to restrictions on the marketing and use of certain dangerous substances and preparations.
9. Hexavalent chromium as an anti-corrosion of the carbon steel cooling system in absorption refrigerators.

(\*) OJ L 186, 12.7.1991, [pg. 59](#)

(\*\*) OJ L 262, 27.9.1976, [pg. 201](#)

## ■ Added Exemptions to the Restrictions 2005

Added by:  
2005/717/EC  
And  
2005/747/EC

- 9a. DecaBDE in polymeric applications
- 9b. Lead in lead-bronze bearing shells and bushes’.
- 11. Lead used in compliant pin connector systems.
- 12. Lead as a coating material for the thermal conduction module c-ring.
- 13. Lead and cadmium in optical and filter glass.
- 14. Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80 % and less than 85 % by weight.
- 15. Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit Flip Chip packages.’

## ■ Added Exemptions to the Restrictions 2006

**Amended by:**  
**G/TBT/N/EEC/103**  
**Commission**  
**Decision**

16. Lead in linear incandescent lamps with silicate coated tubes.
17. Lead halide as radiant agent in High Intensity Discharge (HID) lamps used for professional reprography applications.
18. Lead as an activator in the fluorescent powder (1% lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP ( $\text{BaSi}_2\text{O}_5:\text{Pb}$ ) as well as when used as specialty lamps for diazo-printing reprography, lithography, insect traps, photochemical and curing processes containing phosphors such as SMS ( $(\text{Sr},\text{Ba})_2\text{MgSi}_2\text{O}_7:\text{Pb}$ ).
19. Lead with  $\text{PbBiSn-Hg}$  and  $\text{PbInSn-Hg}$  in specific compositions as main amalgam and with  $\text{PbSn-Hg}$  as auxiliary amalgam in very compact Energy Saving Lamps (ESL).
20. Lead oxide in glass used for bonding front and rear substrates of flat fluorescent lamps used for Liquid Crystal Displays (LCD).

## ■ Added Exemptions to the Restrictions 2006

Amended by:  
G/TBT/N/EEC/103  
Commission  
Decision

21. Lead and cadmium in printing inks for the application of enamels on borosilicate glass.
22. Lead as impurity in RIG (rare earth iron garnet) Faraday rotators used for fibre optic communications systems.
23. Lead in finishes of fine pitch components other than connectors with a pitch of 0.65 mm or less with NiFe lead frames and lead in finishes of fine pitch components other than connectors with a pitch of 0.65 mm or less with copper lead-frames.
24. Lead in solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors.
25. Lead oxide in plasma display panels (PDP) and surface conduction electron emitter displays (SED) used in structural elements; notably in the front and rear glass dielectric layer, the bus electrode, the black stripe, the address electrode, the barrier ribs, the seal frit and frit ring as well as in print pastes.
26. Lead oxide in the glass envelope of Black Light Blue (BLB) lamps.

## ■ Added Exemptions to the Restrictions 2006

27. Lead alloys as solder for transducers used in high-powered (designated to operate for several hours at acoustic power levels of 125 dB SPL and above) loudspeakers."

'28. Hexavalent chromium in corrosive preventive coatings of unpainted metal sheetings and fasteners used for corrosion protection and Electromagnetic Interference Shielding in equipment falling under category three of Directive 2002/96/EC (IT and telecommunications equipment). Exemption granted until 1 July 2007."

'29. Lead bound in crystal glass as defined in Annex I (Categories 1, 2, 3 and 4) of Council Directive 69/493/EEC".

## ■ RoHS Homogenous Materials

The Directive states “per Homogenous Material.”

“Homogenous materials”:

- means a unit that cannot be mechanically disjointed into single materials”.
- of uniform composition throughout,
  - so examples of “Homogenous Materials” would be individual types of plastics, ceramics, glass, metals, alloys, paper, board, resins and coatings.

The term “mechanically disjointed” means that the materials can be, in principle, separated by mechanical actions such as unscrewing, cutting, crushing, grinding and abrasive processes.

## ■ RoHS Compatability

### RoHS-Compatible -

- The EU defines “RoHS-Compatability” as products that either contain no more than a maximum concentration value of 0.1% by weight in Homogeneous Materials for lead, mercury, hexavalent chromium, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) and no more than 0.01% by weight in Homogenous Materials for cadmium;
- or fall within one of the stated [exemptions](#) set forth in the Annex to the RoHS Directive.

