RoHS: Long-Term Perspective and Legal and Trade Challenges

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Compliance Data and the Law

- The following part of the presentation considers how manufacturers need to address the "worth" of compliance data from their vendors, the route by which it arrived, and the guarantees which came with it. This part of the talk will take the form of a series of "what if" scenarios should a company be challenged on its product compliance, and hopefully will throw some light onto the correct way to approach data collection and audit procedures.

Why do we need data certified?

- RoHS is not an option it is the LAW, and as such will be treated very seriously. This will include spot checks, and demands for data to support that the goods comply with RoHS.
- Note you do not have to STATE that the goods comply with RoHS. The very act of importing them means that you acknowledge that they MUST be RoHS compliant.
- The only way to keep on the right side of the law is to actively seek out compliance data from the suppliers of every component and process that goes into an end user product and store that data in a fashion that will be able to be produced on demand for a period of 4 years.
- Failure to produce data will typically result in a fine of $10000.
- Non compliance to RoHS will probably result in all goods being frozen at points of entry and distribution in the EEC.

What data do we collect?

- Good question, depends whether you are dealing with Europe or Japan.
- In Europe, RoHS addresses only 6 substances with some exemptions for applications such as lead used in optical glass or as an alloying element in steel. There are other industry specific exemptions such as lead in solders for internet infrastructure etc, but basically there are only 6 compounds and 2 threshold limits:
  - Lead
  - Cadmium
  - Mercury
  - Hexavalent Chromium
  - Polybrominated biphenyls (PBB's)
  - Polybrominated diphenyl ethers (PBDE's)

A maximum concentration value of 0.1 % by weight in homogenous[1] materials for all but Cadmium which is 0.001%

What data do we collect?

- Dealing with Japan, there are more compounds listed which INCLUDE the RoHS restricted substances.
- So depending who you are dealing with you might want to get a declaration for RoHS OR RoHS plus the Jig A and B list (JIG – Joint Industry Group)
- Don't forget - it has to be in a form that can be audited by the country the electronics is being imported into, virtually on demand (28 days in the case of UK as an example) and must be available for a period of 4 years from the time the units were imported into that country.

What is the point?

- Here is a scenario:
- Company A is based out of Silicon valley, but actually manufactures it's high priced consumer technogoodies in China.
- Company B buys products from company A and sells them in it's stores throughout Europe, the market demand for the technogoodies is 80% from October to December for the Christmas market and 20% for the other 9 months of the year.
- Company A has just shipped a Gazillion dollars worth of technogoodies to company B, and the goods have been challenged at point of import for proof of RoHS compliance.
- The product is analyzed and found to be non compliant due to excessive cadmium in one of the printing compounds used on the product housing – all product is stopped at point of entry on a Europe wide basis – there are 30 shopping days left until Christmas.

What happens next?

- The technogoodies are certainly not going to make the stores in time for Christmas – no one at European customs is going to cut a “waiver”.
- So we have a situation where a Gazillion dollars of goods is stuck in European customs and is never going to make it to market.
- So basically we are in Lawyer land.
- Company B sues company A for loss of revenue. Company A looks at the issue and starts action against the company that supplied the non compliant parts……so what does happen next?
- Like so much in life ……It depends……..

What Agreements did you have?

- What happens next depends entirely on the agreements that company A has in place with the vendor of the non compliant components.
- If company A has run these supplier agreements past their legal team SINCE the environmental issues of RoHS legal compliance came up, they are likely to be in good shape PROVIDING the legal department understood the implications of non compliance.
- The agreements they had with the vendors would have been modified to contains RoHS substance restrictions, and conformance declarations of product for either individual piece parts or whole ranges of product supplied by them will be in place.
- In this scenario, the company supplying the parts contact their insurance company who work through the action, company A and B get compensated, the matter is probably settled out of court.

