Green Chemistry Education Webinar Series

Advancing Sustainability Through the Supply Chain
Effective Communication and Transparency

March 31, 2016
What is the GC3?

• Cross-sectoral, B2B network of over 70 companies and other organizations
• Formed in 2005
• Collaboratively advances green chemistry across sectors and supply chains
Today’s Speakers

Howard Williams
SVP Sustainability, New Ventures & Acquisitions, Construction Specialties, Inc.

Andrea Schmidt
Senior Staff Program/Project Manager, Product Sustainability, Seagate Technology

Todd Copeland
Environmental Responsibility Manager, Patagonia
Ground Rules

• Due to the number of participants in the webinar, all lines will be muted

• If you have a question or comment, please type it in the “Questions” box located in the control panel

• Questions will be answered at the end of the presentation
Advancing Sustainability

Howard Williams
SVP Sustainability, New Ventures & Acquisitions
Construction Specialties, Inc.
It all starts with “Why”

• From beginning to end, all involved need to know what you want to achieve and why you’re doing it.

• Your/our supply chain must know why you’re doing this in order to effectively support the work.

• Your/our product development teams need access to information as they select materials.

• Your/our procurement staff

• Your/our facilities staff

• Your/our Business Unit Managers

• Your/our Senior Managers
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• Your/our Senior Managers
Basic, but essential...

1. Policy
   1. Product
   2. Processes
2. Standards
3. Communications
4. Outcome
5. Audit
Color is an important part of our product offerings

• Approximately 80 colors had to be retro-optimized
  • Discovered 18 pigments create the 80 colors
  • Optimize pigments and the colors come with it

• Cradle to Cradle looks at each homogenous mass at the 100 ppm level
  • 100 ppm captures intentionally added ingredients
360-degree communication

• Business unit frustrated by supplier of flexible compound
• Our purchasing manager’s conversations with supply chain were going nowhere for 8 – 10 months
• When manager of suppliers sales department understood we were not expecting them to pay for our certification the information became available
• We did not effectively support and communicate with our purchasing manager
Pilot & Export

North American Divisions

Exporting knowledge gained in N.A. to Other Division(s)

Manufacturing Plants

Pacy, France

Fabricas Elena, Mexico
Del Rio, Texas
Muncy, Pennsylvania
Hughesville, Pennsylvania
Montgomery, Pennsylvania
Anaheim, California
Fort Valley, Georgia
Kennesaw, Georgia
Toronto, Canada
Wescott, United Kingdom

Pacy-sur-Eure, France
Sens, France
Szczecinska, Poland
Malaysia
Transparency:  
From? To? Why?  
(How) Are you protecting your supplier’s business interests?
Collaboration saves reinventing best practices
Persistence wins (most of the time)
Towards Seagate’s supply chain transparency

Annie Schmidt
Seagate Technology
Product Sustainability
Senior Staff Program/Project Manager
You May Know Seagate as a Hard Drive Manufacturer...

- 1st and only to ship over 2 billion drives
- Stores more than 40% of the world’s data
- #1 OEM storage – over 2 billion drives
But We’re Also a Company That:

- Serves many types of customers and businesses
- Delivers deep expertise and unique IP in storage & data management
- Combines UX, software & design capabilities to create new categories of storage solutions
- Ranks as one of the top 25 companies worldwide in supply chain operations
Seagate’s Move Into Supply Chain Transparency: Full Material Disclosure (FMD)

• What is FMD?
  • Seagate’s system for collecting supplier component, parts and materials information on all products
  • Data loaded to database supported by restricted substance lab reports

• What drives FMD?
  • Global regulatory and customer requirements
  • Customers require documented product material content compliance to RoHS, REACH, and their specific product substance restrictions
  • More cost effective for Seagate

• How does Seagate accomplish FMD?
  • Compliance Assurance System (CAS) database loads supplier data via IPC 1752
  • CAS informs supplier annually to refresh data
  • Database evaluates supplier data against global regulations and customer requirements
  • Produces data for customer/customs inspection reports
Design/Development