# ■ Declaring Material Substances

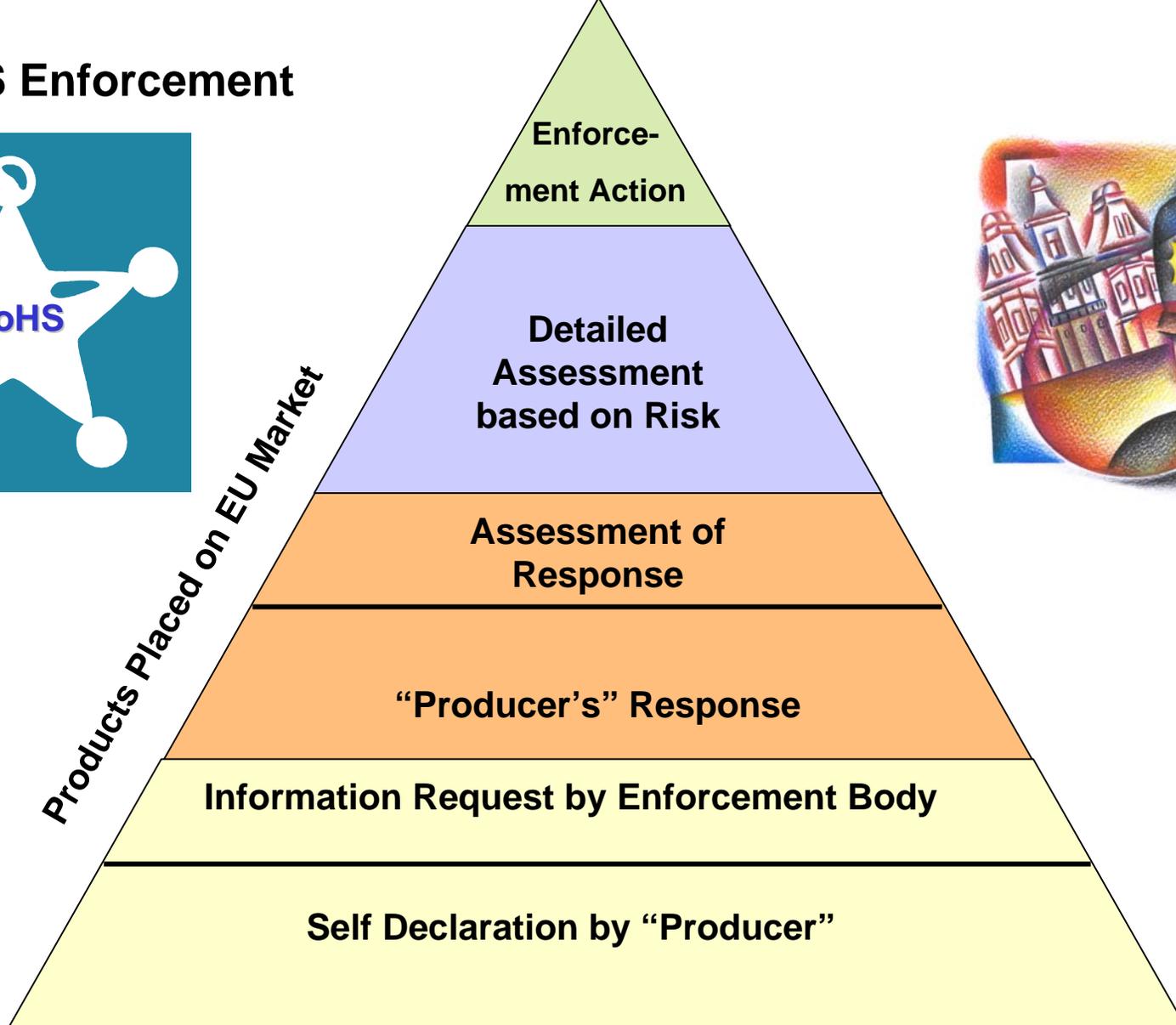
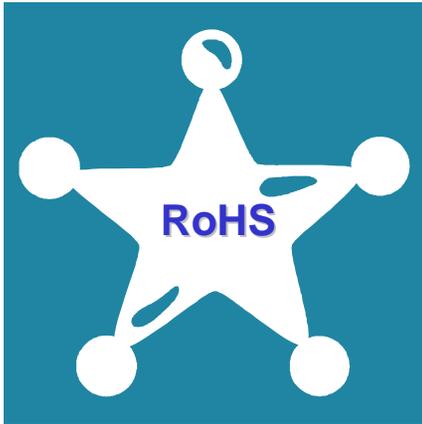
The IPC1752 Standard allows for six levels of declaration:

- Class 1 – RoHS reporting at a homogeneous level in yes/no format
- Class 2 – Class 1 plus manufacturing information (peak processing temperature, time at peak, MSL level)
- Class 3 – RoHS reporting at a homogeneous level in yes/no format, JIG level A & B at the part level and other customer-specific substances at the part level
- Class 4 – Class 3 plus manufacturing information (peak processing temperature, time at peak, MSL level)
- Class 5 – RoHS reporting at a homogeneous level in yes/no format, JIG level A & B at the homogeneous material level and other customer-specific substances at the homogeneous level
- Class 6 – Class 5 plus manufacturing information (peak processing temperature, time at peak, MSL level).

Classes 5 and 6 allow for the manufacturer to specify a “proprietary substance” with a declaration that it is not one of the JIG A or B substances. In this way a manufacturer can protect their intellectual property.

