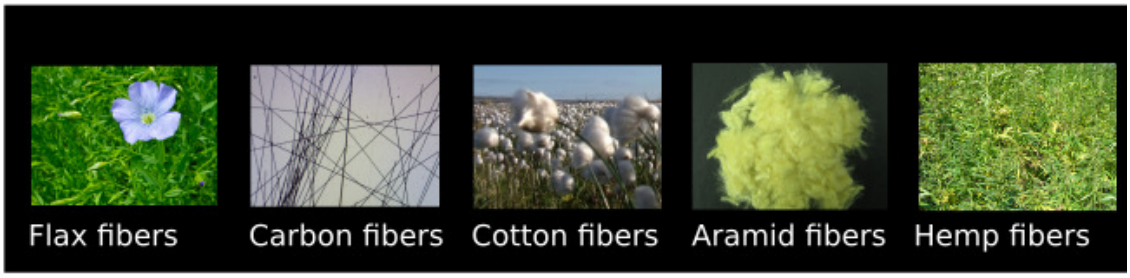
IST AG
Fiber & Particle Analysis

Fiber length matters!



Why is length measurement of fibers important for reinforced composites?

Answers from customers:

Verify textile processability of recycled carbon fibers.

Quality monitoring of cutting process of polyamid fibers.

Characterize frequency distribution of fibers, wood chips and strands for board materials.

Control fiber length as part of the processing chain.

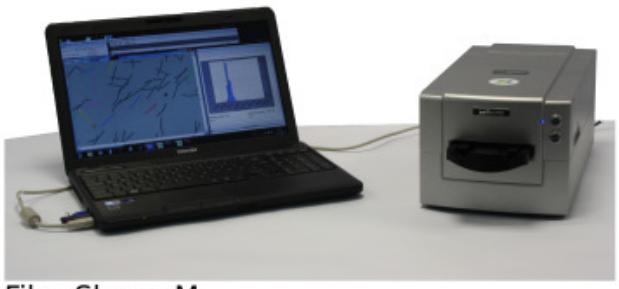
Optimize for uniform flock fiber length to maximize texture quality.

FibreShape - geometrical characterization

The length and other geometrical properties of fibers are determinant parameters in the production of fiber reinforced composite materials. The geometrical characterization of fibers provides the information to predict the quality, strength and uniformity of a fiber reinforced composite.
In order to obtain the images of the fibers the FibreShape system relies on scanners with transmissive light units and a digital microscope also operated in transmissive light mode. The analysis, visualization and evaluation are done by the FibreShape software. FibreShape's use of scanners is crucial for its success. They enable the characterization of advanced geometrical properties but at the same time support specimen of large sizes and the measurement of many specimen in a single batch. Microscopes are employed when a higher resolution is required such as for the width measurement in the range of microns.

