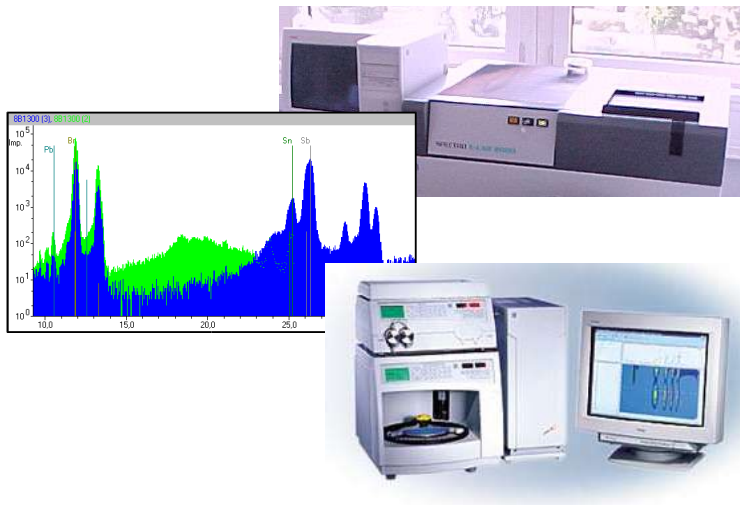


Procedures for the Determination of Regulated Substances in Electrotechnical Products



IEC ACEA ad hoc Working
Group
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Introduction

- Use of certain substances like Pb, Hg, Cd, Cr VI, and some types of brominated flame retardants in electrotechnical products are regulated in current and proposed legislation e.g in:
 - **EU RoHS**
 - **Chinese draft legislation (“Chinese RoHS”)**
 - **US (California) Electronic Waste Recycling Act (S.B. 20),
Electronic Waste, Advanced Disposal Fees (S.B. 50)**



Demonstrating Conformance

- Supplier Declaration of Conformity (SDoC, ISO-IEC 17050)
- Material declaration (EIA, EICTA, JGPSSI)
 - Material declarations voluntarily introduced
 - Harmonising various, already existing material declaration systems is needed
- RoHS test methods (IEC ACEA)



Why Testing Then?

- Testing may be performed for a variety of reasons:
 - **As an alternative to supply chain material declarations**
 - **Companies may require their suppliers to perform testing as the basis of the supplier's material declaration**
 - **Companies may perform “spot checks” of their suppliers to confirm compliance**
 - **Government officials may test as basis to assess compliance**
- Industry is convinced of the importance of defining testing protocols for regulated substances of electrotechnical products



Is There a Real Need for a New Test Method?

- Certain test methods to determine regulated material content already exist, but:
 - most are not appropriate for testing **electrotechnical products**
 - are not internationally recognized
 - **Not agreed upon by countries regulating substances in electrotechnical products**
 - **Testing methods, differ from each other**



Importance for Setting Standard Testing Methods

- Compliance checks have to be performed in a consistent and reliable manner
- Need for detailed specifications of standard methods to verify compliance with the regulations
- Standard methods need to be implementable by laboratories all around the world
- International standard methods encourage trade of products by avoiding technical barriers
- Harmonisation of compliance and enforcement methods is essential for a proper functioning of the global market



Members IEC ACEA ad hoc WG

Name	Affiliation	Region	Role / Task Leader	Product Group
Markus Stutz Mike Loch Michael Riess	Motorola	EU	Convenor Link ACEA PBB/PBDE HPLC/UV & FT-IR	IT & Telecommunications
Andy Baynes Rob Guzzo	Apple	EU	Outside communications Link EICTA	IT & Telecommunications
Joachim Zietlow Ralph Jaeger	Sony	EU	Pb/Cd ICP-AES & EDXRF Link JBCE	IT & Telecommunications Consumer equipment
Ed Yandek	GE Lighting	US	Standards expertise	Lighting equipment
Todd Brady	Intel	US	Pb/Cd ICP-AES Link EIA	IT & Telecommunications
Rudi Van Eldik Marion Wolf	Univ. Erlangen, AOC	EU	Cr VI ICP-AES, Hg CV AAS, Pb/Cd AAS	
Maarten ten Houten	Philips	EU	Glas?	IT & Telecommunications Consumer equipment Lighting equipment leisure and sports equipment
HyoBong Hong	Samsung	Asia	PBB/PBDE GC/MS Link Korea Associations	IT & Telecommunications Consumer equipment Large household equipment
Gerd Schulz	Epcos	EU	Sample preparation Link Germany Associations	IT & Telecommunications
Song Wei	Pony Labs	Asia	Hg ICP-AES, link China Associations	
Friedrich Koch Klaus Budde	Siemens	EU	Link ACEA Pb/Cd IPC-AES, PBB/PBDE GC/MS	IT & Telecommunications Consumer equipment Large household equipment
Joe Johnson	Microsoft	US	Screening EDXRF	IT & Telecommunications
Paul Quickert Ferdinand Hermann John Lewis Zhan Shi	HP	US	Screening WDXRF Cr VI Diphenyl	IT & Telecommunications
Alfred Arnaiz	AFME	EU	Standards expertise Link Spain Associations	
Anne Brinkley Silvio Weeren	IBM	US	PBB/PBDE EDXRF Pb/Cd EDXRF	IT & Telecommunications
Shigemi Sakamoto Takao Sato	JEITA	Asia	Link Japan Associations	
Miyuki Takenaka	Toshiba	Asia	Pb/Cd ICP-MS	IT & Telecommunications
Noboru Yamashita	Shimadzu	Asia	Screening EDXRF	
Walter Huck	Murata	EU	Liason to TC 91 (components)	Components
Scott O'Connell	Dell	US		
Dop Jooren	Tyco	EU	Liason to SC48B WG5	
Viktor Sundberg Fabio Spizzo	Electrolux	EU	Cr VI	
Luciano Mantovani Giuseppe Vittori	CNR CEI	EU		
Dongkai Shangguan	Flextronics	US	Screening	EMS



