The Road to EU ROHS Compliance
3M Business Units’ Unique Product Market

American Industrial Hygiene Conference & Exposition
Crossover Session #314
Tuesday, June 5, 2007

Presented by:
Frances May, MPH, CIH, 3M Company
Phyllis Cheatum, MSPH, 3M Company
The session will cover the following:

- Brief European Union (EU) RoHS definition
- Unique product portfolio with respect to ROHS
- Supplier Interface
  - Supplier Certification Challenges
The Road to RoHS Compliance

Introduction

- Business Impact/Decisions
  - Supplier Interface
  - Customer Expectations
  - Applicability/Exemptions
  - Product Labeling *(To label or not to label)*
  - Transitions-compliant vs. non-compliant part
- Sustainability
- Key Learnings

Please Visit - www.aiha.org/Content/InsideAIHA/Volunteer+Groups/sscomm.htm
The Road to ROHS Compliance

Definition

- European Union Directive on the Restriction of Hazardous Substances (RoHS) in Electrical and Electronic Equipment, 2002/95/EC

- Applies to products placed on the market after July 1, 2006
The Road to ROHS Compliance

- Prohibits six hazardous substances above certain de minimis levels
  - Four heavy metals—lead, mercury, cadmium, hexavalent chromium
  - Two polybrominated flame retardants—PBBs and PBDEs
  - EXCEPT for certain exempt applications
- De minimis levels
  - Cadmium – 0.01% (100 ppm)
  - All others – 0.1% (1000 ppm)

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EU RoHS – What’s in Scope? Exempt Applications?

- Exempt Applications
  - Initial RoHS Annex list
  - Change was constant
    - Example: October 2005 amendments with additional exempt applications, including DecaBDE in polymeric applications, certain lead solders, lead and cadmium in optical glass
  - There were other exempt application requests pending
  - So, decision for business…do you wait?

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EU RoHS Applicability/Exemptions

- Company needed process to document internal determinations on EU WEEE/RoHS applicability
- China RoHS creates uncertainties over scope and EU exempt applications
- Other countries or US States (CA Assembly Bill) could adopt RoHS provisions with uncertain scope
- Customer demands
- Competitiveness factors
EU RoHS Exemptions/Applicability Challenge

- Manufacturing with multiple businesses. Some required RoHS compliant lines, some did not (medical product exemptions)
- Businesses needed to consider all of these factors in business plans for products
Does ROHS Apply to Your Products?

- Increasingly, more customers were requesting ROHS compliance for products outside the scope of the directive themselves, but are used in covered products:
  - Adhesives
  - Film – purpose to reflect or make image brighter
  - Security Laminates – tamper resistance
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Supplier Interface
Supplier Certification Challenges

- Suppliers Unfamiliar with ROHS regulations
- Suppliers Unable to Meet Project Timeline
- Suppliers Unwilling to Meet Project Timeline
Supplier Certification
Supplier Unfamiliar with ROHS

- Initial Supplier Certification process
- Involved three (3) page questionnaire to Suppliers
  - Signature needed certifying products did or did not contain RoHS substances (quantity)
  - Initially asked information on JIG- A, JIG B and WEEE recycling information
- Change in Strategy because vendors were not returning forms.

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Supplier Certification
Supplier Unfamiliar with ROHS

- Initial Supplier Certification Responses
  - ROHS? WHAT IS THAT?
  - Do you mean are we ISO certified?
- Created process for sending and receiving supplier
  - Change in Strategy because vendors were not returning forms.

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Supplier Certification Response Process

- Compliant part
  - Update Systems
  - Run Standard Report on 3M product compliance
  - Certification of product as RoHS compliant

- Vendor Follow up
  - Non-compliant part
    - New design
    - New material/part
    - New Vendor
  - Requalified Part

*Note: Certification of product to customer as ROHS Compliant

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Courtesy of A. Smither, Security Systems Division
Certification is two-fold

Good idea to pull data sheet on product as well.

Preference for direct supplier certification on 3M form

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Supplier Certification
Supplier Unfamiliar with ROHS

- FINAL Supplier Certification Responses
  - Credible
  - Reasonably Reliable

- Good change in certification strategy that caused 50% increase in vendor response either in forms, email or website verification.