Raw/Suppliers

Manufacture

Substance restrictions: compliance with specifications and data/documentation requirements

Compliance to all applicable regulatory and customer requirements
- RoHS, REACH, RoHS 2, China RoHS, Regional restrictions (Canada, etc.)
- Halogen-free, phthalate-free, and myriad other voluntary restrictions

Alignment to standards
- IPC 1752 materials reporting format
  - Open, industry data standard
  - IPC 1753 is a new lab report data standard. Seagate led this effort.

‘FMD’ – Full Materials Disclosure
- Manage compliance to changing regulations and customer specifications restricting toxic substances

Stability
- Supplier reporting requirements and formats seldom change

Security
- Supplier data are kept confidential

Supplier responsibility
- Suppliers must participate and must provide all required data

Closed loop resourcing
- The same resources manage both supplier data AND customer reporting

Low cost, best-practice compliance
- Best compliance, fastest response, lowest cost

Seagate invested in CAS* System and developed Full Material Disclosure strategy to increase resiliency and reduce costs with accelerating product material requirements.

Accelerating restrictions and data output demands will strain resources without new standards and tools. Seagate is actively pursuing development activities.

*CAS: Comprehensive Analysis System
Product-level Lab Test Requirement

Requirement to report what is in our products

• What is the Product Lab Test Requirement?
  • Final audit product test prior to customer ship authorization
  • Use samples with materials representative of normal production
  • ISO 17025 certified independent 3rd party product teardown, “grind and find” analysis for restricted substances

• What drives Lab Test Requirement?
  • Global regulatory and customer requirements
  • Requirement for doing business globally and with specific customers
  • Customers require documented product material content compliance to RoHS, REACH, and their specific product substance restrictions

• How does Seagate meet this requirement?
  • Seagate’s standard operating procedure
  • Product Stewardship specification
  • Audit Lab Test Specification
Assembled Bill of Substance for a Desktop Disk Drive

<table>
<thead>
<tr>
<th>Substance</th>
<th>CAS Number</th>
<th>Cumulative Concentration</th>
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<tr>
<td>AL</td>
<td>7429-90-5</td>
<td>61.9451</td>
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<tr>
<td>FE</td>
<td>7439-89-6</td>
<td>80.5984</td>
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<tr>
<td>COPPER (METALLIC)</td>
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<td>SI</td>
<td>7440-21-3</td>
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<tr>
<td>LCP polymer</td>
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<td>97.5019</td>
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<td>POLYESTER MATERIAL</td>
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<td>ACRYLATE URETHANE OLIGOMER</td>
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The Seagate supplier specification restricts almost 2000 CAS numbers
Chemical Transparency and FMD

• Core Products
  • Fully compliant with FMD
  • Up to 5% can be undisclosed at the homogeneous material level

• Products from Seagate acquisitions
  • In varying stages of progress toward FMD compliance
  • Product and supply chain complexity drive time to compliance
FMD and Software Tools

• Ten years on and we need more capacity
  • Expanding global regulatory climate and customer demands
    • Conflict Minerals / Responsible Sourcing
    • Process Chemistry

• Requirement for software houses to provide integrated solutions
  • With current technology
  • Can’t be accomplished manually
    • More expensive
    • Lower data quality
Customer and NGO process chemistry disclosure requirements

- Manual process
- “People are dying to make our phones and computers.”* 
- While most sustainability efforts focus on product sustainability, the volume of process chemicals not incorporated into products is conservatively estimated to be 4 times that of product chemistries


Conflict Minerals and responsible sourcing

- Emerging requirements to expand conflict minerals into other extractives and other geographies
- Focus growing toward responsible sourcing throughout the supply chain
Mission Statement

Make the best product, cause no unnecessary harm, and use business to inspire and implement solutions to the environmental crisis
CHOOSING ORGANIC

Twenty years ago, I changed my eating habits after I read how much harm cattle grazing inflicted on the earth. That was an easy choice for me - especially when I realized I did not need a steady diet of red meat to sustain my health.

