Eliminating Restricted Substances in the Apparel and Footwear Supply Chain: The AFIRM Supplier Toolkit

Nathaniel Sponsler, Manager-Product Regulations, Gap Inc.
Webinar Discussion Instructions

• Due to the number of participants on the Webinar, all lines will be muted.

• If you wish to ask a question, please type your question in the Q&A box located in the drop down control panel at the top of the screen.

• All questions will be answered at the end of the presentation.
Introduction to the AFIRM Supplier Toolkit

Nathaniel Sponsler
Gap Inc.
Who is AFIRM?

- Apparel & Footwear International RSL Management Group
- Established in July 2004
- Original Member Companies:
  - adidas
  - C&A
  - Gap
  - Levi
  - Nike
  - Marks and Spencer
AFIRM Mission

- To reduce the use and impact of harmful substances in the apparel and footwear supply chain
<table>
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<th>Current Members</th>
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<tbody>
<tr>
<td>• adidas-Group</td>
</tr>
<tr>
<td>• BESTSELLER</td>
</tr>
<tr>
<td>• Carhartt</td>
</tr>
<tr>
<td>• ESPRIT</td>
</tr>
<tr>
<td>• Gap, Inc.</td>
</tr>
<tr>
<td>• Gymboree</td>
</tr>
<tr>
<td>• H&amp;M</td>
</tr>
<tr>
<td>• Hugo Boss</td>
</tr>
<tr>
<td>• J.CREW</td>
</tr>
<tr>
<td>• Levi Strauss &amp; Co.</td>
</tr>
<tr>
<td>• New Balance</td>
</tr>
<tr>
<td>• Nike</td>
</tr>
<tr>
<td>• Pentland</td>
</tr>
<tr>
<td>• PUMA</td>
</tr>
<tr>
<td>• s.Oliver</td>
</tr>
<tr>
<td>• Warnaco</td>
</tr>
<tr>
<td>• Wolverine World Wide</td>
</tr>
<tr>
<td>• VF Corporation</td>
</tr>
</tbody>
</table>

[Branding logos]
What Exactly is the Toolkit?

- Collection of resources to help the global apparel/footwear supply chain understand and reduce the use and impact of harmful substances.
AFIRM Toolkit History

• First version published October 2008

• Supplier Feedback:
  – Seemed geared toward brands
  – More technical information and examples requested
  – Request for AFIRM combined RSL to meet all brand requirements
New 2011 AFIRM Supplier Toolkit

- Published November 2011
- Responds to Supplier Feedback
  - Geared toward suppliers
  - More detailed information on more chemicals
  - Improved formatting and internal links
- Available in Chinese & Vietnamese
  - More languages planned in 2013
New 2011 AFIRM Supplier Toolkit

• Key Additions
  – RSL Failures with corrective action examples in simple format
  – Detailed Chemical Guidance Document with full Index

• Resources available for all levels of technical expertise
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Where are the risks?

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# Background on Restricted Substances

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   - Benefits of Water-Based Polyurethane
   - Additional Online Resources

## Restricted Substances

<table>
<thead>
<tr>
<th>Restricted Substances</th>
<th>Description &amp; Where they may be found</th>
</tr>
</thead>
<tbody>
<tr>
<td>APEOS are non-ionic surfactants including NPEOs, OPEOs, NP, and OP. NPEOs and OPEOs degrade into NP and OP, respectively. APEOs can be used as or found in:</td>
<td></td>
</tr>
</tbody>
</table>
| Alkylphenol Ethoxylates (APEOs) / Alkylphenols (AP) | • Detergents  
• Scouring agents  
• Wetting agents  
• Softeners  
• Emulsifier/dispersing agents for dyes and prints  
• Impregnating agents  
• Degreasing agents for leather  
• Leather Finishing  
• De-gumming for silk production  
• Dyes and pigment preparations  
• Polyester padding  
• Down/feather fillings |
| Nonylphenol Ethoxylates (NPEO) | Octylphenol Ethoxylates (OPEO)  
Nonylphenol (NP)  
Octylphenol (OP) |
Appendix B - Factory Management Plan

7. Data Management

7.1. Access to RSL data throughout the supply chain is a key component in management strategy for the RSL. Strategic testing of materials is critical for streamlining RSL management.

