MANAGING HAZARDOUS SUBSTANCES IN SUPPLY CHAIN

Chris Yau
WG 5 Convener
CABC Past Vice-Chairman
EVOLUTION OF HAZARD SUBSTANCES CONTROL

- Only a few customers (mainly toys) requested it.
- Relied on self-declarations

- Buyer audit against “RoHS + customer requirements”
- Multiple audits by different customers, sometimes with similar checklists
- Focused on final product testing

- 3rd party certification
- Management system approach
- Recognized by the industry

Before RoHS Directive
Ad-hoc banned substances control
RoHS Directive issued
Customer-specific RoHS compliance practice
IECQ QC 080000
Organizations are overwhelmed with costly, and sometime redundant, customer audits

They want an *internationally recognized* certification process by which to demonstrate their ability to control and manage their design activities, supply chain, materials management, and manufacturing processes specific to their customer requirements.
### Many Hazardous Substances to Control

<table>
<thead>
<tr>
<th>Regulations / Directives / Standards</th>
<th>Reference</th>
<th>Pb (ppm)</th>
<th>Cd (ppm)</th>
<th>Hg (ppm)</th>
<th>Cr 6+ (ppm)</th>
<th>PBB (ppm)</th>
<th>PBDE (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU RoHS 2.0</td>
<td>2011/65/EU</td>
<td>1,000</td>
<td>100</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>China RoHS</td>
<td>ORDER NO. 32</td>
<td>1,000</td>
<td>100</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>EU battery</td>
<td>2006/66/EC</td>
<td>—</td>
<td>20</td>
<td>5</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>EU packaging</td>
<td>94/62/EC</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>EU ELV</td>
<td>2000/53/EC</td>
<td>1,000</td>
<td>100</td>
<td>1,000</td>
<td>1,000</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>China ELV</td>
<td>GB/T 30512</td>
<td>1,000</td>
<td>100</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
</tbody>
</table>
### Regulations / Directives / Standards

<table>
<thead>
<tr>
<th>Regulations / Directives / Standards</th>
<th>Reference</th>
<th>HSs to be banned, restricted, or notified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halogen</td>
<td>IEC 61249-2-21; IPC-4101B; JPCA-ES-01</td>
<td>- CL $\leq$ 900 ppm; - Br $\leq$ 900 ppm; - CL+Br $\leq$ 1,500 ppm;</td>
</tr>
<tr>
<td>EU POP</td>
<td>No. 850/200</td>
<td>PBDE, PFOS, SCCP, HBCDD, PCB, PCN……</td>
</tr>
<tr>
<td>EU food contacting material</td>
<td>No 1935/2004</td>
<td>Ba, Co, Cu, Fe, Al, Mg, Zn, ……</td>
</tr>
<tr>
<td>EU REACH</td>
<td>No. 1907/2006</td>
<td>168 SVHCs to be notified; 64 banned or restricted</td>
</tr>
<tr>
<td>CA Proposition 65</td>
<td>No. 1907/2006</td>
<td>Close to 1,000 substances, Warning is to be made on products while expose is possible.</td>
</tr>
<tr>
<td>Items</td>
<td>Risks</td>
<td>Results</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Game controller</td>
<td>Plastic in cables contained &gt; 1.9% (by weight) short chain chlorinated paraffin's (SCCP) [POP Regulation] Solders on PCB contain up to 45% lead. [RoHS]</td>
<td>Recall from end users</td>
</tr>
<tr>
<td>Travel charger</td>
<td>Solders of PCB and plugs contain 84% lead and 1.1% Cd. [RoHS]</td>
<td>Withdrawn from market</td>
</tr>
<tr>
<td>Flashing Spiky Ball toy</td>
<td>Solder contains 6.177% lead. LED lamp contains 0.52% bromine [RoHS]</td>
<td>Rejected at border</td>
</tr>
<tr>
<td>AM/FM Radio</td>
<td>Plastics in wiring and capacitors contain up to 0.19% lead Solders on PCB contain 0.071% Cd</td>
<td>Withdrawn from products</td>
</tr>
<tr>
<td>Hand Blender</td>
<td>Solders on PCB contain 80% lead [RoHS]</td>
<td>Withdrawn from market</td>
</tr>
</tbody>
</table>

VIOLATION NUMBERS ARE RISING

<table>
<thead>
<tr>
<th>Year</th>
<th># cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>132</td>
</tr>
<tr>
<td>2010</td>
<td>199</td>
</tr>
<tr>
<td>2011</td>
<td>168</td>
</tr>
<tr>
<td>2012</td>
<td>227</td>
</tr>
<tr>
<td>2013</td>
<td>240</td>
</tr>
<tr>
<td>2014</td>
<td>379</td>
</tr>
<tr>
<td>2015</td>
<td>354</td>
</tr>
</tbody>
</table>
EXAMPLES OF IMPROPER PRACTICES IN THE SUPPLY CHAIN
Staff responsible for selecting suppliers were not competent in reading chemical analysis reports

- The supplier is approved as long as it submitted the reports
- Some reports were not using the recommended testing methods, or the testing was done on mixed samples

There was no supplier monitoring and cancellation mechanism

- There was no procedure on supplier monitoring
- Once a supplier is on the “approved list”, it will stay on the list – there is no disapproval mechanism
The compliance status of indirect materials used in production was unknown
  • e.g. mold release agent, glues, thinner, etc.