Mission & Goal IEC ACEA ad hoc WG

- **Mission:**
 - **Develop a normative document that will define test procedures that will allow the electrotechnical industry to determine the concentration of the regulated substances Pb, Hg, Cd, Cr VI, PBB, PBDE (EU RoHS, China, US, Japan, etc.) in electrotechnical products on a consistent global basis**
- **Goal:**
 - **Develop a normative document for electrotechnical industry to be used by labs globally for OEMs, suppliers, NGOs, governments, etc.**
 - **The normative document will be submitted as proposal for an IEC standard**



Scope IEC ACEA ad hoc WG

- This standard provides test procedures for determining the concentration of Lead (Pb), Mercury (Hg), Cadmium (Cd), hexavalent Chromium (Cr VI), and two types of brominated flame retardants, Polybrominated Biphenyls (PBB) and Polybrominated Diphenyl Ethers (PBDE) contained in electrical and electronic products defined in Annex I of WEEE.
- 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)**

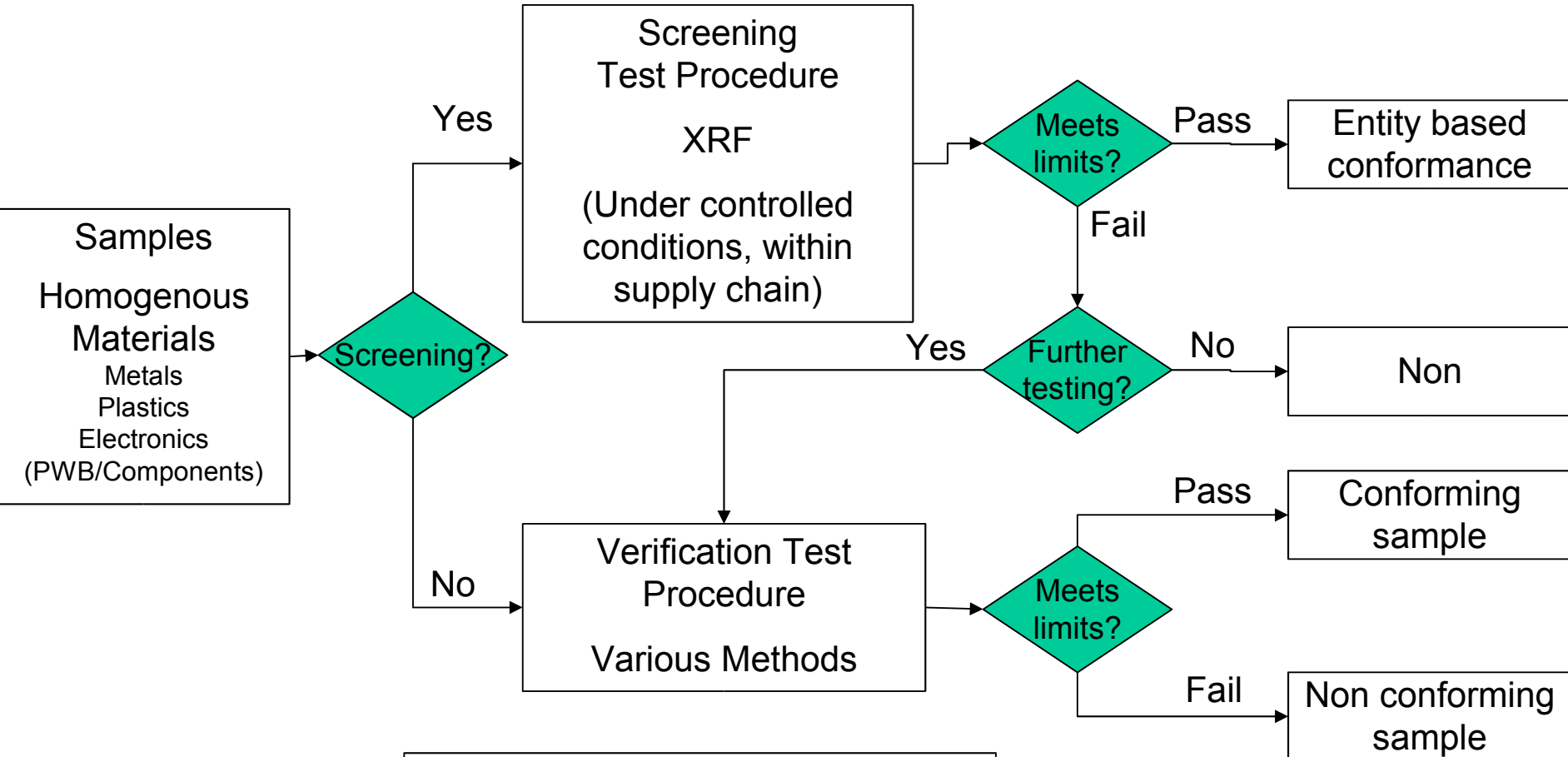



Annex 1: Product Groups

- Need to adjust the test procedure to major product groups. Major product groups are (according to RoHS, experts in WG):
 - **Large household appliances**
 - **Small household appliances**
 - **IT and telecommunications equipment**
 - **Consumer equipment**
 - **Lighting equipment**
 - Electrical and electronic tools (with the exception of large-scale stationary industrial tools)
 - Toys, leisure and sports equipment
 - Automatic dispensers



Test Procedure Flow



 Decision criteria will be entity based



Screening Test Procedure XRF

Steps	Substances	Polymer Materials	Metal Materials	Electronics (PWBs/Components)
Sample preparation		Direct measurement, Powder measurement, Thin foils	Direct measurement, Powder measurement Pellets	Direct measurement, Powder measurement, Pellets
Analytical technique definition (incl. typical margins of errors)	PBB/PBDE	EDXRF, WDXRF, μ-XRF		
	Cr VI			
	Hg			
	Pb / Cd			
References (material, methods) for comparison				
Information delivered		Black/grey/white area concept		



Verification Test Procedure

Steps	Substances	Polymer Materials	Metal Materials	Electronics (PWBs/Components)
