FiberLean MFC: New Technology Showcase

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FiberLean Technologies Ltd

FiberLean® Technologies

TAPPI NANO DIVISION

Take aways

- FiberLean is one of the world's largest producers of MFC
- Proven technology at full-scale in paper and packaging applications
- Three new product lines – two MFC without minerals
- High solids merchant product form to complement on-site satellite manufacturing
- Improved ability to tailor products to get the best from all chemical pulp types
- Wide regulatory clearance
- Surface application technology (FLoT) is proven at full-scale

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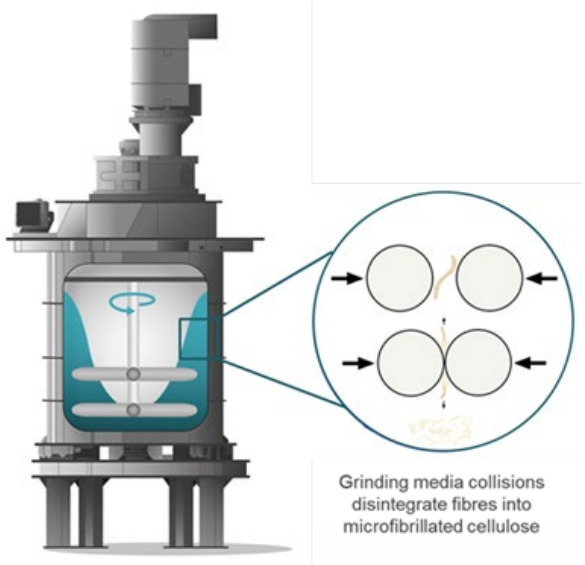
Proven technology at full-scale in paper and packaging applications

Stirred Media Mills



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- Highly fibrillated, high performance cost effective products.
- No close tolerances or precision engineered components.
- Robust proven technology, 12 000 dmt installed capacity, operational since 2014 at paper and packaging mills.
- Continuous single stage process
- Availability > 95%
- Low Capex and Opex
- High throughput
- Small footprint
- Modular easily-scalable design, ~1000 dmt modules
- No additives or pre-treatments

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Three new product lines – two MFC without minerals

FiberLean MFC FLy®
100% MFC for ultimate strength

- Use of virgin fibre in the FiberLean® MFC process.
- A wide variety of pulp species can be used.
- Possible with unbleached or bleached fibres.
- Additive/chemical-free process.
- 100% bio-based material.

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FiberLean MFC FLex®
MFC blends with mineral

- Achieve greater strength and binding capability when using mineral fillers.
- Maximum particle entanglement is achieved through co-processing of raw materials to yield a composite.
- Compatibility with a broad range of minerals and fibre-types, including recycled.
- Ratio of mineral to fibre can be adjusted and tailored to each application.

FiberLean MFC reFLex®
MFC from recycled fibres

- Conversion of recycled feedstocks into MFC (e.g., OCC, DIP, office waste etc.).
- Sustaining and improving quality of products made from recycled fibre-based materials.
- Giving a new lease of life to recycled materials and closing the loop in circular systems.

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High solids merchant product form to complement on-site satellite manufacturing

- Press-cake product form
- Approx. 15 – 20 % fibril solids
- Shelf-life approx. 1 year