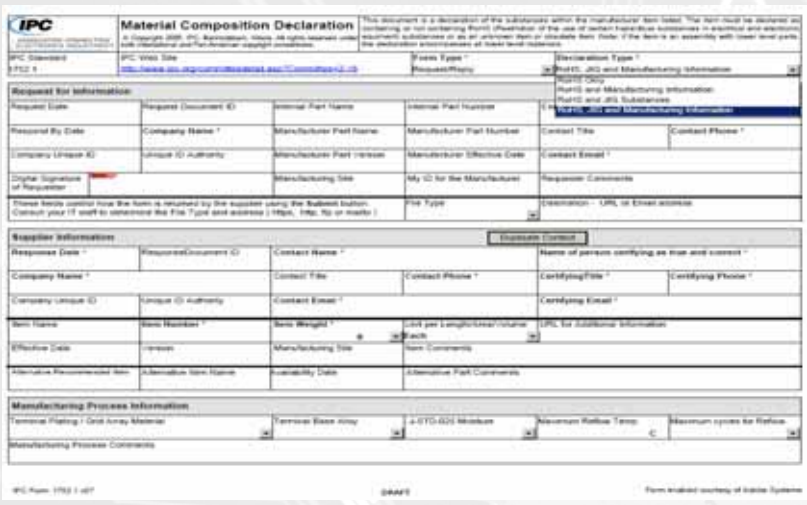
What Agreements?

- Ah - so company A did not have any agreements. The future then is totally out of their control and in the hands of the lawyers.
- Expect a long drawn out litigation, where the vendor of the parts asserts that company A is the design authority. Note - in this, if there is no RoHS conformance agreement, they are actually right, part of the purpose of getting those RoHS certifications is actually to highlight parts which are NOT compliant so that design engineering can change them. Cast your mind back 5 years. Do you remember asking for a list of every compound that went into a chip resistor?
- Company B will almost certainly have insisted on RoHS certification, so company A is stuck somewhere in the middle fighting fires with both the supplier and the customer – apart from losing a significant chunk of revenue stream for the quarter……..
- Company A - Welcome to Lawyer heaven……..

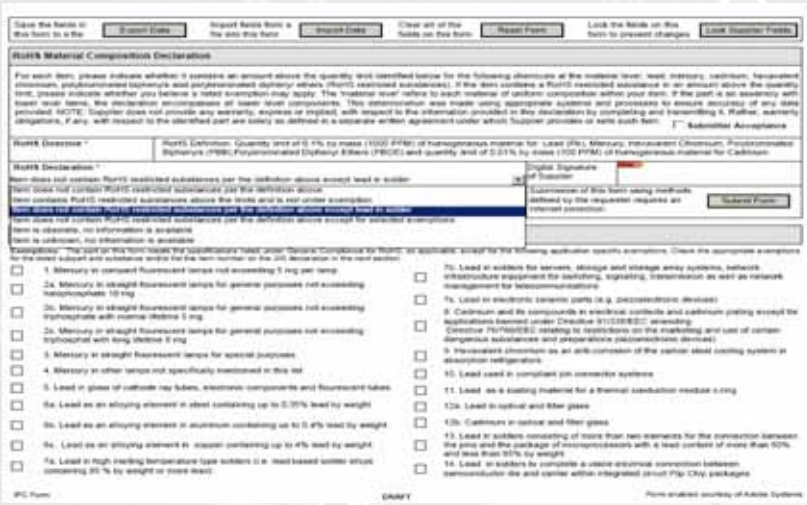
What and how to collect

- What to collect is easy, the excluded substances are clearly defined. How to collect it depends on what level of protection you need for your company.
- In my opinion the best protection is a legally binding statement saying that the parts contain none of the excluded substances at amounts above the threshold levels.
- This is going to depend to a great extent what you can negotiate with your supplier.
- The how to collect part of the equation is relatively simple. You can create your own form or simply use the IPC 1752 standards outlined in the next few slides as examples.