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## Supplier Certification BOM Snapshot

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>DESCRIPTION</th>
<th>Need to Order</th>
<th>ROHS</th>
<th>MSG</th>
<th>CD</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>26-1014-8080-9</td>
<td>SCR #6-19X.875 TF SS HI-</td>
<td>Order RC</td>
<td>RC</td>
<td>X</td>
<td>X</td>
<td>no open order</td>
</tr>
<tr>
<td>26-1017-3736-4</td>
<td>SCR M3X0.5 X10L BLK INT</td>
<td>RC</td>
<td>X</td>
<td></td>
<td></td>
<td>2500 recd 8/2, now have RC inv</td>
</tr>
<tr>
<td>26-1017-3739-8</td>
<td>SCR M3X.5X6 PAN ZNC SEMS</td>
<td>RC</td>
<td>X</td>
<td></td>
<td></td>
<td>6000 recd 8/2, now have RC inv</td>
</tr>
<tr>
<td>26-1017-3740-6</td>
<td>SCR M4X0.7 X6 SEMS PAN P</td>
<td>RC</td>
<td>X</td>
<td></td>
<td></td>
<td>3000 due 8/23, RC</td>
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<tr>
<td>26-1017-3744-8</td>
<td>NUT M3.0X.5 KEPS STL ZIN</td>
<td>RC</td>
<td>X</td>
<td></td>
<td></td>
<td>2400 recd 8/8, now have RC inv</td>
</tr>
<tr>
<td>26-1017-3923-8</td>
<td>WASHER M6 PLAIN ZNC</td>
<td>Order RC</td>
<td>X</td>
<td></td>
<td></td>
<td>10000 due 8/15, RC</td>
</tr>
<tr>
<td>26-1017-3935-2</td>
<td>WASHER FL 1/4 NAR TYP A</td>
<td>Order RC</td>
<td>X</td>
<td></td>
<td></td>
<td>no open order</td>
</tr>
<tr>
<td>26-1017-3936-0</td>
<td>WASHER FL 1/4 NARROW STL</td>
<td>RC</td>
<td>X</td>
<td></td>
<td></td>
<td>300 recd 8/8, now have RC inv</td>
</tr>
<tr>
<td>26-1017-3943-6</td>
<td>SCR M4X0.7X25 SEMS EXT T</td>
<td>RC</td>
<td>X</td>
<td></td>
<td></td>
<td>1500 recd 8/1, now have RC inv</td>
</tr>
<tr>
<td>26-1017-3946-9</td>
<td>SCR TF 8-18x2.00 HI-LO P</td>
<td>RC</td>
<td>X</td>
<td></td>
<td></td>
<td>1200 recd 8/8, now have RC inv</td>
</tr>
<tr>
<td>26-1017-3967-5</td>
<td>SCR 8-18X3/8 TAPT PAN PH</td>
<td>RC</td>
<td>X</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>26-1017-3968-3</td>
<td>SCR 8-18X1/2 TAPT PAN PH</td>
<td>RC</td>
<td>X</td>
<td></td>
<td></td>
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<tr>
<td>26-1017-3980-8</td>
<td>SCREW TF 8-18x1.25 HI-LO</td>
<td>RC</td>
<td>X</td>
<td></td>
<td></td>
<td>500 recd 8/4, now have RC inv</td>
</tr>
<tr>
<td>78-8032-1587-6</td>
<td>TERM 8RING 22AWG</td>
<td>U</td>
<td>RC</td>
<td>X</td>
<td></td>
<td>7000 recd 7/31, these are RC</td>
</tr>
<tr>
<td>78-8126-8050-8</td>
<td>SCANNER COVER BOTTOM RH</td>
<td>Expedite U</td>
<td>RC</td>
<td>X</td>
<td></td>
<td>99 in NUK</td>
</tr>
<tr>
<td>26-1017-0113-9</td>
<td>INDUCTOR TDK ZJYS51R5-M4</td>
<td>Expedite U</td>
<td>RC</td>
<td>X</td>
<td></td>
<td>1000 recd 8/7, now have RC inv</td>
</tr>
<tr>
<td>78-8129-2095-3</td>
<td>CAP 47PF HIGH Q GMC31CG4</td>
<td>Expedite U</td>
<td>RC</td>
<td>X</td>
<td></td>
<td>4000 due 8/9, RC</td>
</tr>
<tr>
<td>26-1004-3130-8</td>
<td>CONN AMP 2-520183-2</td>
<td>Expedite RC</td>
<td>X</td>
<td></td>
<td></td>
<td>4400 due 8/15, RC</td>
</tr>
<tr>
<td>78-8126-7573-0</td>
<td>SPEC, THERMAL PRINTER</td>
<td>U</td>
<td></td>
<td>X</td>
<td></td>
<td>new # 78-8129-2542-4 compliant 10/1</td>
</tr>
<tr>
<td>78-8126-7829-6</td>
<td>SOLID TOP, CABINET, W/ V</td>
<td>U</td>
<td></td>
<td>X</td>
<td></td>
<td>w/be compliant by 9/2</td>
</tr>
</tbody>
</table>

Please Visit - [www.aiha.org/Content/InsideAIHA/Volunteer+Groups/sscomm.htm](http://www.aiha.org/Content/InsideAIHA/Volunteer+Groups/sscomm.htm)
Supply Chain Challenges
Suppliers Unable to Meet Timeline

- Supply Chain
  - Delivering compliant parts later than expected.
  - Lead times – (working through BOMs to components that affect lead items now)
- Inventory management
  - How do you burn through what you have? Do you decide to do that or what will be the loss?

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Supply Chain Challenges

Suppliers Unable to Meet Timeline

- Supply Chain
  - Unreported Parts – progress
    - We’re working on it – Response
    - How do we monitor and stay on top of those?
  - How long do we give the supplier since this was a viable response?
- Products Outsourced and private labeled
  - How do we manage those?

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Supply Chain Challenges
Suppliers Unable to Meet Timeline

- Supplier Transition was Delayed
- Many businesses moving toward RoHS compliant status for hardgood products, even for products where they may not be clearly within scope.

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Supply Chain Challenges

Suppliers Unwilling to Meet Timeline

➤ Why? Suppliers could not see the need/benefit
  ➤ Local US Suppliers
  ➤ If only source, really work with supplier to understand the challenge to help them move forward.
  ➤ Facility sourcing working with supplier gained better results than Bus. Unit sourcing and vice versa.

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Supply Chain Challenges

Suppliers Unwilling to Meet Timeline

➢ If only source:
  ➢ Develop good understanding of purchasing/supply chain ordering process
  ➢ Work closely with Supply Chain Manager to understand
    ➢ Is the product going to EU?
    ➢ When is it needed in the EU?

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Supplier Challenges

Possible Solutions

- Supplier long lead time
  - Try to reduce lead time

- Supplier Unwilling
  - Part Substitution or 2nd Source

- Review and leverage Corp. Sourcing where needed.

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Supplier Challenges

Possible Solutions

- Asked Manufacturing Facility to drive a weekly Critical Lead Time List
- Set up weekly meetings to discuss parts with long supplier lead times are being identified - leads past certain dates (i.e. June 15) were escalated to upper management
Documentation Systems for ROHS Certification

The AIHA Stewardship and Sustainability Committee

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Managing Constraints
Part Number Changes

- To Change or Not to Change – That was the question??!!
- Impact to Corporation
  - Current Documentation Systems – used mainly for chemicals
  - Hardgood product changes created concerns
  - RoHS was brand new to Corporate Staff organizations that manage this function

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Managing Constraints
Part Number Changes

- To Change or Not to Change – That was the question??!!
- Resistance by some Business Units to make part number changes, initially.
- In some cases, customers demanded this, other cases not.

