IPC MIDWEST CONFERENCE & EXHIBITION

A Comparison of Materials Testing Methods

Presented by:

Jim Cronin

Environmental Monitoring and Technologies, Inc.

Environmental Monitoring & Technologies, Inc.

Environmental Laboratory & Testing Services

IPC
ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES®

We will discuss

- Available testing methods
- Advantages and disadvantages of the test methods that are available
- How 3rd Party laboratory testing is one aspect of your Compliance Strategy

Global Environmental Regulations

- European Union
- China
- Norway
- Australia
- South America
- Toys
- Korea
- Japan
- California
- OEM “Green” Programs
- Automotive

Global Environmental Regulations

- European Union
- China
- Norway
- Australia
- South America
- Toys
- Korea
- Japan
- California
- OEM “Green” Programs
- Automotive

What’s Next ?

Global Environmental Regulations

- Regulated hazardous substances
- Presence and concentrations
- Manufacturing
- Bill of Materials (BOMs)
- Compliance

IPC Get Interconnected.™ MIDWEST CONFERENCE & EXHIBITION

" The Supplier" is responsible for compliance!

1. Collection of materials data from supply chain (C of Cs)
2. Request validated product information
3. Diligent recordkeeping and documentation, updated as needed
4. Laboratory testing to confirm collected data, verify suspect data, or fill gaps

IPC ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES®

IPC Get Interconnected.™ MIDWEST CONFERENCE & EXHIBITION

Compliance and **Due Diligence** are the goals !

IPC ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES®

Laboratory Testing

What's available today ?

- **Non-Destructive**
  - X-ray Fluorescence (XRF) Screening
- **Destructive/Traditional Sample analysis**

Sample Prep prior to Analysis

- Provide homogenous sample material
- Deconstruction
- Disassembly
- Grinding/Sample Homogenization

X-ray Fluorescence (XRF) Screening

- Hand held or Benchtop
- Homogeneous material
- Mode of Operation
- Length of “Shot Time”
- Size of “Shot Window”
- Depth of shot
- Reading the Spectra

XRF Screening Testing

- Advantages
  - Cost-effective
  - Fast
  - Non-destructive
  - Mimics regulatory inspection testing
- Disadvantages
  - Hand held vs.Benchtop
  - Test parameters
  - Appropriate calibration is critical
  - MDLs
  - “Inconclusive” results

Destructive Sample Analysis

State-of-the-art analytical instrumentation

- ICP – Inductive Coupled Plasma
- CVAA – Cold Vapor Atomic Absorbtion
- GC/MS – Gas Chromatograph/Mass Spec detector
- UV-vis Spectrophotometer
- IC – Ion Chromatograph

Destructive Sample Analysis

Advantages

- Quantitative
  - ppm and ppb results
- Test parameters
- Method Detection Limits

Disadvantages

- Increased planning cycle
- Expense
  - Sample quantity
  - Destructive

Quality Assurance (QA)

- Method Blanks (MB)
- Laboratory Control Samples (LCS)
- Matrix Spike Samples/Duplicates (MS/MSD)
- Calibration Verification (CV)
- Additional QA program elements include analyst training, SOPs, QAM, MDL studies, etc.

XRF vs. Destructive

XRF vs. Destructive

1st Goal: To show Compliance

2nd Goal: To show Continuing Compliance

IPC Get Interconnected.™ MIDWEST CONFERENCE & EXHIBITION

"Product Audit" Strategy

using
XRF *and* Destructive
Analysis

IPC ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES®

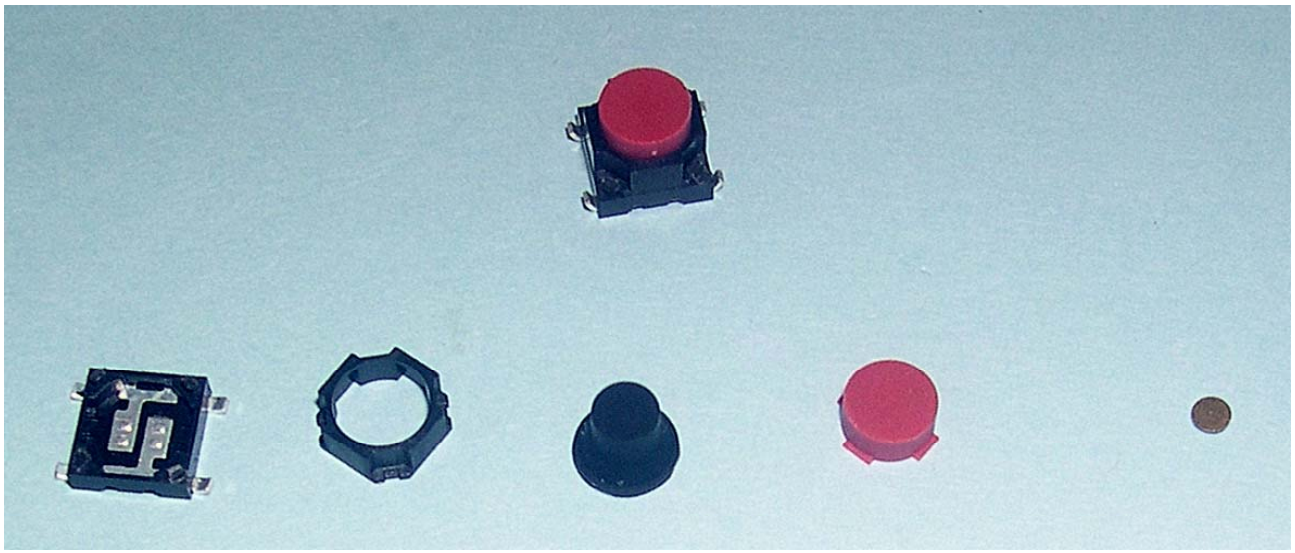
“Product Audit”

Strategy provides

- Compliance information
  - inconclusive results
  - “high risk” material
  - “high risk” vendor
  - continuing compliance evaluation

"Product Audit" Strategy

- Deconstruct/disassembly



"Product Audit" Strategy

- XRF screen analysis

"Product Audit" Strategy

- Inconclusive/Failure results
  - Destructive Analysis
  - Vendor response

IPC Get Interconnected.™ MIDWEST CONFERENCE & EXHIBITION

Benefits of a "Product Audit" Strategy

- Mimics regulatory inspection testing
- Tailored to the Client's requirements
- Provides time-dependent compliance data
- Testing of materials to fill data gaps
- Ongoing, periodic surveillance or continuing compliance
- Cost effective
- Provides Due Diligence

IPC ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES®

Conclusion

- Identifying the presence and concentration of regulated hazardous substances is a global concern that will continue to evolve
- Test methods have been established and will continue to be developed as needed
- Understanding global environmental regulations and how they will be regulated will assist with your compliance strategy
- Incorporating XRF and Destructive analysis will provide data that will provide continuing compliance and Due Diligence

IPC Get Interconnected.™ MIDWEST CONFERENCE & EXHIBITION

Thank You !

Environmental Monitoring & Technologies, Inc.

Environmental Laboratory & Testing Services

IPC ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES®