Data sheet

L&W Fiber Tester Plus
Lorentzen & Wettre Products | Pulp Measurements

L&W Fiber Tester Plus measures fibre quality quickly and easily and is at the same time an instrument for advanced analysis of fibre dimensions. It is fully automated and comes with a carousel with 6 glass beakers. The instrument is intended and optimized for laboratories and has a compact design.

L&W Fiber Tester Plus measures fibre length, width, fines (P&S), shape factor, macrofibrils and coarseness by image analysis. Software and hardware modules for crill is available as well as software modules for vessel cells, minishives, local deformations (kink) and calculations of fibre mixes. The images taken of of the fibres are displayed during measurements. It is also possible to save images of the fibers as well as of detected objects for later viewing.

Easy to place

The reports and statistics of the measured samples are flexible. For example, it is easy to select different weighing functions for averages and distributions of fibre properties. The report is also easy to specify for each sample type which is set up by the user.

Two-dimensional imaging technology

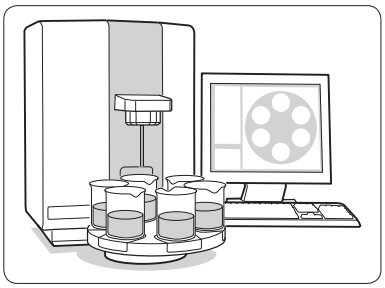
A very small measurement gap according to ISO standard between glass plates secures a good alignment of the fibres. The entire fibre can then be seen and detected by the camera.

Benefits

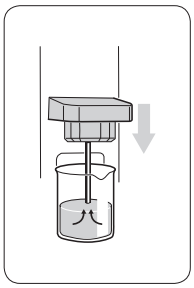
- Fast classification of pulp quality
- New properties to define pulp quality
- Optimization of refining – thanks to macrofibril area and perimeter
- Integrated measurement of impurities
- Internal vacuum system for removal of air bubbles
- Measurement gap according to international standard
- Self-opening and cleaning measurement cell
- Only laboratory fiber analyzer that measures crill

L&W Fiber Tester Plus is a bench-top model, and is easy placed in any laboratory.

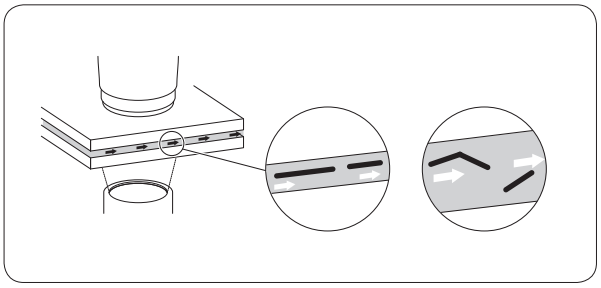
Automated measurement technology enables frequent analysis of pulp quality:



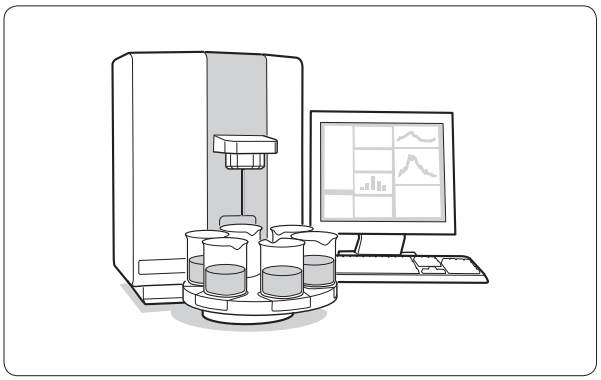
1. The measurement procedure is initiated via the computer. The operator can load up to 6 different samples.



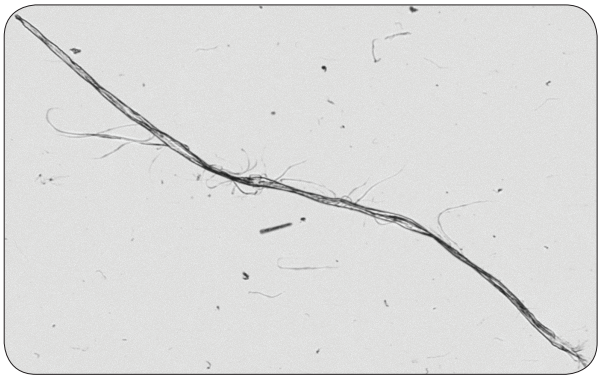
2. The pulp is fed into L&W Fiber Tester Plus.



3. For measurement accuracy, a very small distance between the plates is needed. The fibres are then oriented in two dimensions, which enables L&W Fiber Tester Plus to make a correct measurement.