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Can you tell which board is RoHS compliant and which is not?
Managing Constraints
Part Number Changes

- Existing Engineering Systems would require print changes – not easy task
  - Challenging to change part numbers
  - Range from 2000 - 10,000+ for certain business
  - Changes are needed to make documentation clean.
  - Helps differentiate between non compliant and compliant product line

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Managing Constraints
Part Number Changes - Solutions

- Work closely with Corporate Identification System group
- Work closely with Corporate IT Management
- Some cases - escalate amount of work relative to the current resource for part number changes
Business Unit Transition Challenges
3M Business Unit Transition Challenges

- Education/awareness across business functions – not just a regulatory issue
- Resources – corporate/business
- Product rationalization
- Lab/Manufacturing changes
- Global business integration
- Customer interaction/expectations

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Education/Awareness

- Business team reviews
- Lab
- Manufacturing
- Sales; customer service
- Technical service
- Quality

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Resources

- Corporate vs. business unit
  - Not all 3M businesses were impacted; limited corporate resources
  - Huge business impact for affected businesses, but limited business resources
  - Initial actions were business-driven; led to evolution of corporate guidelines
Product Rationalization

- Business team decision on product line transitions
- Compliance road map
- Product change notifications
- Part number changes
Lab/Manufacturing Changes

- Requalification of materials/processes
- Recognition and acceptance of the fact that some of the changes were not directly related to compliance
- Maintenance of dual processing capability and dual inventory
  - Customer use of exemptions

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Lab/Manufacturing Changes

- Supplier management
- Product documentation:
  - Part number changes
  - Bills of materials/drawings
  - Technical specification sheets
- Product labeling

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Part Number Changes

- No change in form/fit/function
  - “RC” designation in run number
- Change in form/fit/function
  - 2510-6002UG
    - UG = tin/lead plating
  - N2510-6002RB
    - N = high temp plastic
    - RB = matte tin plating
Product Labeling

- Not required under RoHS
- Important for inventory control and customer satisfaction
- No industry standard label
- Sample label developed by 3M for use at business discretion:

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Global Business Integration

- Good understanding of supply chain
- Private label vs. 3M manufacture
- Regional differences in interpretation of directive and path to compliance
  - US – matte tin plating
  - Japan – gold plating
- Consolidated approach to customer requests
Customer Expectations and Interaction

- Type of information requested; volume of requests
  - RoHS → RoHS+ → …100% composition
  - Yes/No → ISO 9002/14001
  - One division → 30 requests in 2004; 546 requests in 2006
Customer Expectations and Interaction

- Varied customer formats
- 3M letterhead
- Corporate guidelines for response
- Confidential business information concerns
- Legal review in some cases

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May 11, 2007

Carrier Access Corporation
SUBJ: RoHS Compliance

To Whom It May Concern:

I certify, on behalf of 3M Company, that to the best of 3M’s knowledge the parts listed below are RoHS compliant per EU directive 2002/95/EC (Restriction of the Use of Hazardous Substances in Electrical and Electronic Equipment), as amended by Commission Decision 2005/618/EC.

MP2-P090-CES72540-R
MP2-P090-CES72541-R
MP2-P090-CES72542-R
MP2-H060-CES72456-R
MP2-P270-CES72402-R
MP2-P090-CES72401-R
DIN-48CSC-CES70350-R

"RoHS compliant" means that the product or part does not contain any of the following substances in excess of the following maximum concentration values in any homogeneous material: (a) 0.1% (by weight) for lead, mercury, hexavalent chromium, polybrominated biphenyls or polybrominated diphenyl ethers; or (b) 0.01% (by weight) for cadmium. Unless otherwise stated by 3M in writing, this information represents 3M’s knowledge and belief based on information provided by third party suppliers to 3M.

Please Visit - www.aiha.org/Content/InsideAIHA/Volunteer+Groups/sscomm.htm
3M Approved Response Letter

In the event any Product is proven not to conform with 3M's RoHS certification, then 3M's entire liability and Buyer's exclusive remedy, will be at 3M's option either: (i) replacement of Product with a conforming product, or (ii) refund of the purchase price paid by Buyer for each non-conforming Product, within a reasonable time after written notification of said non-conformance and return of said Product to 3M. 3M shall not under any circumstances be liable for direct, incidental, special, or consequential damages (including but not limited to loss of profits, revenue, or business) related to or arising out of this certification, including, the use, misuse or inability to use the Product. Unless stated otherwise in writing, the foregoing language cannot be waived, modified, or supplemented in any manner whatsoever.