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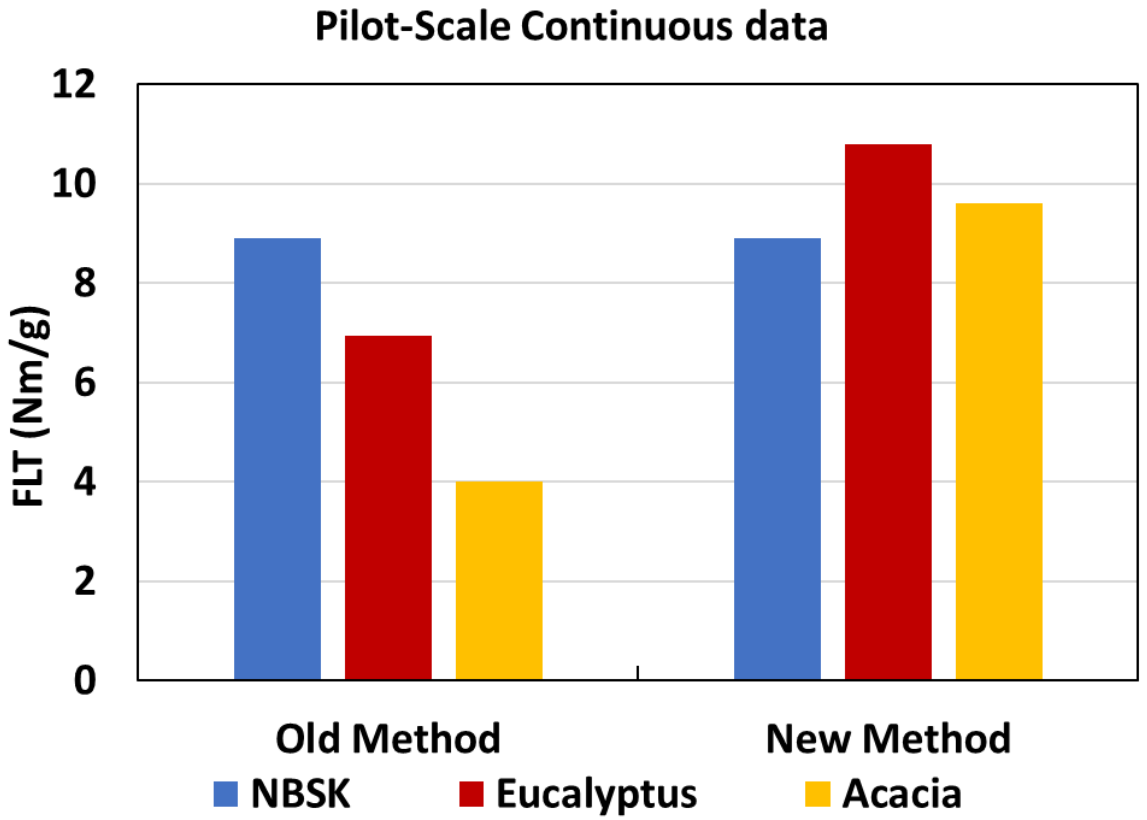
Improved ability to tailor products to get the best from all chemical pulp types



Tuneable nature of stirred media mills allow process to be optimised for the substrate

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Wide regulatory clearance

USA

EPA – existing substance under TSCA. Not subject to reporting under EPA nano rule

Food contact clearance through FDA (5wt.% fibrils in packaging), FCNs 1582 and 1887

Covers all ratios of mineral: MFC including mineral-free

FDA GRAS – in progress, part of Vireo led consortium. For food use

Canada

Environment and climate change Canada – existing substance under CEPA

Health Canada opinion – "…we see no reason to object…to the use of FiberLean in food contact packaging, under conditions as described on the FDA website in the FCN 1582"

Covers all ratios of mineral: MFC including mineral-free

China

The National Health Commission of the People's Republic of China approved microfibrillated cellulose pulp (CAS 65996-61-4) as an additive in paper and paperboard used for contact with all types of food, subject to a maximum usage of 5% (based on the dry weight of fiber) and no specific migration level requirement

Covers all ratios of mineral: MFC including mineral-free

Germany

Acceptance confirmed for BfR XXXVI and XXXVI/2 at up to 5 wt.% fibrils when produced with minerals at between 50% and 83% mineral content

Mineral-free application has been filed with BfR

Netherlands

Cellulose microfibres produced with calcium carbonate, kaolin and/or other permitted mineral fillers are included in Chapter 2 (Paper and board) of the Dutch commodities act regulation at up to 5wt.% fibrils

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Surface application technology (FiberLean On Top)

MFC applied at the paper machine wet end:

- Drain, press and dry using existing paper machine equipment.
- Low CapEx requirement.
- 2-layer sheet functionality achieved with 1 forming section and no coaters.
- Convert existing production lines to new grades.
- FiberLean are the inventors & patent owners globally of this exciting technology.

Multiple application uses:

White Top Liner

Barrier

Commercial-scale application of MFC:
3 m wide paper machine operating at 500 m/min.

3 m wide applicator available now for trials

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Thank you to TAPPI for the opportunity to present

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