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Cellulose Filament (CF) Demonstration, Application Development and Commercialization

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Kruger Biomaterials Inc.
Kruger Inc.

- Founded in 1904
- Privately-owned, forth-generation family company with 5,000 employees (Canada + USA)
What is Cellulose Filament?

Kraft fibres are peeled into ~1,000 Cellulose Filaments

Length: 100-2,000 μm
Width: 30-500 nm
Aspect ratio: 100-1000

Cellulose Filaments

Kraft fibers
Cellulose Filament project

• On Sep. 17, 2013 Strategic Alliance between FPInnovations and Kruger Biomaterials Inc.
• 3-year long, 43.1M$ project
• Project objectives:
  • Design, construction and operation of a 5T/d CF plant
  • Development of new CF applications
• Largest cellulosic biomaterial plant in the world
Partnership with FPInnovations

• Largest forest products research organization in the world with 525 specialized staff, 4 facilities across Canada with annual budget of about 80M$

• Continuous support:
  • Scale up, Design, Construction
  • Start up, Operation and QC/QA
  • Application development
Project Timeline

2013-Sep-17: Project start, plant design
2014-Mar-31: Plant built, start up, QA&QC
2014-Jun-05: 1st batch of quality CF
2014-Jul-10: 1st truckload shipment
2015-Mar: 5T/d production rate
2017-Feb: 24/7 operation, 17T/d
Until today: 60+ industrial trials
4 R&D partnerships
50+ Collaboration
Commercial paper products
Collaboration between Academia and Industry

• Focused application development

• 4 R&D partnerships with Universities and industrial companies

• Collaboration with over 50 clients under NDA
Prioritized Applications

• Paper products
• Polymer composites
• Concrete and Mortars

• Other potential applications:
  • Adhesives & Sealants,
  • Paints & Coatings,
  • Cosmetics,
Pulp and Paper Application

• We have completed over 60 industrial scale trials
• We have developed:
  • Reinforcement pulp grades
  • Unique publication paper grades
  • Specialty paper grades and
  • Tissue products
• Several commercial grades
Multifunction additive

- Strengthening
- Light weighting
- Rheology modifier
Polymer Composite Applications

- Chemical pre-treatment to produce dispersed dry CF
- Introduction of CF into various polymers with up to 40% CF dosage
- Improved physical properties
- Very low water uptake
Concrete and Mortar Applications

• Acts as a rheology modifier

• Improves physical properties (flexural, compressive, tensile)

• Has comparable mechanical and durability properties to steel and synthetic fiber
Conclusion

• Dedicated team for new business
• Adaptive manufacturing with strict quality control
• Competitive intelligence, understand the product
• Product differentiation, value propositions
• Effective technical sales process with technical partnering
• Focused product and application development, partnership between industry and academia
• Market visibility, consistent message
• Capability to balance protecting and sharing IP
Acknowledgement

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• Government of British Columbia
  • Ministry of Forests, Lands and Natural Resource Operations
• Kruger Inc.
Creating tomorrow’s performance materials, hand in hand with nature

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