7.2. Describe how you manage data you collect from sample analysis/testing and how you share that information with your partners:
   - Do you have a database for all testing data?
   - Do you send this data for management review on a regular basis?
   - Do you identify suppliers with repeated failures and put them on notice?

8. Tracking Time Table

8.1. Set up a time table which identifies your RSL Plan of each year. Some items must be included, such as: Four deadlines of reviewing of your RSL Data trend; One training/meeting on RSL to your vendors; Summary of your RSL tracking from Purchasing at the end of the year.

Example:

<table>
<thead>
<tr>
<th>Progress</th>
<th>Target Date</th>
<th>Finish Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete RSL Plan and present to factory management</td>
<td>1/20/13</td>
<td></td>
</tr>
<tr>
<td>Discuss RSL Plan with vendors</td>
<td>2/20/13</td>
<td></td>
</tr>
<tr>
<td>Set up the RSL Action Plan Schedule</td>
<td>4/20/13</td>
<td></td>
</tr>
<tr>
<td>Prepare material for RSL testing</td>
<td>5/20/13</td>
<td></td>
</tr>
<tr>
<td>Finish RSL testing</td>
<td>6/20/13</td>
<td></td>
</tr>
<tr>
<td>Review RSL data trend with vendors</td>
<td>7/20/13</td>
<td></td>
</tr>
<tr>
<td>Review and revise RSL plan for continuous improvement</td>
<td>8/20/13</td>
<td></td>
</tr>
</tbody>
</table>
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**Appendix D – Best Practices to Avoid RSL Issues**

<table>
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<tr>
<th>Restricted Substance</th>
<th>Manufacturing Technology that Could Introduce the Substance</th>
<th>Steps to Avoid Restricted Substance in Finished Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Fibers (cotton, rayon, wool, hemp, etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>Resins to prevent shrinkage</td>
<td>Use formaldehyde free resins. Use low formaldehyde resins &amp; fully care to chemical supplier specifications to remove free formaldehyde.</td>
</tr>
<tr>
<td></td>
<td>Resins to prevent wrinkling</td>
<td>Use formaldehyde free resins. Use low formaldehyde resins &amp; fully care to chemical supplier specifications to remove free formaldehyde.</td>
</tr>
<tr>
<td></td>
<td>Resins to permanently include wrinkles</td>
<td>Use formaldehyde free resins. Use low formaldehyde resins &amp; fully care to chemical supplier specifications to remove free formaldehyde.</td>
</tr>
<tr>
<td></td>
<td>Discharge Printing</td>
<td>Water based discharge printing systems rely on Zinc Formaldehyde Sulfonate (ZFS). Discharge prints must be used according to manufacturers’ instructions to test adult formaldehyde requirements.</td>
</tr>
<tr>
<td></td>
<td>Pigment print binder</td>
<td>Use formaldehyde free binders. Use low formaldehyde binders &amp; fully care to chemical supplier specifications to remove free formaldehyde.</td>
</tr>
<tr>
<td>Synthetic Fibers (polyester, nylon, acetate, acrylic, etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy metals (mercury, lead, cadmium)</td>
<td>Dye stuff</td>
<td>Use dyestuff from internationally recognized dye stuff suppliers with commitments to chemical compliance.</td>
</tr>
<tr>
<td></td>
<td>Pigment prints</td>
<td>Use pigments from internationally recognized dye stuff suppliers with commitments to chemical compliance.</td>
</tr>
<tr>
<td>Azo amines</td>
<td>Dye stuff</td>
<td>Use dyestuff from internationally recognized dye stuff suppliers with commitments to chemical compliance.</td>
</tr>
<tr>
<td></td>
<td>Pigment print</td>
<td>Use pigments from internationally recognized dye stuff suppliers with commitments to chemical compliance.</td>
</tr>
<tr>
<td></td>
<td>Cross linking agent in coating processes</td>
<td>Use formaldehyde free resins. Use low formaldehyde resins &amp; fully care to chemical supplier specifications to remove free formaldehyde.</td>
</tr>
<tr>
<td></td>
<td>Stabilizer</td>
<td>More likely in welded plastics than fibers, but cadmium should not be used as a stabilizer.</td>
</tr>
<tr>
<td></td>
<td>Polymer extrusion contamination</td>
<td>Heavy metals such as lead, cadmium and mercury are not likely intentionally used in polymer extrusion, but could be present due to contamination.</td>
</tr>
<tr>
<td></td>
<td>Disperse dyes</td>
<td>Dye stuff</td>
</tr>
<tr>
<td></td>
<td>Azo dyes</td>
<td>Dye stuff</td>
</tr>
</tbody>
</table>
Appendix E – RSL Corrective Actions

Restricted Substance Problem Solution Prevention Library

- Formaldehyde
- Aromatic Amines
- Heavy Metals
- Disperse Dyes
- APEO's
- Organotins
- Phthalates
- Misc.