4. All results from the measurement are presented on the screen and stored in a database. They can also be obtained as printed out reports and easily transferred to other computers for further analysis or for example in Excel.



Example of grey scale image of a single fibre.

Measures several different fibre properties:

Length – L&W Fiber Tester Plus is designed to measure true fibre length with minimum impact from the degree of deformation.

Width – The calculation principle allows for detection of variations of parts of µm.

Shape factor – Calculates how straight the fibre is, a variation in shape factor between 81% and 85% for a bleached chemical softwood pulp can make a difference of 15 Nm/g of tensile index. A change of 1% in shape factor has a significant impact on Tensile Index.

Fines – Fines have a negative effect on dewatering and pressing. Fines generated in beating are good for strength. A coarse fines class (P) and a finer class (S) are reported.

Macro fibrillation area and perimeter – Two fibrillation indexes (fibril area and fibril perimeter) are are calculated based on area and perimeter respectively. The fibrillation indexes are calculated for different length classes, thus the user can monitor if different fibre length classes are behaving differently.

Coarseness – Coarseness is defined as weight per fibre length unit and is often related to fibre wall thickness and flexibility.

Number of fibres per gram – Requires dry weight data for the sample and the same is valid for coarseness.

Impurities – Special software is available for the analysis of kink, vessel cells, minishives flocs and dirt. There are recommended settings for vessel cells and shives. But also other types of objects can be specified.

Blend – Optional software is available for analyzing the ratio of reference fiber species in a fiber mix. The references are stored permanently in the database

Crill – L&W Crill is a software and hardware add-on to L&W Fiber Tester Plus. It measures crill quota in a separate measuring cell, not by image analysis but by a method based on that particle diameter interfere with different parts of the light spectra. Very small particles (fibrils) interfere with UV-light more than IR-light and larger particles (fibers) interfere more with IR-light. Refining of pulp increases the crill quota and crill quota correlates to fibril perimeter.

Technical specifications

L&W Fiber Tester Plus – code 912 Plus

Inclusive	L&W Fiber Tester Plus, software, PC, power supply
Technical details	Monitoring of fibres during measurement. Possible to save images of each fibre. Sample amount typically 0.1 g dry weight pulp, not critical
Measurement results	- Weighted averages for length, width, fibril area, fibril perimeter and shape factor are reported. - Difference between double measurements for length, width, fibril area and perimeter and shape, a small difference confirms a good measurement - Number of measured fibres - Number of fibres in sample, number of fibres per gram (with coarseness) - Fibre area in sample, Fibre volume in sample - Cell wall thickness calculated based on cylinder model
Measurement range	- Length according to ISO and Tappi standards - Width from 4 µm. Upper limit can be set from menu depending on sampling type - Resolution within measurement range is 0.1 µm for an average SW fibre - Shape factor (0) 50–100% - Alternative weights used in the statistical calculations are 1 (arithmetic), length, width, area, volume and square of length - Fines l < 0.2 mm or l < 0.1 mm depending on used standard for length - Coarseness as weight per unit fibre length
Repeatability	Length 1.5 %, width 1 % and shape 0.5 % of average Coarseness typically better than 3 % of average
Table	- 2–15 length intervals - Limits are easily selected from sample type menu - For each choosen interval the weighted result (chosen in sample type setting) of the following properties are shown; mean width, macrofibril area and perimeter and shape factor. - Fines can be selected to be included or excluded with the fibres.
Distributions	Frequency and accumulated distributions: - Length 75 classes - Width in 50 classes - Shape factor in 50 classes
2D data	Length/width matrix, 15 × 20 classes
RAW data	Length, width, shape factor, macrofibril- area and perimeter
Sample types	- Separate sample types can be declared for different sampling points or by different users. - Different sampling types will generate different reports - Raw data is saved the reports can be changed after wards if the sampling type is modified with respect to weighting, scales etc.

Installation requirements

Power	100 W
Instrument air	0.4–0.6 MPa (60–90 psi) Dry, oil free

Water

Consumption	100 l/h
Pressure	0.3–0.6 MPa (45–90 psi)
Temperature	20–40°C (for accurate Coarseness 30 +/- 2 °C)
Filtration	3 µm
Optons	L&W Fiber Tester Blend L&W Fiber Tester Kink/Vessel L&W Crill

Dimensions	0.4 × 0.5 × 0.6 m 16 × 20 × 24 in	**Volume**	0.2 m³ 7 ft³
Net weight	35 kg 77 lb	**Gross weight**	65 kg 143 lb

Applicable standards

ISO 16065-2

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