I trust that this information provides the assurance you require. Please contact me at 512-984-3878 if there are any additional questions.

Regards,

Frances May
Frances May, CIH
Advanced Product Regulatory Specialist
Customer Format Example

Simple...

<table>
<thead>
<tr>
<th>Manufacturer Name</th>
<th>Part Number</th>
<th>RoHS Compliance (Yes/No)</th>
<th>RoHS Compliant Alternate P/N</th>
<th>Lifecycle Status</th>
<th>RoHS expected compliance date</th>
<th>Please Attach the Certificate of Compliance</th>
</tr>
</thead>
</table>

Please Visit - www.aiha.org/Content/InsideAIHA/Volunteer+Groups/sscomm.htm
Customer Format Example

Complicated...

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Customer Expectations and Interactions

- Early response approaches varied by divisions and products
- Most used a combination approach:
  - Completed customer form per business rules
  - Certification (signature) on approved letter

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Customer Expectations and Interaction

- Certifications impacted by:
  - Exempt applications (customer)
    - Example - Lead in solders for servers, storage, and storage array systems
  - Exempt applications (manufacturer)
    - Examples – lead used in compliant pin connector systems; WEEE Category 9 products (monitoring/testing equipment)
Customer Response Process Flow

**Customer Request**

3M Entry Contact
- Sales rep
- Key Account Mgr
- Cust. Svc. Rep
- Appl/Sus Eng.
- Tech Svc.
  - Mfg
  - Quality
  - BU or OUS PRL

**BU PRL**

Review request

PRL
- Regulatory
- Composition

Marketing
- Policy
- Roadmap

Engineering
- Process
- Performance

BU PRL

Customer

Sample process for one 3M business unit

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Customer Expectations and Interaction

- Turnaround time
  - Directly related to response approach and resources
  - Strict first in/first out
- Regional variation in expectations
  - Certification letter vs. test report

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Customer Expectations and Interaction

- RoHS does not require testing
- RoHS does not specify particular test methods
- Majority of the test report requests were from Asia Pacific OEMs and their suppliers
- Issues: avoid duplicative testing; centralize any testing decisions; testing increases overall costs of products supplied
Customer Expectations and Interaction

- UK DTI RoHS Guidance
  - “Producers may wish to consider role of both material declarations and component or material analysis”
  - “Any suitable analytical method”
  - Annex D flow chart - includes suggestion for supplier categorization (based on familiarity with RoHS, etc.), as well as risk factors to help determine when analysis is advisable.

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Customer Expectations and Interaction

- Varying terminology
  - RoHS 6/6, RoHS 5/6, green, lead-free
- Parts from multiple divisions on a single request
  - Route to owning groups; consolidated reply often impossible due to business rules
- Once your name and email address is out there, you become the contact for everything.....
Sustainability and Key Learnings

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Sustainability – Customer Service

- Evolution of customer response process and tools
- Web-based RoHS selector developed to allow customer self-service and improve response time for certification

Please Visit - www.aiha.org/Content/InsideAIHA/Volunteer+Groups/sscomm.htm
RoHS Selector Tool


One of 3M’s core values is to respect our social and physical environment. 3M is committed to comply with ever-changing, global, regulatory and consumer environmental, health, and safety (EHS) requirements. One important requirement is the European Union’s Restriction of Hazardous Substance (RoHS) Directive, which applies to many products in the electrical and electronic markets.

As a service to our customers, 3M is providing information on the RoHS status of many 3M products. Please click on the above links to search by 3M product.