Sample preparation		Direct measurement, Grinding Microwave digestion Acid digestion Dry Ashing Solvent extraction	Direct measurement, Grinding Acid digestion	Grinding Microwave digestion Acid digestion Solvent extraction
Analytical technique definition (incl. typical margins of errors)	PBB/PBDE	See next slide		
	Cr VI			
	Hg			
	Pb/Cd			
References (material, methods)		BCR-680, BCR-681, In-house references	Commercial Solid Metal Standards In-house references	None commercially available, In-house references
Limitations & Information delivered				



Verification Test Methods (details)

	Substance	Polymer Materials	Metal Materials	Electronics (PWBs/Components)
Analytical technique definition (incl. typical margins of errors)	PBB/PBDE	GC/MS (incl. FT-IR) HPLC/UV&MS	NA	GC/MS (incl. FT-IR) HPLC/UV&MS
	Cr VI	NA	Spot test (ISO 3613) Alkaline Digestion & Colorimetric (EPA 3060A)	NA
	Hg	ICP-AES&MS CV AAS AFS DMA		
	Pb/Cd	ICP-AES AAS ICP-MS		

Bold: Preferred Method
Normal: Acceptable Method



Tasklist (I)

Step/ substance	Instrument	Material Type	Responsible Task Leader
Screening	EDXRF Semiquantitative EDXRF for Br, Cr, Hg, Pb, Cd subgroup (IBM, Microsoft, Motorola, Sony, etc.) EDXRF makers subgroup		Mr Yamashita (with Mr Weeren, Johnson, Riess, Zietlow, MacLeod (UL) etc.) Mr Stutz (with Mr Yamashita)
	GC/MS including FT-IR	Plastics / Electronics	Mr Hong (with Mr Riess)
HPLC/UV & HPLC/MS	Mr Riess		
Cr VI	Spot test (ISO 3613)	Metals	Mr Shi
	Alkaline Digestion & Colorimetric (EPA 3060A)		Mr Shi



Tasklist (II)

Substance	Instrument	Material Type	Sample Preparation	Responsible Task Leader
Hg	ICP-AES/MS	Polymer Materials Metallic Materials	Microwave digestion Acid digestion	Ms Wei
	CV AAS	Electronics	Microwave digestion	Ms Wolf
	AFS			Ms Wei
	DMA (AAS)			Ms Takenaka / Mr McGrady
Pb/Cd	ICP-AES	Polymer Materials	Microwave, Aqua Regia, Dry Ashing	Mr Zietlow (Jaeger/Takenaka/Wolf/ Brady/Shi)
	AAS	Metallic Materials	Acid Digestion	Ms Wolf
	ICP-MS	Electronics	Microwave, Aqua Regia	Ms Takenaka
<p>Sample preparation: Mr Schulz (through DKE AK 191.0.2)</p> <p>Disassembly procedure: Mr Brady et al., solicit input from global stakeholders (global, lobbying, market surveillance)</p>				



Timeline

- Working Draft (WD) document Dec. 04
- Committee Draft (CD) document March 05
- Committee Draft for Voting (CDV) document Dec 05
- RoHS July 06

