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A blueprint for a Globally Harmonized RoHS Standard

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There are presently five RoHS style legislations enacted. All of these are substantially different. There are other countries, and in the USA, individual states considering similar legislation. The burden on industry so far has been high and is likely to increase. The World Electronics Forum has identified the spread of RoHS as a significant challenge to the industry and has succeeded in getting APEC (Asia Pacific Economic Cooperation) to consider harmonization of RoHS amongst its members.

There is essentially only one harmonized aspect of all versions of RoHS, the substances targeted. Scope, limit values, and marking requirements are all different. China and Japan have similar formats for declaration, but China has additional requirements. The EU has a single definition of how the Maximum Concentration Values are applied, whereas China has three.

As noted in the paper "Comparison of RoHS legislations around the world" (Sommer 2006) the driver for adoption of RoHS is no longer environmental, it is economic. Simply put, countries need to adopt RoHS to protect their export markets and to prevent them from becoming dumping grounds for non compliant product and components.

It is clear that it would be in industry's best interests for there to be one global RoHS standard. There are aspects of the different RoHS legislations that could give rise to a "best practice" approach for a global standard. It is suggested that the following would form a sensible starting point.

Recommended for Harmonized Standard	Rationale
Maximum Concentration Values 1) In Homogeneous Materials or parts <4mm^3 Mercury 1000ppm Hexavalent Chromium 1000ppm Lead 1000ppm Cadmium 100ppm PBB 1000ppm PBDE 1000 ppm 2) In metallic surface conversion (passivation) Hexavalent Chromium Not intentionally	Precedence is set for MCVs in homogeneous materials. Testing technology limitations make testing of small components difficult. This has been reflected in the EU Enforcement Agencies Informal Network Guidance where it is stated that under certain circumstances non homogeneous components may, be tested as homogeneous entities. The China version of RoHS explicitly creates a category for components <4mm3 to be treated as homogeneous entities. Accurate quantitative testing weight/weight for Hexavalent Chromium in surface

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added	conversion coatings is not yet technically feasible. **The easiest way to enforce the ban on hexavalent chromium in surface conversions is to create an additional category for this with the limit of "Not Intentionally added. The China version of RoHS explicitly creates a category for metallic surface coatings.**
Scope Inclusions Any electrical or electronic equipment or component.	Scope has been one of the most debated aspects of EU RoHS. EU RoHS used limited inclusive approach (the original eight categories) and then complimented this with some (incompletely) defined exclusions such as large scale industrial tools and fixed installations. There is still considerable confusion as regards EU Scope. China defined some 1400 items within their scope. This is more robust approach but still has potential for uncertainty with areas such as equipment that may have an application that is in scope but could also be used in an application that is out of scope. **To prevent confusion it is suggested that a totally inclusive approach, with specified exclusions, would work better. A robust definition of Electrical and Electronic Equipment would be needed.**
Scope Exclusions Military Equipment Implanted medical devices	Military equipment and Implanted Medical devices are typically at the forefront of technology. Restricting the materials may prevent innovation. **This list is not exhaustive and would need careful consideration and consultation with stakeholders**
Exemptions The present EU Exemption list. However an exemptions process would need to be set up that is more responsive than the present EU Process, and allows a global body (not just the EU) to validate and approve the exemptions	A Global Standard requires a centralized process into which all countries that have enacted the Global RoHS legislation may provide input.
Product Marking	The market will determine the need for the

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There should be a voluntary standardized mark that can be used if producers wish.	mark. Recycling authorities will not need the mark as all electrical and electronic waste should be treated as hazardous. Lead will always be present by exemption in SMT resistors, some brasses and aluminums and numerous other applications under exemption ("Alert - EU RoHS does not always mean China RoHS Compliant" Sommer 2006)
Disclosure Subassembly level disclosure in the format used by China RoHS and Japanese RoHS should be used.	Unless a subassembly level disclosure table is provided, the entirety of each piece of equipment would need to be treated as hazardous waste. This may be unnecessary and could lead to wasted resources and excessive energy use through inefficiency. If the product is able to be disassembled into hazardous and non-hazardous waste, then these two waste streams could be dealt with separately in an efficient manner.

To be able make a Globally Harmonized RoHS Standard a reality, many parties have to be willing to talk and compromise. There has been suggestion for other countries to adopt EU RoHS in its entirety, but it would be imprudent for one country to bind itself to the laws of another country over which they have no control. Essential to the success of a Global RoHS Standard is a global body to oversee the process and the Standard.

All RoHS style legislations thus far are subject to periodic review. The review process is one potential method by which the various countries could start to work towards a Globally Harmonized RoHS Standard.

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Bibliography

Formal title	Comment
EU RoHS	
Directive 2002/95/EC	EU RoHS Directive
Directive 2002/96/EC	EU WEEE Directive
Directive 2005-618-EC	EU RoHS Maximum Concentration Values
Directive 2005-717-EC	Exemptions for DecaBDE and Lead in bearings
Directive 2005-747-EC	Exemptions for Cadmium and Lead

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Directive 2006-690-EC	Exemption for lead in Crystal glass
Directive 2006-691-EC	Exemptions for lead and cadmium - fine pitch
Directive 2006-692-EC	Exemption for Hexavalent Chromium
Report "Adaptation to scientific and technical progress under Directive 2002/95/EC"	Oko Institute report on exemptions July 2006
DTI RoHS Regulations Government Guidance Notes	EU RoHS Guidance document
Frequently Asked Questions on Directive 2002/95/EC on the Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) and Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE)	EU RoHS FAQ Document
Procedures for the Determination of Levels of Six Regulated Substances (Lead, Mercury, Hexavalent Chromium, Polybrominated Biphenyls, Polybrominated Biphenyl Ether) in Electrotechnical Products	IEC111/24 CD
RoHS Enforcement Guidance Document	
Comparison of RoHS legislations around the world	Sommer 2006
Alert - EU RoHS does not always mean China RoHS Compliant	Sommer 2006
1998 Aarhus Protocol on Heavy Metals	First reference to lead, cadmium and mercury as the 3 heavy metals to be targeted by EU environmental policy
European Commission DG ENV. E3 Project ENV.E.3/ETU/2000/0058 Heavy Metals in Waste Feb 2002	Cites lead, cadmium and mercury and Chromium as substances of concern
China RoHS	
Measures for the Administration of the Pollution Control of Electronic Information Products	China RoHS
Electronic Information Products Classifications and Explanations,	6 March 2006 Explanatory Note)
SJ/T 11364-2006:	Marking for Control of Pollution Caused by Electronic Information Products
SJ/T 11363-2006:	Requirements for Concentration Limits for Certain Hazardous Substances in Electronic Information Products
SJ/T 11365-2006:	Testing Methods for Hazardous Substances in Electronic Information Products
General Guidelines of Environment-friendly Use Period of Electronic Information Products	
GB/Z xxxx-200x:	Special Disassembly Requirements for Testing Hazardous Substances in Electrical and Electronic Products (11/06 Draft)
Regulation Q&A (FAQ)	28 Feb 2007 Update
Standards Q&A (FAQ)	28 Feb 2007 Update
EU China Trade Project Report	Charles Barker and Xing Weibing
Korea RoHS	

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Act for resource Recycling of Electrical and Electronic Equipment and Vehicles	Korea RoHS
Japanese RoHS	
Law for Promotion of Effective Utilization of Resources (J-MOSS)	Japan RoHS
California RoHS	
AB2202	California RoHS