As a company, we face a similar choice. In the course of our ongoing environmental assessment, we discovered that the most damaging fiber used to make our clothing may actually be conventionally grown, 100% “pure” cotton. That’s because the process of growing conventional cotton involves the heavy use of chemicals that toxify the soil, air and ground water. And since many of these chemicals were originally formulated as nerve gases for warfare, it is no surprise that where spraying occurs, health problems follow, including higher rates of cancer and birth defects in humans and wildlife. These are outrageous costs to pay for the battle against bugs. And it’s a battle we’ll never win: while the bugs adapt to the chemicals, the rest of us sustain the long-term damage.

Meanwhile, in our own backyard, a handful of farmers have been growing cotton without chemicals for years. Their yields are just as high, or nearly as high, as those of their “conventional” counterparts and the quality of their fibers is equal or sometimes better. The environmental difference? Of all the potential fibers for clothing, organically-grown cotton may be the least damaging and the most sustainable.

Knowing how destructive conventionally-grown cotton is, and that there’s a viable alternative, Patagonia has to choose organic. Now that we know, it would be unconscionable for us to do anything less. That is why, as of this spring, we no longer use conventional cotton in any part of the line.

To change to organic cotton has its price. Organic farming is labor-intensive, and so it is more costly. And after the cotton leaves the field, nearly every step in production - ginning, spinning, and knitting - incurs added costs for our relatively small runs.

These higher costs also create new risks for our business. We’ve had to drop some products that no longer make economic sense to produce. And we have to be prepared for a loss in revenue should higher prices translate to fewer sales. We undertake another risk, too: we can’t go back. To do so would violate our basic principles: to make a quality product and to reduce our environmental harms. Making clothes out of conventional cotton is something our company can no longer afford to do.

Cotton sportswear makes up a small part of our product line. As we look ahead, we see immense challenges in making our other products in ways less harmful to the landscape. Those challenges prove that our organic cotton project is a single step in a very long process - but an important step nonetheless.

We are betting that we have enough loyal customers who will make the same choice we have made here at Patagonia: to pay more now for organics rather than the hidden environmental costs later. It’s a simple, personal choice, of course, to act on what we learn. We’ve all made such choices: to give up or cut down on red meat, to pay more for an energy-efficient appliance, or forego a purchase entirely because it’s not needed.

If these choices are simple and individual, their ripple effects are profound. The market is laser-like in its response to changes in what people want. Together we can create a significant business base for the organic cotton movement. We should. Organic farmers are returning to the only model we have for sustainable commerce, one that gives back to the planet as much as it takes out. Their success will be a quiet revolution in modern life. Let’s follow their lead.

June Chimnial
Dyeing & Finishing
- Chemicals Management
- Water and energy consumption
- Air pollution and water pollution
- Worker and consumer safety
Our DWR Problem [Updated]

Update: The majority of this post first appeared on March 6, 2015. It has been updated here with the most recent information about Patagonia’s work to improve chemical safety in our supply chain.

Patagonia—as well as other high-quality outdoor outerwear suppliers—for years relied on a Durable Water Repellent (DWR) of a certain chemistry (described below) to bead up, then disperse, surface moisture from rainwear.
“Patagonia Bets $1 Million on Biochemistry”

- Environmental Leader
Question & Answer

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Upcoming Events

Green Chemistry Careers in Industry
April 12, 2016, 1:30 pm EDT

Innovating with Intent: Science & Sustainability at Eastman
April 13, 2016, 12:00 pm EDT

GC3 Innovators Roundtable
Burlington, VT
May 24-26, 2016
Thanks for joining us!

For more information about the GC3:
www.greenchemistryandcommerce.org