

Technical Considerations for Effective RoHS Compliance Programs



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Objectives



- Lingering Testing Issues for RoHS Compliance
- Considerations for Effective Compliance Programs



Lingering RoHS-Testing Issues



- Lack of standards for analytical testing
 - TC111 voted down the recent 62321 CDV in Dec2006
 - China RoHS went ahead and published a Testing Standard based on the 62321 CDV...???
 - Cr testing not finalized
 - PBB/PBDE testing not finalized
 - Labs around the globe are testing with different methods, without one accepted standard
- Homogeneous Material definition, size, mass, and volume an issue
 - Definition of HM still not clear (especially for Cr on metal)
 - With very small devices/components, the cost of getting enough material to test is extraordinary
 - China using $<4\text{mm}^3$ as sample size to be considered HM



Lingering RoHS-Testing Issues



- TC111 vs. ASTM F40 direction
 - TC111 has approached problem from the OEM level
 - Advantage: easily identifying the producer for responsibility
 - Disadvantage: doesn't have an easy control path to bottom of supply chain
 - Highest cost approach
 - ASTM F40 is approaching problem from raw material level
 - Advantage: if all raw materials are compliant, then all products would be
 - Disadvantage: easily identifying all raw material suppliers is problematic
 - Lowest cost approach as raw materials are tested once, period.



Lingering RoHS-Testing Issues



- No accreditation available for RoHS Test Labs
 - without standard, no common accreditation possible
- China RoHS purportedly will require only China Labs to do the testing
 - and only CCC organizations to certify
- Certification Marks are not meaningful today unless 100% testing is performed
 - not practical except for simple components or raw materials



Comparison of XRF and Analytical Testing Methods



Testing Method	Strength	Weakness
XRF	<p>Fast (minutes)</p> <p>Lowest cost</p> <p>Best used as a screening tool (as noted in the International standards for testing)</p> <p>Doesn't require a Test Lab</p> <p>Doesn't require highly trained lab personnel</p> <p>Portable testing possible</p> <p>Non-destructive testing, sample preparation usually not required</p>	<p>Accuracy is low</p> <p>Can only measure Pb, Cd, Hg, Cr, and Br (if Cr or Br are found, analytical testing may be needed)</p> <p>Can't measure hexavalent Cr, or PBB/PBDE</p> <p>Cd can be difficult to measure in metals as the Method Detection Limit is near to the RoHS limit</p> <p>Some samples can not be suitably tested with XRF due to sample size or weight</p>
Analytical	<p>Quality is high, Accurate</p> <p>Can determine hexavalent Cr and PBB/PBDE levels</p> <p>International standards have defined Analytical methods that are acceptable for RoHS compliance</p> <p>Homogeneous materials testing is possible with smaller sample size than with XRF</p>	<p>Requires a qualified Laboratory, with qualified personnel, in a fixed location</p> <p>3-6 times more expensive than XRF</p> <p>Test times are measured in hours, not minutes</p> <p>Destructive testing. Components/materials not usable after testing</p>



Checklist of Considerations



- The following slides present questions to consider to insure your compliance program is effective



Supplier Declarations and Test Reports



- Evaluation of Declarations and Test Reports
 - Do you check for falsified or counterfeit reports?
 - Are the documents reviewed or simply stored in a file?
 - Do all the declarations and test reports actually meet the requirements?
 - Do you have trained personnel that can evaluate the submitted documentation?
 - Do you check for accuracy, math errors, engineering interpretation errors?
 - Was the right method used to test the homogeneous material?
 - Was homogeneous material mixing used?
 - Were measurement detection limits and reporting limits properly adjusted if mixed?



Supplier Control Includes Test Labs



- Test lab selection process
 - Were certified reference materials (CRMs) used?
 - Did you do proficiency testing with test lab vendors?
 - Do you have trained personnel that can truly evaluate potential Test Lab vendors?
 - Do they know QC080000 or HSPM?
- Quality of lab testing
 - Does the test lab calibrate properly?
 - Is duplicate testing performed?
 - Are recognized test methods applied to homogeneous materials correctly?
 - Is the test lab properly evaluating raw test data?
 - Is lab accredited by CNAL, ISO or other authority?
 - Is the accreditation scope clearly documented?
 - Is the lab accredited to perform the tests you need or requested?



Common Testing Errors



- Use of EN71 or other non-RoHS testing methods
- Each color in plastic requires individual HM testing
- Testing for hex-Cr not done (properly)
- Testing for PBB and PBDE not done
 - Does the test lab look for nona-BDE?
 - Congeners in plastics test not identified or calibrated properly (209 congeners in total)
- Labs using old versions of TC111 IEC62321 Test Method Standard (unauthorized)
 - Testing not following the “homogeneous materials” definition and philosophy (Separate tests for each HM)
- Was XRF testing performed when analytical techniques were required?
 - Do you check raw test data for test methods used?



Monitoring of Incoming Components?



- Do you do incoming inspection?
- If XRF screening is used,
 - Is it only on the outside of the component?
 - Do you deconstruct some components regularly to check the “inside”?
 - Have you validated your XRF measurements with analytical testing?
 - for passing, failing, and inconclusive results?



Monitoring of Incoming Components?



- If XRF screening is used,
 - Do you have a well-documented XRF screening policy and process?
 - Trained staff?
 - Proper lab procedures (calibration, sample prep, quality control, use of CRMs, SOPs, accreditation to ISO17025)?
 - What passes? What fails? What is Inconclusive?
 - What XRF result triggers further analytical testing?
 - Are the policies applied uniformly throughout your company and consistently with your suppliers?



Manufacturing and Process Control in Your Supply Chain



- How do you validate suppliers have a controlled process?
 - Do you monitor process control through audits?
 - How often?
 - Do you test incoming product regularly, with both XRF and analytical testing?
 - Do you require manufacturing changes to be communicated to you by your suppliers?
 - How do you monitor these?
 - If a supplier converted a process to become HS compliant, how did they achieve this?
 - Was the change fully documented and evaluated?
 - How do your suppliers monitor and control their suppliers?
 - How deep into the supply chain do you feel you have measures to ensure compliance to global RoHS legislation?



Compliance Solutions Summary



- Training/Education
 - Global Legislation Updates
 - Newsletters for up-to-date activity
 - QC080000 knowledge
- Global RoHS Compliance in 3 months
 - Present state to full global compliance in 3 months (turn-key)
- XRF and Analytical Testing & Certification
 - UL Mark for simple components and HMs
 - iQ Database Listing RoHS Compliance next to UL Safety Listing
- Mgmt System Certification (QC080000-based)

Product



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