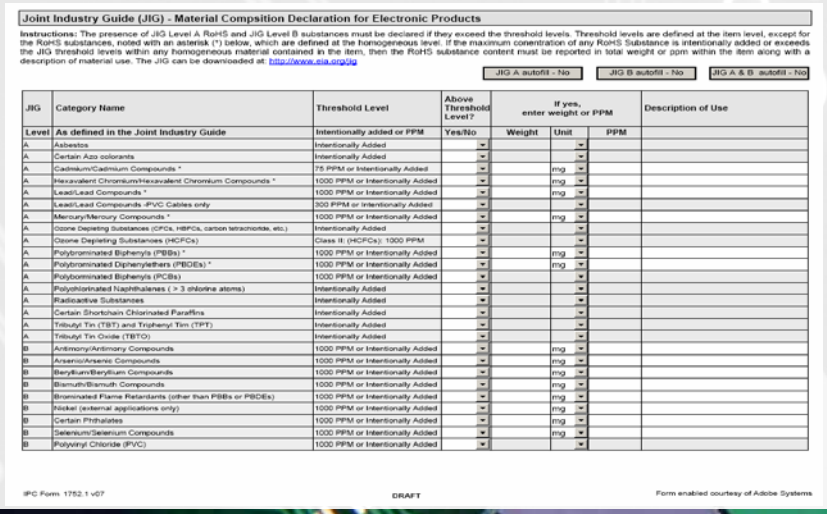
IPC 1752 Standard



RoHS Declaration and Exemptions



JIG A and B Declaration



Joint Industry Guide (JIG) - Material Compsition Declaration for Electronic Products

Instructions: The presence of JIG Level A RoHS and JIG Level B substances must be declared if they exceed the threshold levels. Threshold levels are defined at the item level, except for the RoHS substances, noted with an asterisk (*) below, which are defined at the homogeneous level. If the maximum conentration of any RoHS Substance is intentionally added or exceeds the JIG threshold levels within any homogeneous material contained in the item, then the RoHS substance content must be reported in total weight or ppm within the item along with a description of material use. The JIG can be downloaded at: http://www.eia.org/jig

JIG A autofill - No | JIG B autofill - No | JIG A & B autofill - No

JIG	Category Name	Threshold Level	Above Threshold Level?	If yes, enter weight or PPM			Description of Use
Level	As defined in the Joint Industry Guide	Intentionally added or PPM	Yes/No	Weight	Unit	PPM	
A	Asbestos	Intentionally Added					
A	Certain Azo colorants	Intentionally Added					
A	Cadmium/Cadmium Compounds *	75 PPM or Intentionally Added			mg		
A	Hexavalent Chromium/Hexavalent Chromium Compounds *	1000 PPM or Intentionally Added			mg		
A	Lead/Lead Compounds *	1000 PPM or Intentionally Added			mg		
A	Lead/Lead Compounds -PVC Cables only	300 PPM or Intentionally Added					
A	Mercury/Mercury Compounds *	1000 PPM or Intentionally Added			mg		
A	Ozone Depleting Substances (CFCs, HBFCs, carbon tetrachloride, etc.)	Intentionally Added					
A	Ozone Depleting Substances (HCFCs)	Class II: (HCFCs): 1000 PPM					
A	Polybrominated Biphenyls (PBBs) *	1000 PPM or Intentionally Added			mg		
A	Polybrominated Diphenylethers (PBDEs) *	1000 PPM or Intentionally Added			mg		
A	Polybomrinated Biphenyls (PCBs)	1000 PPM or Intentionally Added					
A	Polychlorinated Naphthalenes (> 3 chlorine atoms)	Intentionally Added					
A	Radioactive Substances	Intentionally Added					
A	Certain Shortchain Chlorinated Paraffins	Intentionally Added					
A	Tributyl Tin (TBT) and Triphenyl Tim (TPT)	Intentionally Added					
A	Tributyl Tin Oxide (TBTO)	Intentionally Added					
B	Antimony/Antimony Compounds	1000 PPM or Intentionally Added			mg		
B	Arsenic/Arsenic Compounds	1000 PPM or Intentionally Added			mg		
B	Beryllium/Beryllium Compounds	1000 PPM or Intentionally Added			mg		
B	Bismuth/Bismuth Compounds *	1000 PPM or Intentionally Added			mg		
B	Brominated Flame Retardants (other than PBBs or PBDEs)	1000 PPM or Intentionally Added			mg		
B	Nickel (external applications only)	1000 PPM or Intentionally Added			mg		
B	Certain Phthalates	1000 PPM or Intentionally Added			mg		
B	Selenium/Selenium Compounds	1000 PPM or Intentionally Added			mg		
B	Polyvinyl Chloride (PVC)	1000 PPM or Intentionally Added					

