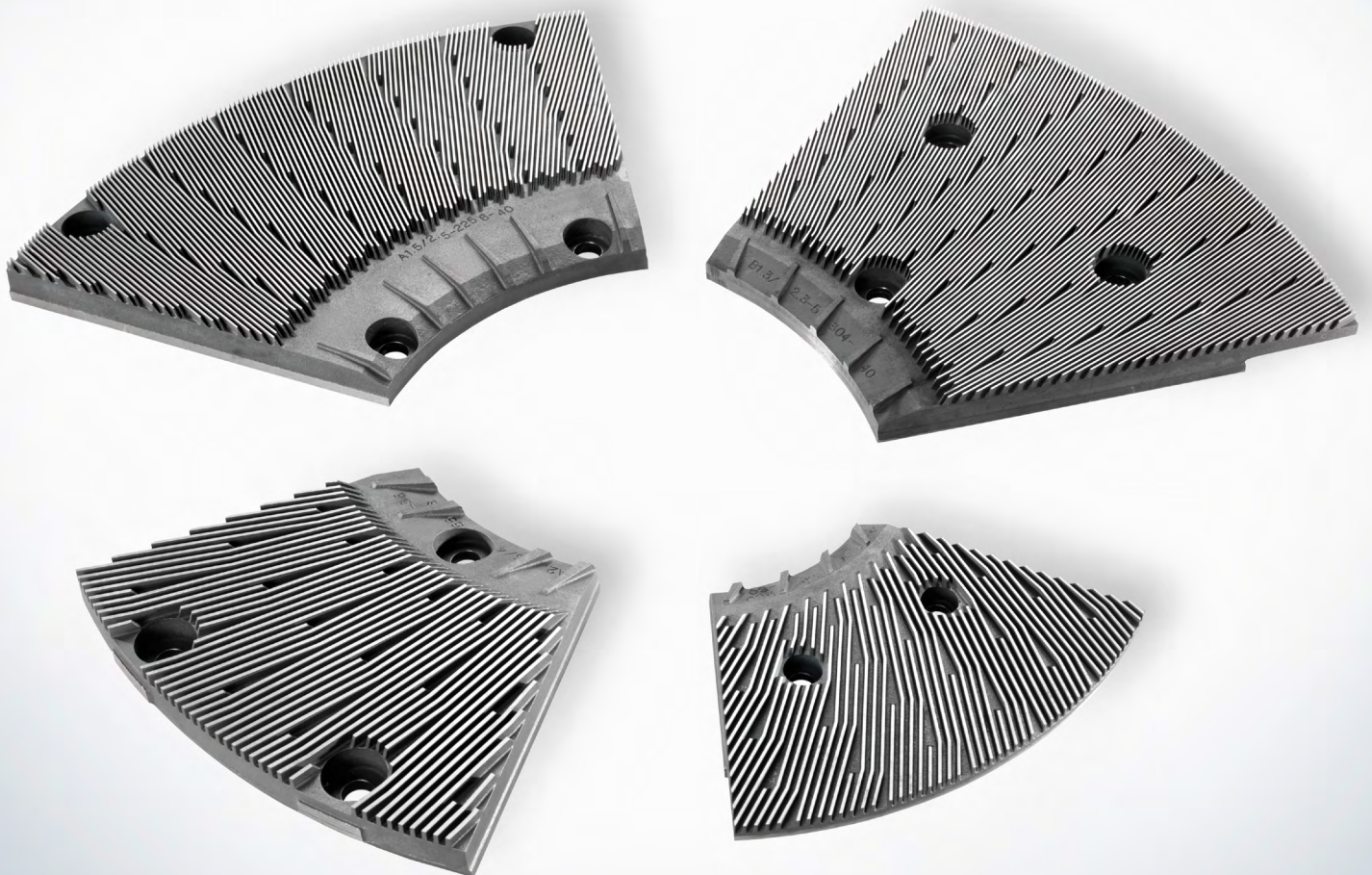
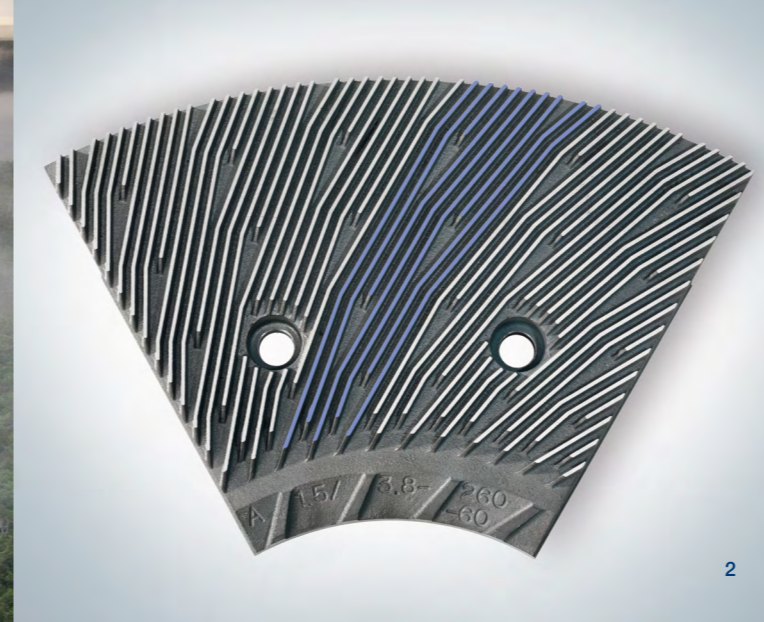


