Lorentzen & Wettre Products
Pulp testing
A uniform pulp quality is very important, it is the base for a uniform paper quality, and creates the best situation for optimization of the paper machine.

Modern optical technique makes it possible to analyze fibre properties statistically and in detail. Since the measurements are automatic with good repeatability they are suitable for online measurements. For example paper strength properties can be predicted quite well from the fibre properties including coarseness. Lorentzen & Wettre supply excellent online measurements of fibre quality.

Runnability problems in the paper machine and paper quality deviations can be created from different types of fines, shives or vessel cells in the pulp. The problems can also be a result of unknown variations in fibre mix, fibre quality or refining. If appropriate pulp quality properties are measured continuously in the process it is easy to see correlations with other things that happen in the process and this enables taking correct actions and strategies based on measured facts. Early detection of deviations in quality makes early corrective actions possible.

Uniformity is important on all levels. A stable process is a good start but fast variations are common already in the fibre flows and consistency. Uncontrolled variations in flow rate and pulp consistency create quality variations since applied energy in refining and added chemicals will not be matched and the pulp streams will not be properly mixed. Feedback control of flow and consistency are always important. Lorentzen & Wettre supplies a full range of consistency sensors for feedback control of consistency and a full range of samplers for calibration samples.

Optimal papermaking is a result of compromises. An increase in tensile index causes a decrease in tear index. Maybe you have to compensate with some other parameter to reach the optimal point for best economy within specifications. A longer fibre for reinforcement might give a worse formation and you might have to reduce the forming consistency to compensate for this effect. To be able to optimize the process you have to know what you are doing. Lorentzen & Wettre supplies you with the right tools.
Online pulp testing

L&W Pulp Tester is a reliable, repeatable and cost-effective online system for laboratory and for process control of pulp quality. Measurements conform to established standards and together with the latest and fastest technique it is a major help in achieving uniform paper quality and stable runnability. No matter what pulp is produced, it is important to fully understand the process and have reliable data.

L&W Pulp Tester offers a combination of different measurements. Additional modules can be added to the main unit to fit the particularly needs of the production. Measurement results are displayed as different default and user-defined numerical and graphical reports and can be stored in the L&W Pulp Tester database. After a measurement cycle, results can be transferred through the mill’s data network for immediate action of the operators.

L&W Pulp Tester also features communication protocols, networking and remote support possibilities. Standardized measurements with laboratory precision modules can be connected for measurements of different properties according to the customers’ requirements, such as optical properties, fibre morphology and freeness. The basis of the system is a sample preparation unit, with dilution tank and up to 10 (or even more) different pulp sampler connections. Manual samples are also easily measured, the sample is diluted to accurate consistency in the sample preparation unit. Thereafter it is distributed to the different measuring modules. After this, the sample is flushed out and the system is cleaned before the next sample is collected. It takes down to 4 minutes, depending on the pulp, to test one sample. This means that when the system is going for full speed, L&W Pulp Tester will report up to 360 measurements of each property in 24 hours!
L&W Pulp Tester Sample Preparation
L&W Pulp Tester Sample Preparation is the base unit in the L&W Pulp Tester system with possibility for up to ten or even more online samplers. The samplers automatically provide the system with samples that are diluted in the L&W Pulp Tester Sample Preparation module (containing a primary and a secondary dilution tank) and then distributed to the different measurement modules in the system. Each sample handles up to 40 grams of pulp (dry weight) and the cycle time is down to 4 minutes.

L&W Pulp Tester Optical Consistency
Consistency is measured optically in the sample preparation unit in order to dilute each sample to a certain consistency. A defined consistency or amount of pulp can then be transferred to each measurement module in the system. This requires a fast measurement.

L&W Pulp Tester Gravimetrical Consistency
True consistency can only be measured by measuring the gravimetrical dry weight of the sample. This is solved by integrating a sheet former with pressing and drying in the system and to weight the dry sheet on a balance. Such a procedure requires longer time for the sample handling but is used in combination with the optical consistency meter. The optical device gives the speed and the gravimetrical device gives the accuracy. True consistency is needed for correct freeness according to standards and several fibre morphology parameters can be expressed relative to true weight. To measure coarseness it is necessary to know the true dry weight of the sample. The dry sheet is also used for measurement of optical properties.

L&W Pulp Tester CSF
Uneven dewatering may cause operational problems in the paper machinery. High CSF (Canadian Standard Freeness) value means easily dewatered pulp. The CSF method is widely used for mechanical pulps. The international standard for CSF is used.

L&W Pulp Tester SR (MSR)
Dewatering measurements can be used to improve beating control, provide better operating reliability in the paper machine, and facilitate quality changes. For chemical pulps the Schopper-Riegler method (SR) is common. The international standard for SR is used.

L&W Pulp Tester Fiber Morphology
L&W Pulp Tester Fibre Morphology is the only online fibre analyser on the market following the latest international standard for fibre length measurements (ISO 16065-2:2007). It is based on our L&W Fiber Tester in which the fibres are oriented in an image plane in the measurement cell and do not admit spread in the direction perpendicular to this plane. Fibre length, width, shape factor, local deformations, fines, coarseness, vessel cells, shives and fibre blends are measured.