No validation after HS-HSF conversion
  • Assembly (e.g. change of components)
  • Injection molding (e.g. machine cleansing)
  • Spray painting (e.g. gun cleansing)
  • SMT/PCBA (e.g. change of soldering irons, soldering wires, solder paste, and components)
  • Process parameters (e.g. solder iron temperature, reflow oven temperature profile, etc.)
Incoming materials were considered HSF as long as there was a “HSF” (or similar) sticker on the package
  • Wrongful application of stickers were seen during our audits

Misleading wordings were used on purchase orders to indicate RoHS-compliance (or similar HSF) materials
  • “Green materials”
  • “Lead free”
  • “Environmental-friendly”
Ignore HS requirements beyond RoHS

- Many industries such as automobile and toys control more than RoHS' six substances
- HS are usually classified as “banned” or “controlled” on buyers’ POs, but the definitions of banned and controlled are not clear (could mean zero or under certain limits)
- Suppliers hence were frustrated. Many suppliers ended up controlling only the RoHS-6.
HOW IECQ QC 080000 HELPS
IECQ QC 080000

- Provides the management system framework
- Covers manufacturers, assemblers and suppliers of *electrotechnical products* and related assemblies (including modules), and associated materials and processes.
- Ensures that hazardous substances are managed and controlled by the organization according to declared regulations, and applicable standards and customer requirements
IECQ QC 080000 AND QMS

- IECQ QC 080000 adds to ISO 9001 or other equivalent quality management system standards
- IECQ QC 080000 includes the requirements for managing hazardous substances on top of the quality management system
- ISO 9001 MUST be read in conjunction with IECQ QC 080000
  - The organization may implement their QMS based on other full equivalent QMS standards, e.g. TS 16949, AS 9100, IRIS
## IECQ QC 080000 VS CUSTOMER AUDIT

<table>
<thead>
<tr>
<th></th>
<th>IECQ QC 080000</th>
<th>Customer Audit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Standard</strong></td>
<td>QC 080000 (+ISO 9001)</td>
<td>Customer-specific checklist</td>
</tr>
<tr>
<td><strong>HS controlled</strong></td>
<td>All applicable (regulatory + customer requirements)</td>
<td>Customer-specific HS list</td>
</tr>
<tr>
<td><strong>Accreditation</strong></td>
<td>IEC-IECQ</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Targeted customers</strong></td>
<td>Forward-looking, quality and environmental committed.</td>
<td>Problems oriented</td>
</tr>
<tr>
<td><strong>Result</strong></td>
<td>A sustainable system that is HSF Accredited Answerable to many customers</td>
<td>Compliance audit only. Proves only the present condition is satisfactory.</td>
</tr>
</tbody>
</table>
SAME RULES FOR EVERY CB

- Rules published in IECQ 03-5, which includes standard assessor days for all IECQ CBs

- IECQ CB assessment team have competence on the IECQ QC 080000 specification, the core processes of the organization being assessed, and the knowledge of the associated hazardous substances
SAME RULES FOR EVERY CB

- All manufacturing locations are assessed, no sampling
- Deficiencies are not to be recorded or reported as Observations or Opportunities for Improvement
  - Either complied or not complied
Replaces multiple 2nd Party assessments by buyers with one “IECQ Assessment”.

Benefits to Industry
- Cost savings
- Savings in resources
- Consistency in supplier assessment
- Confidence in supply chain
- Online certificates
IECQ HSPM COMPETITIVENESS

- One single set of Rules and Operational Procedures for all IECQ approved Certification Bodies (CBs) to follow
- All IECQ CBs undergo the single assessment process
- Single certificate format used by all IECQ CBs worldwide
- All certificates issued via the IECQ online system and located in the one place with public access and search
  - If the certificate is not showing on the IECQ website – it does not exist!!
ONLINE CERTIFICATES

IECQ Online Certificates

- All certificates located
- Public access
- Search features
- Online version is the master
IECQ HSPM CERTIFICATION BODIES

17 CBs participated
CERTIFICATES GROWTH CONTINUES!
NUMBER OF CERTIFICATES - ASIA

China 2121
Hong Kong 13
Japan 3
Malaysia 5
Philippines 2
Singapore 2
S Korea 16
Taiwan 536
Thailand 6
Vietnam 2

as of 8 Apr 2016
NUMBER OF CERTIFICATES – NAM

Canada 1
Mexico 5
US 2

as of 8 Apr 2016
NUMBER OF CERTIFICATES – SAM

Argentina 2
Brazil 7

as of 8 Apr 2016
NUMBER OF CERTIFICATES – EU

as of 8 Apr 2016

Czech Rep 1
Netherland 1
Slovakia 1
NUMBER OF CERTIFICATES

- 78% are in China
- 98% are in the Greater China region
  - “World factory”
COMING TREND - A REMINDER

22 July 2014
Exemption lifted:
Medical devices
Monitoring and control instruments

22 July 2016
Exemption lifted:
In-vitro diagnostic medical devices

22 July 2017
Exemption lifted:
Industrial monitoring and control instruments

22 July 2019
All E&E equipment covered except those explicitly exempted
To accommodate other hazardous substances directives and regulations other than RoHS, e.g.
  - Compliance assessment, preparation of technical file, preparation of self-declaration, use of markings, change control, product recall in re-casted RoHS
  - The information communication within the supply chain in REACH

Better alignment and consistency with ISO 9001:2008

Remove the ambiguity and clarify the intention of some requirements in IECQ QC 080000:2005
WG5 WORKS - FUTURE DEVELOPMENT

- Revising IECQ QC 080000 to align with ISO 9001:2015
  - Final draft being circulated for comment
  - To be released in mid-2016

- To review and strengthen the training and auditor qualifications of the IECQ HSPM schemes

- To issue audit good practices guidelines
IECQ HSPM audits provide the management solution for your hazardous substances supply chain management with

- Consistent CB operational rules
- Consistent auditor competence
- One single place to check the certificates

IECQ HSPM is the only internationally recognized HSPM audit programme

IECQ HSPM covers more than just EU RoHS – it covers all HS regulations that’s applicable to you and your supplier
THANK YOU