Pluralis Line

Saving energy with the optimal filling for every type of fiber





- 1 Pluralis fillings can be used for nearly all types of raw materials and paper qualities.
- 2 The blue areas show the three characteristics of the Pluralis line: sectorized structure, continuous bars for best flow guidance, open groove design. Image: Pluralis LF

The Pluralis Line from Voith benefits your energy balance

The process of refining fibers has a big effect on the energy balance of the production process. Refiner fillings optimally adapted to the fiber characteristics substantially increase the potential for energy and raw material savings. Many years of experience, well-founded knowledge and the proven use of Pluralis SF for short fibers and Pluralis LF for long fibers are the basis for the development of the Pluralis Line.

Gentle refining with Pluralis

Pluralis refiner fillings are characterized by a very long cutting edge length (CEL) and a flow-optimized design with sectors connected to one another. A larger number of sectors increases the homogeneity of the filling cut angle. This facilitates strength-oriented refining, taking into account the optimal specific edge load.

Area of application

The fillings are suitable for nearly all types of raw material and paper qualities. Since 2006 more than 200 refiners worldwide have been equipped with these fillings. The Pluralis Line fillings are available for both Voith refiners as well as for refiners from other manufacturers. An analysis of the actual machine and operating conditions helps in the selection of suitable Pluralis products.

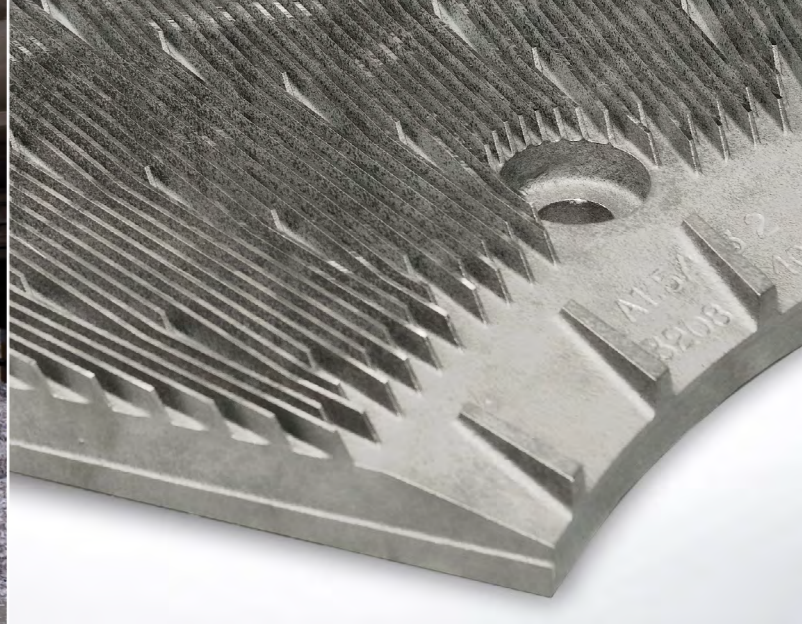
Benefits Pluralis Line

- + Reduction in the number of refiners required
- + High hydraulic capacity with low idle running load
- + Increased tear strength of the wet paper web
- + Reduction of raw material costs due to optimal strength development of the end product
- + Outstanding dimensional stability and surface quality
- + Demonstrable reduction of energy costs
- + Longer service life of the refiner fillings due to gentle refining (low-intensity refining)
- + Easy maintenance and fewer fines