Some larger companies such as Motorola demand level 6 declarations as a base line requirement for supply. The Sony Green Partner program has similar requirements.

## ■ RoHS Enforcement



## ■ RoHS Enforcement



### What do I do?

- **Collect all data about how you claim RoHS compliance**
  - RoHS test data,**
  - Supplier declarations,**
  - Audit reports, certifications etc.**
- **Submit documentation to the EU within 28 business days**

## ■ RoHS Testing

- **Testing may be performed for a variety of reasons:**
  - As an alternative to supply chain material declarations
  - As a supplement to a material declaration
  - As a “spot check” to confirm supplier compliance
  - As a basis to assess compliance (enforcement)
- **Certain test methods to determine regulated material content already exist, but:**
  - Most are not appropriate for testing electrotechnical products
  - Testing methods differ from each other
  - Methods are not internationally recognized
  - Not agreed upon by countries regulating substances in EEE

## ■ RoHS Analysis XRF



### XRF Testing (Pre-Screening) -

XRF (X-ray fluorescence spectrometry) can be used to pre-screen homogenous materials to determine its ultimate fate.

For example, an alloy is tested for all banned substances, and the results are below 699PPM for all substances, and below 69 PPM for Cadmium, then we can determine that the material does not contain the MCV's for the banned substances, and chemical analysis is no longer required.

Should the result be above 1300PPM (and/or 130PPM for Cadmium), then we can determine that the material exceeds the MCV's, and must be replaced.



## ■ RoHS Standards Development

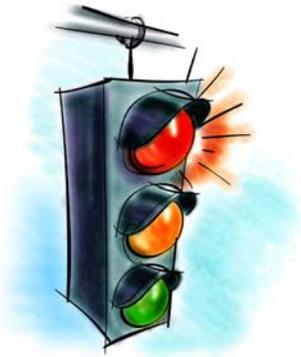


### IEC 62321 Draft Standard:

- Submitted as a proposal for an IEC standard
- Provides test procedures for the 6 banned substances used in EEE
  - This standard will **not** determine:
    - Definition of a “unit” or “homogenous material” as the sample
    - Disassembly procedure to get to a sample
    - Assessment procedures (e.g. is the concentration compliant with the regulation)
- **ASTM F40 “Declarable substances in Materials”** is currently being developed. This will also be a global standard.



## ■ RoHS Surveillance Audits



### Is your product at risk?

**High Risk:** A supplier can receive various raw materials from various manufacturers, in order to fulfil your part number. They also manufacture similar parts for customers that do not require RoHS conformance. - *Regular surveillance audits, material testing and declaration forms required.*

**Medium Risk:** A supplier has known materials, and can prove its contents by submitting “material declaration forms,” yet no testing and verification has been performed. - *Random audits to be performed, random testing of materials.*

**Low Risk:** These suppliers can provide test data to known test standards, material declaration forms, and they offer a product that must meet RoHS guidelines for many other OEMs. - *Initial gathering of documentation is required, periodic updates on material declarations, no audits required.*

## ■ RoHS / WEEE DO's

- Design for Global Compliance (RoHS & WEEE)
- Identify all current and future markets (RoHS & WEEE)
- Evaluate your risks (RoHS & WEEE)
- Certify your materials (RoHS)
- Perform quality and surveillance audits (RoHS)
- Create recycling manuals (WEEE)
- Add recyclable materials to your product (WEEE)
- Perform “due-diligence” (RoHS)
- Consider a 3<sup>rd</sup> party to handle surveillance audits and periodic testing of materials (RoHS)

## ■ RoHS / WEEE DON'Ts

- Assume RoHS compliance
- Accept erroneous documentation from suppliers
- Sell into the EU without registering your products
- Wait until the last minute to become compliant
- Assume exemptions will last forever

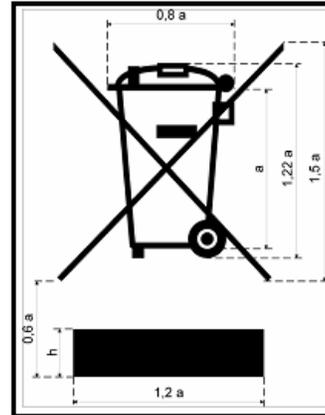
## ■ RoHS / WEEE Services that TÜV Rheinland Provide

- Full WEEE registration and coupling with a 3<sup>rd</sup> Party collection/recycling agency within all EU countries
- **Full WEEE analysis including:**
  - Calculation of recovery and recycling rates
  - Identification of recyclable materials
  - Creating a recycling manual for end-of-life
- **Full RoHS analysis including:**
  - XRF Spectrometry and chemical analysis per homogenous material
  - B.O.M. screening for non-compliant materials
  - Issuance of the “RoHS Compliant” mark of conformity

# ■ THANK YOU



wEEE



Presented by Geoffrey Bock  
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