Please Visit - www.aiha.org/Content/InsideAIHA/Volunteer+Groups/sscomm.htm
RoHS Selector Tool

**Interconnect Compliance Status**

Use the search tool below to find the RoHS compliance status of a desired 3M part. Or download the full list (requires user registration) as a Microsoft Excel document.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>RoHS Compliant</th>
<th>RoHS Compliant Part Number</th>
<th>Date of Compliance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2510-6002UG</td>
<td>No</td>
<td>N2510-6002RB</td>
<td>Jan - 2005</td>
<td></td>
</tr>
<tr>
<td>N2510-6002RB</td>
<td>Yes</td>
<td>N2510-6002RB</td>
<td>Jan - 2005</td>
<td></td>
</tr>
<tr>
<td>N2510-6002UG</td>
<td>No</td>
<td>N2510-6002RB</td>
<td>Jan - 2005</td>
<td></td>
</tr>
</tbody>
</table>

3 Product Matches for
'2510-6002UG N2510-6002RB'

To print a RoHS Certificate, check ONE or MORE boxes and then click View or e-Mail Certificate or use these options: Check All, Clear All.

"RoHS Compliant 2005/95/EC" means that the product or part ("Product") does not contain any of the substances in excess of the maximum concentration values in EU Directive 2002/95/EC, as amended by Commission Decision 2005/618/EC, unless the substance is in an application that is exempt under RoHS. This information represents 3M's knowledge and belief, which may be based in whole or in part on information provided by third party suppliers to 3M.

In the event any Product is proven not to conform with 3M's RoHS certification, then 3M's entire liability and Buyer's exclusive remedy, will be at 3M's option either: (i) replacement of Product with a conforming product, or (ii) refund of the purchase price paid by Buyer for each non-conforming Product, within a reasonable time after written notification of said non-conformance and return of such Products to 3M. 3M shall have no liability for any damages.

Please Visit - www.aiha.org/Content/InsideAIHA/Volunteer+Groups/sscomm.htm
RoHS Selector Tool

RoHS Compliance Certificate

3M Electronic Solutions Division certifies that the product(s) listed below is/are compliant with EU Directive 2002/95/EC (Restriction of the use of Hazardous Substances in Electrical and Electronic Equipment).

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Date of Compliance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>N2510-6002RB</td>
<td>1/6/2003</td>
<td></td>
</tr>
</tbody>
</table>

“RoHS Compliant 2005/95/EC” means that the product or part (“Product”) does not contain any of the substances in excess of the maximum concentration values in EU Directive 2002/95/EC, as amended by Commission Decision 2005/618/EC, unless the substance is in an application that is exempt under RoHS. This information represents 3M's knowledge and belief, which may be based in whole or in part on information provided by third party suppliers to 3M.

In the event any Product is proven not to conform with 3M’s RoHS certification, then 3M’s entire liability and Buyer’s exclusive remedy, will be at 3M’s option either: (1) replacement of Product with a conforming product; or (2) refund of the purchase price paid by Buyer for each non-conforming Product, within a reasonable time after written notification of said non-conformance and return of said Product to 3M. 3M shall not under any circumstances be liable for direct, incidental, special, or consequential damages (including but not limited to loss of profits, revenue, or business) related to or arising out of this certification, including, the use, misuse or inability to use the Product. Unless stated otherwise in writing, the foregoing language cannot be waived, modified, or supplemented in any manner whatsoever.

F. Little
Certificate electronically signed

Frank Little
Division Vice President
Sustainability – Restricted Substance Management Systems (RSMS)

- Some customers (especially in the Asia Pacific area) are requesting that suppliers sign onto their management systems for restricted substances.
- IEC and others have been considering "Hazardous Substance-Free" Standards that are ISO-based quality management systems.
- 3M is working on development of a restricted substance management system that would assist 3M businesses in managing Restricted Substances in their products by adapting their existing quality management system to include RS requirements.
- The system would formalize Product Stewardship practices 3M businesses have developed and used successfully.

Please Visit - www.aiha.org/Content/InsideAIHA/Volunteer+Groups/sscomm.htm
Key Learnings

- Supplier certification is an ongoing process
- Must be a team effort across functional areas
- Communicate frequently with global business partners
- Measure integration of RoHS into New Product Development and Life Cycle Management

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Key Learnings

- Measure field acceptance of new products and review quality records for trends related to RoHS changes
- Leverage customer relationships for industry trends
- Use knowledge base created for EU RoHS to position for compliance with upcoming regulations – China RoHS, Korea RoHS

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