Area of application Pluralis Line

- Voith TwinFlo refiners TF1x – TF4x
- Escher Wyss DSR refiners DSR1 – DSR3
- Voith SDM refiners (05 SDM – 3 SDM)
- And many standard refiners from other manufacturers

Pluralis Line	Description	Typical stock mixing	Recommended spec. edge load
Pluralis SSF	Super Short Fiber	"Never dried" short fiber pulp 100 % short fiber pulp	0.3 - 0.6 J/m
Pluralis SF	Short Fiber	Short fiber pulp with up to 10% long fiber pulp (reinforcement fibers)	0.5 - 0.8 J/m
Pluralis IF	Intermediate Fiber	Pulp mixtures with up to 1/3 long fiber content Secondary fiber (short to medium fiber lengths)	0.7 - 1.1 J/m
Pluralis LF	Long Fiber	Long fiber pulp Secondary fiber (medium to long fiber lengths)	1.0 - 1.6 J/m
Pluralis AO	American OCC	100 % AOCC Mixtures with AOCC portion > 50%	1.4 - 2.2 J/m
Pluralis CF	Coarse Fiber	Unbleached long fiber pulp High kappa pulp	1.8 - 3.0 J/m

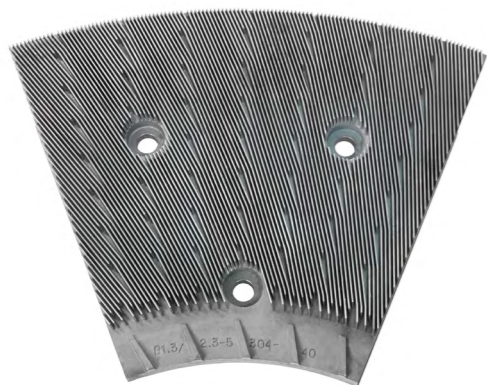


Pluralis SSF and Pluralis SF Sensitive and short fibers

"Never dried" pulp from integrated pulp production is particularly sensitive. It thus requires extremely gentle raw material refining with a low edge load. Hence Pluralis SSF is equipped with narrow 1.3 mm bars. This is a unique characteristic in the market for casted refiner fillings.

Pluralis SF is used for short fiber pulps and allows a long fiber ratio of up to 10%.

Pluralis SSF Super Short Fiber



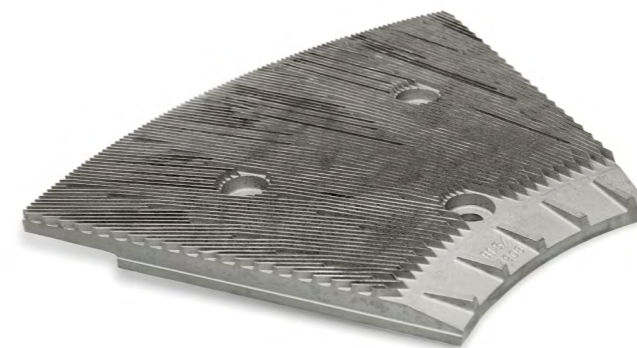
Pluralis SF Short Fiber



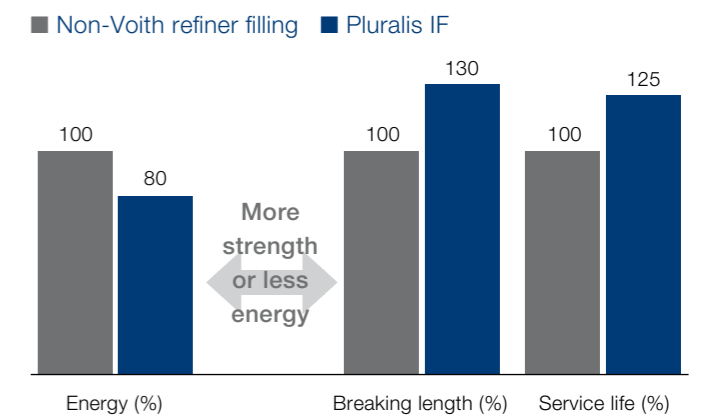
Pluralis IF Medium length and recycled fibers