IPC Form 1752.1 v07 DRAFT Form enabled courtesy of Adobe Systems

Data Collection Summary

- Make sure legal buys in to declarations
- Collect the data using 1752 if possible
- Store in a “retrieve on demand” format
- Keep all records a minimum of 4 years from shipping date.

- Above all think and act pro-actively. Try and think “worst case” to avoid “worst case”

- Lets move on……..

Look back and learn to move forward

- This part of the presentation looks back on the RoHS and other legislation, looks at what is good about it (the environmental protection) and what is bad about it (the way it has been implemented). It considers how such legislation can be handled by the industry going forwards, particularly in view of the next impending round of legislation which will be directly impacting the product design in terms of its ease of recycling.

Where it all started

- Lets turn the clock back a few years – and head South for a few slides to find out why we are “where we are” - Antarctica late 1980’s.
- For years the electronics industry had been throwing up hundreds of thousands of tons of CFC’s into the atmosphere. (although a contributor, this was actually a minor contribution compared to aerosol propellants and other cfc based products)

Where it all started

- Dramatic loss of ozone in the lower stratosphere over Antarctica was first noticed in the 1970s by a research group from the British Antarctic Survey who were monitoring the atmosphere above Antarctica.
- Folklore has it that when the first measurements were taken in 1985, the drop in ozone levels in the Stratosphere was so dramatic that at first the scientists thought their instruments were faulty.
- Replacement instruments were built and flown out, and it wasn't until they confirmed the earlier measurements, several months later, that the ozone depletion observed was accepted as genuine.

Montreal Protocol stops use of CFC's

- In 1985 the Vienna Convention established mechanisms for international co-operation in research into the ozone layer and the effects of ozone depleting chemicals (ODCs). 1985 also marked the first discovery of the Antarctic ozone hole. On the basis of the Vienna Convention, the Montreal Protocol on Substances that Deplete the Ozone Layer was negotiated and signed by 24 countries and by the European Economic Community in September 1987.
- The Montreal Protocol on Substances that Deplete the Ozone Layer was one of the first international environmental agreements that included trade sanctions to achieve the stated goals of a treaty.

CFC ban was the first time the electronics industry had been seriously challenged on environmental issues

- Up until the CFC ban the electronics industry had had no real requirements for environmental conformance at an international level.
- The fact that the Montréal Protocol was established as an international agreement with trade sanctions "morphed" the future of the environmental issue from the hands of concerned scientists, engineers and environmentalists meeting to decide how to prevent a global disaster into what is now a political process which is making decisions – sometimes regardless of scientific data, and without due polling of the industry to see if in fact products can actually be manufactured at all without the banned substances - and without any apparent regard for what the reliability of such a changed product will be.

CFC ban was the first time the electronics industry had been seriously challenged on environmental issues

- Witness the FACT that the EPA in the US is the only scientific research done to establish the potential for leaching lead from electronics solder into groundwater at landfill sites carried out in the early 90's…and found that it never was and never will be an issue, in FACT there are likely to be more hazards due to TIN in landfill.
- You all of course knew that …..HOWEVER……..

The United Nations Steps IN

- What you probably didn't know is that the United Nations Environment Program in the guise of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, passed legislation adopted on 22 March 1989 about what can be moved where across European boundaries.
- It most certainly provided the running fuel for the RoHS initiative. It has been revised many times, the latest being in 2005.
- So while the innovators were busy moving between the Intel 8086 and the latest whizbang gigazippy chippy, the legislators were moving on slowly but surely……

Until WEEE came along

- You will understand all this background in a minute or two – be patient.
- The WEEE recycling directive became law in August 2005. It basically dictates that electronics goods must enter a separate waste stream at their end of life – that waste stream being separate from regular waste and aimed at maximum recycling. This impacts the same countries of the EEC as RoHS….