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<th>Restricted Substance</th>
<th>Issue</th>
<th>Slide #</th>
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<td>Formaldehyde</td>
<td>Discharge Printing</td>
<td>2</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>Cap Stiffener</td>
<td>5</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>Wrinkle Effect</td>
<td>8</td>
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<tr>
<td>Formaldehyde</td>
<td>Pigment Print</td>
<td>11</td>
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<tr>
<td>Formaldehyde</td>
<td>Recipe Calculation</td>
<td>14</td>
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<tr>
<td>Formaldehyde</td>
<td>Leather Tanning</td>
<td>17</td>
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<tr>
<td>Aromatic Amines</td>
<td>Drawcord Dyestuff</td>
<td>21</td>
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<tr>
<td>Heavy Metals - Cadmium</td>
<td>PVC pigment</td>
<td>23</td>
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<tr>
<td>Heavy Metals - Lead</td>
<td>Paint pigment</td>
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<td>51</td>
</tr>
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<td>Adhesive contamination</td>
<td>54</td>
</tr>
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<td>Miscellaneous - PAH</td>
<td>Rubber formula</td>
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<td>Non-wicking treatment</td>
<td>60</td>
</tr>
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<td>Miscellaneous - VOC</td>
<td>Solvent contamination</td>
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</tr>
<tr>
<td>Miscellaneous - Phenol</td>
<td>Print paste thickener</td>
<td>65</td>
</tr>
<tr>
<td>Miscellaneous - VOC</td>
<td>Yarn lubricant</td>
<td>67</td>
</tr>
<tr>
<td>Disperse Dyes</td>
<td>Woven label</td>
<td>69</td>
</tr>
</tbody>
</table>
Appendix E – RSL Corrective Actions

Problem #2

- Consumer complaints that the flip flops had sticky feeling and were removing lacquer finish on wood floors
- Laboratory analysis detected tributycitrate (TBC) instead of ATBC as manufacturer claimed
- TBC is a known solvent for decoating furniture
- Manufacturer substituted TBC as a cheaper alternative for ATBC
Appendix F – Detailed Chemical Guidance Document

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CHEMICAL GUIDANCE DOCUMENT

Dr. Dieter Sedlak (Dipl. Chemc.)
+49 (821) 56 97 96-10
d.sedlak@mts-germany.eu

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<tr>
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</tr>
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</table>
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6.2.4.1 Unintended Oxidation of Chromium III to Chromium VI in Leather and Leather Products

Chromium (VI) is not intended or used in the production process and must be regarded as cross contamination by avoidable oxidation of trivalent Chromium to hexavalent chromium, which is a harmful substance. Oxidation of Cr (III) into Cr (VI) normally occurs in presence of strong oxidation agent in acid environment but it can also take place in presence of mild oxidation agents at high pH. In leather processing neutralization is a stage where such conditions are created; therefore, leather and leather products sometimes contain Cr (VI) although only chromium compounds in the form of Cr (III) were used in the tanning process.

Also the hydrogen peroxide left over from the first step of tanning will contribute to unintended oxidation of Cr (III) to Cr (VI).
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- acrolein (2-propenoic aldehyde), 113
- acrylamide, 13, 43, 45, 48, 115
- acrylate, 42, 43, 45, 47, 48, 49, 54, 113
- acrylic acid, 17, 18, 47, 48, 113, 116
- acrylonitrile, 20, 43, 45, 48, 88, 90, 115
Appendix G – MSDS Examples and Explanations

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH)

Trade name: 
Material-No.: 
Specification: Version: 1.0 / EN
Print date: Page 02 of 15
Revision date:

1. HAZARDS IDENTIFICATION

Classification:

Other Hazards

Informations pertaining to special dangers for human and environment:

Adverse physicochemical effect(s):
Adverse human health effect(s) and symptom(s):
Adverse environmental effect(s):
Other adverse hazard(s):

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical characterization (substance):

CAS.-No.:
EC-No.
INDEX-No.

