Developments of New Synthetic Lattices
(“One Size Does Not Fit All”)

2015 International Latex Conference

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www.nitrile.emeraldmaterials.com
Emerald Overview

• **Nychem™ Specialty Polymers**
  - BFG 1st commercial synthetic latex
  - Broad range of chemistry & technology
  - Extensive range of latex & polymer properties

• **Nychem™ products offer**
  - Outstanding softness and flexibility
  - Excellent chemical resistance (fuel, solvent, water)
  - Toughness with heat and abrasion resistance
  - Adhesion over a range of demanding substrates

• **Good-rite® and Cure-rite® Polymer Additives**
  - Phenolic and aminic antioxidants
  - Accelerators of rubber vulcanization
Evolution into a Solutions Provider

**Expansion of Distributed Control System**
- Automated process and packaging controls
- Backbone to allow installation of Pilot Plant
- Completed in Q4 2012

**Nychem™ Pilot Plant**
- Instrumented, Automated and more capable => Enhanced capabilities for new technology platforms
- Development of new resins and products
- Completed Q3 2013

**Nychem™ Application Lab**
- Benchmark with DSC and INSTRON
- New relationships with customers
- Completed Q4 2014
One Size Doesn’t Fit All

“Core Competencies”
- Strong Manufacturing Base
- Engineering & Safety Excellence

“New Investments”
- Pilot Plant
- Applications Equipment & R&D Resources

“New Capabilities”
- New Technologies
- Customized Products

Solutions Provider
Case Study #1: Improved Sealant

Customer Request

• Fast drying coating
• Continuous no-crack coating
• Excellent fuel and oil resistance
• Maintain aggregate suspension

Emerald Solution

• Pilot Plant
  – 4 weeks to develop process
  – 2 weeks to scale up process

• Application Lab
  – Superior rubber film strength
  – Full formulation coating is fast drying and does not crack

• Project Result
  – Nychem™ N4000M
Nychem™ N4000M Performance

Benefits of Nychem™ N4000M

• 0.25” film did not crack on drying
• Superior resistance to fuel swell
Case Study #2: Nychem™ 1561x604

Customer Request
- Paper with high tensile
- Specific paper stiffness
- Fuel and oil resistance
- Low foaming formulation

Emerald Solution
- **Pilot Plant**
  - 8 weeks to develop process
  - 4 weeks to scale up process
- **Application Lab**
  - 9X increase in rubber tensile strength
  - Maintained 600% elongation
- **Project Result**
  - Nychem™ 1561X604 launched Q3 2015
Nychem™ 1561x604 Performance

Benefits of 1561X604

- Increased tensile 9X vs. incumbent nitrile
- Increased stiffness vs. incumbent nitrile
- Low foam formation allows increased recycle

**Tensile Strength of Film (psi)**

No vulcanization or cross-linking

- 1561X604
- Incumbent

**300% Modulus (psi)**

- 1561X604
- Incumbent

**Foam Test: Time required to not foam**

No defoamer required

- 1561X604
- Incumbent
Emerald’s Transformation

• **Expand** solutions provider capabilities and **assess** new product platforms
• Continue to **expand** applications to **support** customer growth
• **Coordinate** stages from product concept and development to commercialization
• **Initiate, develop and maintain** intimate technical discussions with our customer base

One size **really** doesn’t fit all
Thank You

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