L&W Pulp Tester Optical Properties
Brightness is the most important measure of quality for many types of pulp. Bleaching is associated with high cost. Control of brightness will reduce the cost of bleaching chemicals. The brightness parameter is used to monitor the bleaching process. Brightness together with fluorescence is used to supervise the dosage of OBA (optical brighteners). Brightness is the most commonly used parameter in the sales specifications of paper and paperboard products.

The parameter whiteness is used to describe the perceived whiteness of a finished sheet. Whiteness is for example influenced by bleaching, colouring and OBA. Whiteness may be considered as the most understandable of the optical parameters, but it is a fairly new parameter in paper product specifications. However, it rapidly gains more and more interest. It is used particularly for the OBA-containing paper grades. The optical properties are measured on a dry sheet and follow international standards.

L&W Pulp Tester NIR
NIR (Near Infra-Red Spectroscopy) measures an optical spectrum in the infrared area (1100–2300 nm). The measurement is carried out by reflecting diffuse light against a dry sheet of paper in L&W Pulp Tester NIR module. The spectrum can be used in combination with fibre measurements in order to predict different paper quality properties. The NIR spectrum is sensitive to water, ash, cellulose, hemicellulose, lignin and extractive matter.

L&W Pulp Tester Modelling Tool
Extensive measurement statistics constitutes a solid base for prediction of other properties than the measured. The system is prepared to use multivariate data analysis software for this purpose. Special trials have to be designed with the purpose to gather measurements against reference data. The models are developed from this data. Software support to execute developed models in L&W Pulp Tester is included. The prediction models read relevant data from relevant modules and register the predictions. The models can be reported in L&W Pulp Tester in the same way as directly measured signals.
L&W Fiber Quality Transmitter is a fast inline fibre analyzer for the pulp and paper industry. The analyzer is developed for process control, to be mounted directly into the process pipe, and positions where frequent sampling is needed. L&W Fiber Quality Transmitter measures fibre properties continuously in the process such as: fibre length, fibre width, deformations, fines, and can also predict other calculated properties.

KC/7 Microwave Consistency Transmitter uses microwave true-phase measurement technology to measures total consistency of mixed pulps, different quality pulps, and pulps with fillers with excellent measurement accuracy.

KC/5 Rotary Consistency Transmitter is the most advanced consistency transmitter in the market with its revolutionary direct-drive servo motor, excellent consistency measurement, light weight design, and dramatically reduced maintenance.

KC/3 Blade Consistency Transmitter with its shock resistant seal-less transfer mechanism with unbreakable diaphragm, o-rings or seals is the only transmitter with no moving parts, making it impossible for process liquid to leak inside the sensor.

KPM KS 2/4/6 Pulp Samplers provide representative sampling from the process line safely and eliminates errors by the operator. The sampler breaks through the water layer inside the pipe, eliminating dewatering from the sampling process.
L&W Pulp Disintegrator conforms to industry standards for pulp disintegration. The pulp container is made of stainless steel for durability and ease of cleaning. The ergonomic design ensures that it is easy and safe to use. For example, the unit will not start unless the container is properly closed.

L&W SR Tester is a device to measure the drainage of a pulp suspension, as determined by the international standard for Schopper-Riegler method and expressed as the SR number. The most reliable results are obtained within the SR number range of 10-90. A water powered piston ensures a constant lifting rate to the sealing cone.

L&W CSF Tester is designed to measure the rate at which a diluted suspension of pulp may be dewatered. The drainage rate has been shown to be related to the surface conditions and swelling of the fibres. It is also a useful index of the amount of mechanical treatment given to the pulp. It follows the international standard for CSF.

L&W Moisture Tester measures the moisture content in e.g. pulp sheets, before leaving the pulp mill. It can be used for production control and verification of online systems and for back-up of online moisture sensors. It is time saving and easy to use. In just a few seconds the measurement results are displayed, which is very fast compared to the gravimetric method.

L&W Fiber Tester measures fibre length and width, fines, shape factor and coarseness, vessel cells, minishives, local deformations (kink) and calculations of fibre mixes. L&W Fiber Tester is an instrument for analysis of fiber dimensions, with automated technology for frequent analysis of fiber quality. It is intended and optimized for laboratories and has a compact design, which makes it easy to place.

L&W Moisture Tester measures the moisture content in e.g. pulp sheets, before leaving the pulp mill. It can be used for production control and verification of online systems and for back-up of online moisture sensors. It is time saving and easy to use. In just a few seconds the measurement results are displayed, which is very fast compared to the gravimetric method.

L&W Fiber Tester measures fibre length and width, fines, shape factor and coarseness, vessel cells, minishives, local deformations (kink) and calculations of fibre mixes. L&W Fiber Tester is an instrument for analysis of fiber dimensions, with automated technology for frequent analysis of fiber quality. It is intended and optimized for laboratories and has a compact design, which makes it easy to place.
Lorentzen & Wettre  
**ABB Process Automation Division**  
P.O. Box 4  
164 93 Kista, Sweden  
Phone: +46 8 477 90 00  
Fax: +46 8 477 91 99  
E-Mail: info@l-w.com  
www.l-w.com | www.abb.com