Purity:
Synonyme(s):
Stabilizer(s):
Hazard(ous) impurity(ies):

3. OTHER INFORMATIONS

Korrelation [HA8]: Distinguish clearly between preparations which are classified as dangerous and preparations which are not classified as dangerous according to Directive 1999/45/EC.

Describe the most important adverse physicochemical, human health and environmental effects, symptoms and health risk and possible misuses of the substance or preparation that can reasonably be foreseen.

Korrelation [HA9]: The classification of the substance shall be consistent with the classification provided to the classification and labelling inventory according to Title XI.

Korrelation [HA10]: Describe the most important adverse physicochemical, human health and environmental effects and symptoms relating to the uses and possible misuses of the substance or preparation that can reasonably be foreseen.

Korrelation [HA11]: It may be necessary to mention other hazards, such as dustiness, cross-contamination, suffocation, freezing, high potency for odor or taste or adverse mental effects such as hazards to soil dwelling organisms, ozone depletion, photochemical ozone creation potential, etc., which do not result in classification but which may contribute to the overall hazards of the material.
Screen Print Ink Storage Best Practices

- Storage room dedicated to ink
- Room clean and free of clutter
- Shelves available to organize ink by type and keep containers off the floor
- Shelves clearly labeled
- Ink chemicals containers properly labeled
- Ink containers clean, any spills cleaned immediately
- MSDS, spill clean up equipment available
30. Q: For the sample shown below, is a separate RSL test required for each different color, or could a composite test be performed by combining all colors?

A: Composite testing is allowed by some AFIRM brands and not others. Brands that do allow compositing have different limits for the number of samples that may be included in a composite. This number may vary depending on the materials tested and the restricted substance tested for.

If composite testing is allowed, and if, for example, three is the maximum number of materials allowed for composite testing, a composite of equal amounts of the three materials can be tested. Brand policy as well as nominated laboratories will direct suppliers on composite requirements or restrictions.

31. Q: For an embroidered badge, can RSL testing be performed using a composite test for all colors and all different layers?

A: For those AFIRM brands that allow compositing, RSL testing should be performed by compositing the colors. A separate test of the adhesive layer should be performed if it is possible to separate that adhesive layer.
Appendix L – Additional Online Resources

Chemical Restriction Information

Restricted Substance Lists and Resources

AAFA Restricted Substance List
https://www.apparelandfootwear.org/Resources.RestrictedSubstances.asp

This Restricted Substances List (RSL) was created by a special working group of the American Apparel & Footwear Association’s (AAFA) Environmental Task Force. The RSL is intended to provide apparel and footwear companies with information related to regulations and laws that restrict or ban certain chemicals and substances in finished home textile, apparel, and footwear products around the world. The American Apparel & Footwear Association (AAFA) is the national trade association representing apparel, footwear and other sewn products companies, and their suppliers, which compete in the global market.

AFIRM Brand Links (available on AFIRM website)
http://www.afirm-group.com/companies.htm
Toolkit Reception

Monthly Toolkit Traffic

- July 2012 – 4,615
- August 2012 – 5,559
- September 2012 – 5,269
- October 2012 – 8,087
- **November 15, 2012 - HCM City, Vietnam Seminar**
- November 2012 – **83,583**
- December 2012 – **28,926**
Future Toolkit Additions?

- Further additions based on Supplier feedback?
- Additional ideas?
AFIRM Toolkit Website

- [http://www.afirm-group.com/suppliersltool.htm](http://www.afirm-group.com/suppliersltool.htm)

- Contact: [info@afirm-group.com](mailto:info@afirm-group.com)

Welcome! Please click on the link below to download the AFIRM Supplier RSL Toolkit.

- [AFIRM SUPPLIER TOOLKIT English (pdf)](http://www.afirm-group.com/suppliersltool.htm)
- [AFIRM SUPPLIER TOOLKIT Chinese (pdf)](http://www.afirm-group.com/suppliersltool.htm)
- [AFIRM SUPPLIER TOOLKIT Vietnamese (pdf)](http://www.afirm-group.com/suppliersltool.htm)
The audio recording and slides shown during this presentation will be available to GC3 Members on the GC3 Website: http://www.greenchemistryandcommerce.org

Non-GC3 Member Attendees who would like to view these slides please contact Sarah Shields at sarah_shields@uml.edu

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