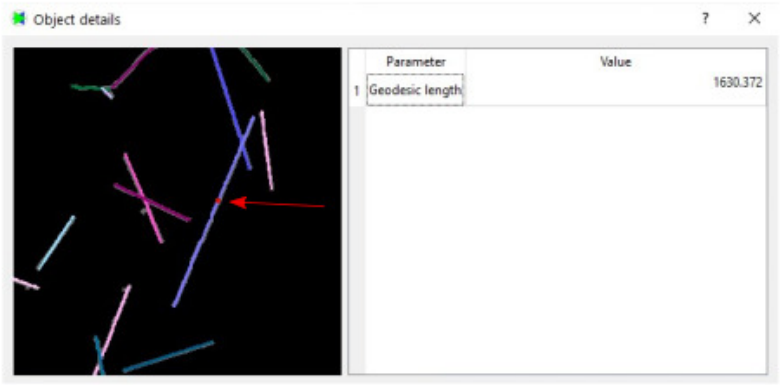
Overview

Model Name	Optical Resolution	Measurement size range	dpi	Scan Area
FiberShape D	6µm	12µm - 1cm (L) / 10µm – 100µm (W)	3600dpi	2.4cm x 3.6cm
FiberShape CROSS D	6µm	12µm - 1cm (L) / 10µm – 100µm (W)	3600dpi	2.4cm x 3.6cm
FiberShape M	8µm	16µm - 5cm (L) / 16µm – 150µm (W)	3200dpi	13.5cm x 5.5cm
FiberShape CROSS M	8µm	16µm - 5cm (L) / 16µm – 150µm (W)	3200dpi	13.5cm x 5.5cm
FiberShape FH	15µm	30µm - 20cm (L) / 30µm – 3mm (W)	1800dpi	21.6cm x 25.5cm
FiberShape CROSS FH	15µm	30µm - 20cm (L) / 30µm – 3mm (W)	1800dpi	21.6cm x 25.5cm

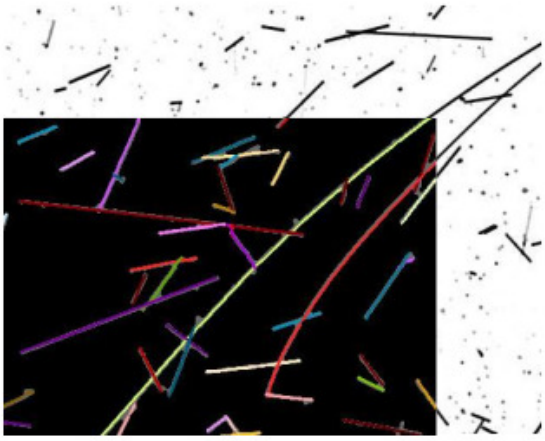


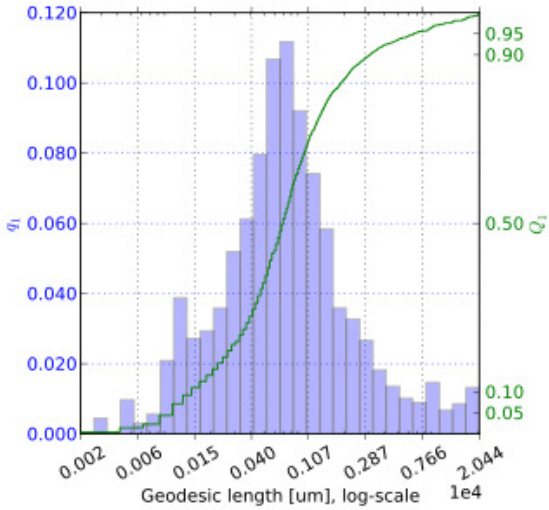
FibreShape M

Analysis of crossing fibers



- Recognize a large number of crossing recycled carbon fibers and measure the length automatically with FibreShape.
- Each recognized fiber can be inspected individually if desired (figure shows geodesic length).
- Many other parameters are available such as width, orientation, curvature, etc.





- Recognize a large number of crossing glass fibers and measure the length automatically with FibreShape.
- Configure the report interactively, save for automatic report creation.
- Various histogram types and scales are supported, such as cumulative distribution by length (figure above).
- Display the results according to ISO 9276 and DIN 66161.

Coming up at IST AG

FibreScanner - novel measuring system for length measurement of long natural and industrial fibers

FibreScanner is a new measuring system in development to analyze natural or industrial fibers of a length of 1cm- 40cm. Instead of moving the sensor over the fibers, the fibers are transported over the line sensor. This inverse approach to the imaging process has the advantage that the natural fibers are stretched in a comb bed and the fiber length can be measured precisely. Combined with an enhanced FibreShape system the FibreScanner will provide accurate length information for long fibers in just a few minutes.

A pilot system is under construction.
Our research partners are: Faserinstitut Bremen, STFI-Sächsisches Textil Forschungsinstitut, Maag Flockmaschinen Kusterdingen.

Stay tuned.

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