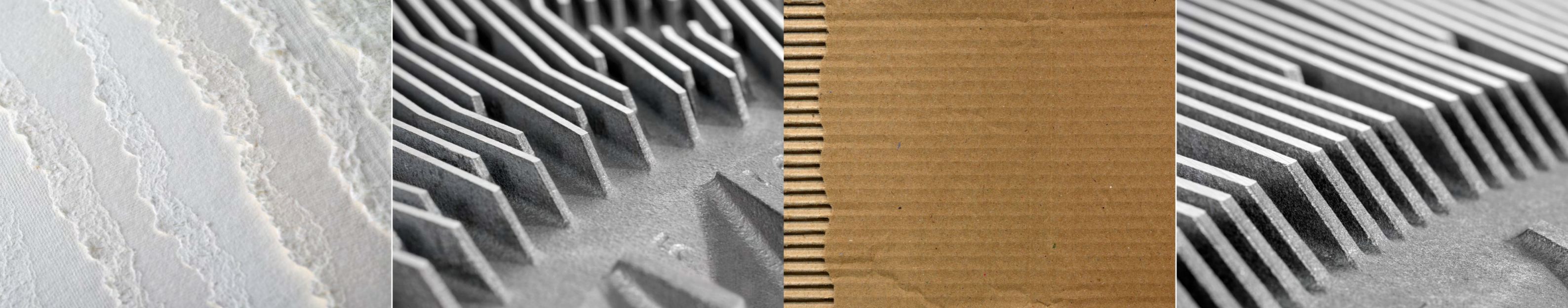
Pluralis IF covers the fiber range between Pluralis SF and Pluralis LF. The specific bar and groove design is especially suitable for mixtures of raw materials that consist of up to one third long fibers. Medium-length fibers, like most of bamboo pulp and recycled fibers can be optimally treated with Pluralis IF. Depending on the desired result, this leads to energy savings or increases in strength potentials. In addition, the service life of the filling can be extended due to the low intensity refining.

Pluralis IF Intermediate Fiber



Case study cost savings 250 k€/year





Pluralis LF Long fibers

Many of the refiners operated worldwide are equipped with Pluralis LF. On the basis of these positive and extensive references, Pluralis LF was able to establish itself in the market many years ago. The Pluralis LF fillings have proven themselves for refining bleached and unbleached long fiber pulps and for BCTMP.

Depending on the application, the number of refiners in operation can be reduced due to the transmission of high refining outputs per machine to the raw material.

Pluralis AO und Pluralis CF OCC raw material and coarse fibers

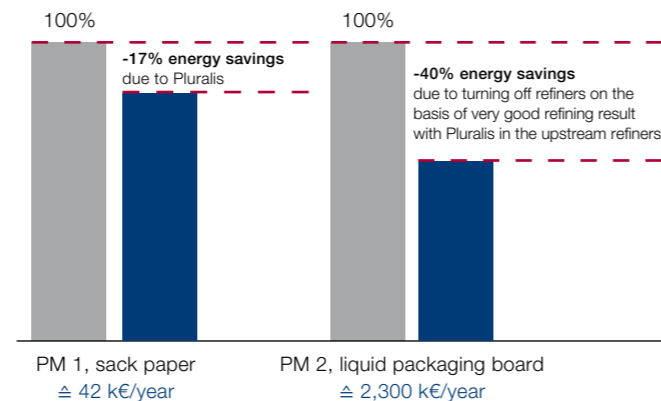
The specific requirements for OCC raw material, in particular for the American market, are met with Pluralis AO. All bars of the filling begin at the same radius and plugging of the filling is thus prevented. Contaminants that pass through the filling are discharged due to the groove shape that widens toward the outside. Excessive wear is thus prevented.

Pluralis CF is used with raw materials with high kappa numbers. They require energy-intensive treatment and have to be treated with high edge loads.

Pluralis LF Long Fiber



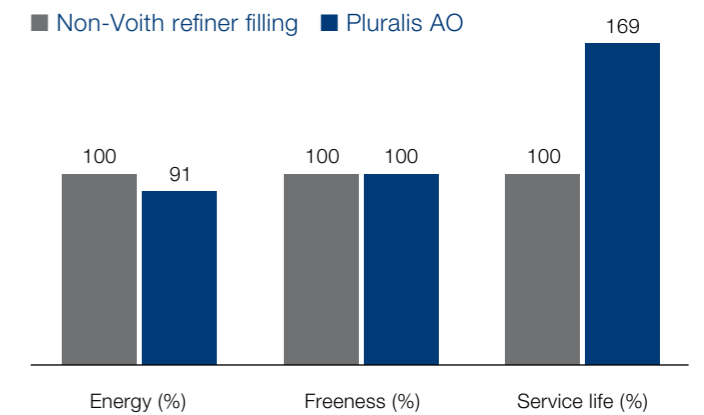
Case study cost savings in k€/year



Pluralis AO American OCC



Case study cost savings 34 k€/year



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