Until WEEE came along

- Which basically means that the very electronics which are now having substances taken out of them to make sure that they will not contaminate the environment at their end of life will in fact never even get the chance of doing so since they will never enter that waste stream but be handled in a completely different waste stream aimed at recycling.
- As in the rest of life too many cooks, too many angles in the legislature, everyone wanting to do good and pulling in multiple different directions….. Causing absolute chaos and burning dollars by the needless billions……
- BUT WEEE is actually the GOOD legislation…….it just makes RoHS redundant and was issued FIRST.

It is what it is, AND……

- ……..We are where we are.
- It is interesting to reflect on the situation and wonder how we got here. Unfortunately, we are as an industry caught in the grip of RoHS-itus, and while we as engineers have been trying to get to grips with the implications for our products of removing banned substances including what scientifically is – in landfill at any rate a relatively innocuous compound – lead in solder, the legislative machine did not stop.
- Last week the European union began the “consultative process” for their new round of legislation which will effectively dictate how a piece of electronics is designed to be ECO friendly… buckle up, it is going to be a rough ride…..

The situation we have is “WAG the DOG”

- ……..So why did I say all of that?
- Quite simple really. The original environmental drive was by scientists , engineers, and environmentalists; eventually becoming a political unstoppable juggernaut – whether the legislation is right or wrong…….
- WE – the electronics industry have to get back in the drivers seat to ensure that future legislation is industry guided and not legislated in isolation by well meaning but in some cases mis-informed politicians.

The situation we have is “WAG the DOG”

- The industry itself needs to be honest and self policing and have one voice in this area. The current situation is that the groups working on various parts of the RoHS initiative do NOT have a single voice either at the European or at any international level.
- Better to be in the drivers seat and have legislators looking over your shoulder than trying to engineer to an impossible legislative plan formed in isolation. Especially in the light of the ongoing legislation for ECO friendly electronics.

Option 1 - Stay Divided and be Conquered..

- The electronics industry is separated into many splintered groups of “self interest” none of which has the leverage to implement or control the environmental future of electronics from a legislative viewpoint. Effectively it is further sub divided by industry market sector concerns in different countries.
- The reality is that NO ONE if asked would actually want to supply a product that was harmful either in use, OR could be potentially harmful in its disposal…….I believe that the legislators and the engineers are in violent agreement on the basic premise of environmental protection.

Option 1 - Stay Divided and be Conquered..

- And yet the legislation steam rollers on without major industry front end support. The only way that the engineers can actually help, is IF the electronics industry trade associations, committees, trade groups and industry sectors actually do what Europe has done……

- WHAT is this guy smoking……..?

Option 2 - Unite and get a win - win…

- ……The European parliament is a parliamentary legislative system WITHOUT A COUNTRY.
- The Electronics groups worldwide need to form the same thing….. A super user group tasked with protecting the environment, and speaking with the united voice of the electronics ruling bodies and councils.
- In this way the electronics industry can directly input to the legislative process through one voice, ensuring that mis-lead (excuse the pun) legislation is screened out before it comes flying down from the mountain laser engraved on tablets of stone. The same group – and yes it will be a big one - could also solicit best practice ECO friendly design standards and advise the legislators on the issues.

IEEE can you achieve a "win – win"…?

- IEEE in closing I have a question…….is the IEEE capable of achieving the win – win by bringing my thoughts to a reality?
- The whole RoHS/ JIG platform is based on electronics and a new round of ECO friendly legislation is being worked on somewhere in Brussels as I speak - can IEEE step up and be the first to acknowledge the need for another "triple E" and be the first to help form it?
- **E**lectronics – **E**nvironmentally conscious – **E**cologically aware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Thank You…….
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