Cellulose filament demonstration

A technology worth replicating

Fast facts

Technology: **Cellulose filament (CF)**
Replicability: **Good potential**
Capital cost: **$10 to 37 million**
Output: **Press-dried CF optimizes the properties of a variety of products.**

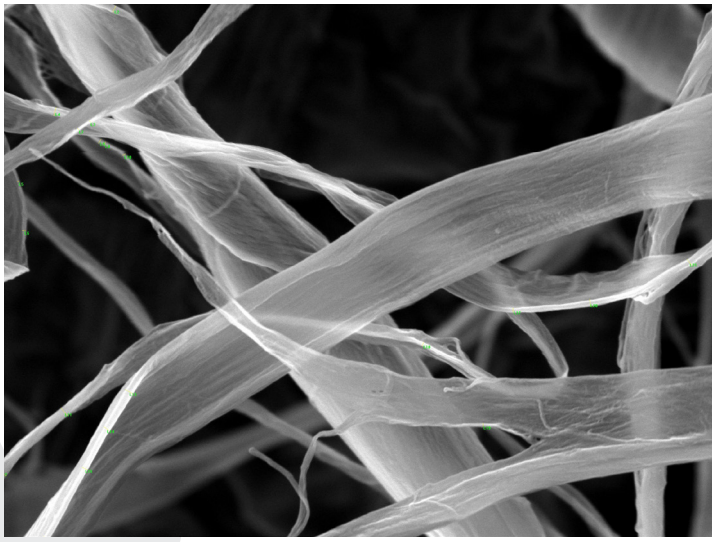
Advantages of cellulose filaments[1]

- Strengthening agent in various matrices
- Potential to be incorporated into existing pulp and paper products in order to develop new grades of pulp and open new markets
- Lowers the basis weight of many products such as packaging materials, publication paper, tissue and towels and also facilitates the incorporation of wood and pulp fibre into non-woven mats, panels, and boards
- Reduces the carbon footprint of the end product by substituting petroleum-based or mineral-based fibres

Success story

Kruger has implemented a world-first and patented process, developed by FPInnovations, that doesn't use any chemicals or enzymes and produces 15 BDt/d of **cellulose filaments**.

The process developed uses standard pulp and paper equipment for pulp processing, lowering manufacturing costs.



How it works

1. Pulp bales, preferably bleached softwood kraft pulp, are re-pulped to re-disperse the wood fibre.
2. The pulp is then passed through refiners operating at low speed and low intensity.
3. The wood fibres are then peeled via mechanical process.
4. As peeling is completed, very thin filaments are obtained with the length of the original fibre preserved.
5. Once accepted, the resulting CF product is sent to a packaging area where it is placed in hermetically sealed bags or sent to a tank for further modification.

Need funding? Access the Canadian Business Network database of government grants, loans and financing options at **canadabusiness.ca/eng/program/search/** for opportunities in your region.

[1] KSH Consulting

Canada

Technology maturity (high)

Has the technology been commercialized outside Canada?

- The plant at Kruger's mill is a world first commercialization of CF technology.
- The main technological risk is the ability to produce CF pulp of sufficient quality.

Ease of implementation (high)

How easily can the technology be replicated, with regard to process complexity, capital costs or intellectual property issues?

- The availability of an existing refiner would be mandatory for replicability purposes, as one of the main advantages of this CF process over other processes is its low capital cost requirement.

Potential for replicability (moderate)

Are there multiple sites available with the potential to facilitate such a project?

- This process could be replicated in mechanical pulp mills across Canada, provided they have either idled refining lines or excess pulping capacity in existing lines.
- To have royalty-free access to CF technology and related intellectual property, new manufacturing sites would need to be members of FPInnovations.

Market opportunities (moderate)

Is the relative market size targeted by this technology accessible?

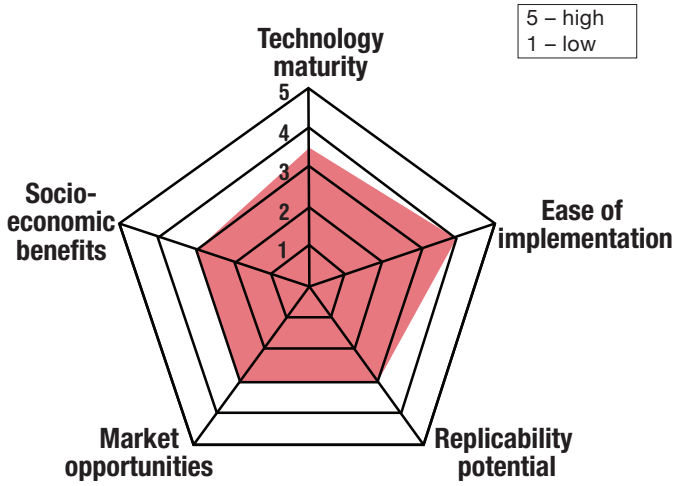
- The potential market for CF in North America as a strength reinforcing agent for pulp and paper products has been conservatively estimated at 120,000 tonnes per year.
- As CF is a new material, applications and markets need to be further developed before large scale production is viable.

Socio-economic benefits (moderate)

Would the project lead to job creation opportunities, environmental benefits and the potential to transform the industry?

- The implementation of a new CF process can help revitalize a mill and/or contribute to the mill's long-term viability.
- The process does not use any chemicals, only mechanical energy, and it produces a recyclable, biodegradable and compostable bio-product.
- The addition of CF can enhance the environmental profile of composites, fibre and mats with the potential to replace petroleum-based or mineral-based products.
- CF can improve the performance of a number of products such as plastics, cosmetics, paints, and concrete products.

Replicability Radar Diagram



Disclaimer: This replication analysis is based on the technology implemented under the project funded by IFIT. The IFIT program does not endorse any specific technology provider and has produced this brief analysis for the benefit of those considering implementing this type of project.

Is it suitable for you?

- ☑ CF can be derived from either soft or hard wood pulp that has been obtained chemically, mechanically (TMP) or by both means (CTMP, high yield pulp, bleached TMP).
- ☑ Access to fresh water and steam for bale pulping and dilution.

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