



kajaaniMAP™
Engaged for process operation

kajaaniMAP™

Embedding quality management in process operation

Reliable measurement data on freeness, shives and fibers, all available with the speed and accuracy needed for today's efficient online process control – that's what Metso Automation's new kajaaniMAP (Modular Analyzer Platform) provides you with. As a complete solution for the most crucial pulp quality measurements, kajaaniMAP gives you so much more than you've been used to. It's the operator's tool of choice for running the process online!

The easy-to-use kajaaniMAP analyzer features advanced, yet cost-efficient technology for the benefit of your process. Its measurements represent superior technological solutions and boost measurement capacity, accuracy, performance, and availability to a level not previously available. For example, it provides you with shive measurements that are about 15 times faster and fiber measurements that are up to 500 times faster than previous-generation devices.

For all pulping processes

kajaaniMAP is suitable for mechanical pulping, chemical pulping, and recycled pulp/DIP. Developed in close cooperation with our customers in the pulp and paper industry, it meets all process

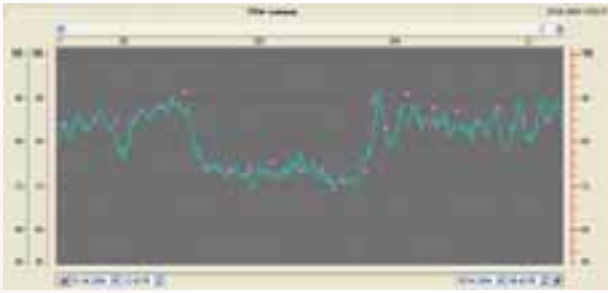
needs required to produce top quality pulp.

Up with productivity

Manual shive and fiber measurements performed in a laboratory are not only



eration



The mill information system shows time trends of online freeness readings in blue compared to offline laboratory readings (PulpExpert). A manual test is shown in red.



tedious and time-consuming, but simply can no longer meet the requirements of modern pulp production. The kajaaniMAP analyzer and its automatic process sampling system enable you to speed up your measurements, in addition

to easing the laboratory workload and improving productivity.

Long experience shows

The international pulp and paper industry has trusted in Kajaani products for over thirty years. Metso's extensive experience combined with in-depth analyzer and process know-how guarantee that the latest addition to our product portfolio, kajaaniMAP, will provide you with reliable and accurate measurement results.

In addition, our global sales and service network is at your disposal, and you can count on our support throughout your equipment life cycle.

Aiming to exceed your expectations

kajaaniMAP is an investment that truly aims to exceed your expectations – both financially and performance-wise. It features high technology, which is user-friendly with low installation and life-cycle costs.

Thanks to modularity, kajaaniMAP can be expanded according to your growing needs.

kajaaniMAP™ highlights:

- *Reliable, repeatable and fast online freeness, fiber property and shive content measurement for control applications*
- *Modular and expandable according to customer needs*
- *Up to 10 automated samplers at up to 100 m distance*
- *Wide process consistency range, up to 15% Cs*
- *Robust and compact package*
- *Automated self-cleaning*
- *Versatile local and remote connections*



Measurement performance that really stands out

The modular kajaaniMAP™ analyzer offers you the right combination of measurements for your process. You can have it furnished with the Freeness module or the Fiber-Shive module or both according to your particular needs. Thanks to its expandability, modules can easily be added to the system later on.

Freeness – over 350 measurements per day

The construction of the Freeness module corresponds to the TAPPI T227 standard, with materials more durable than those used in laboratory devices. Dewatering in the measuring cell exactly follows the standardized laboratory procedure.

It has never before been possible to measure freeness as fast and reliably as with the Freeness module. As each freeness analysis takes only four minutes, you can obtain up to 350 or more analyses per day!

Cleanliness is well taken care of, since after each analysis the module automatically performs a cleaning sequence and a cleanliness check. The water washing efficiency is enhanced by an ultrasonic cleaner, which ensures that the measuring cell is clean for the next analysis. An automatic water freeness test after every measurement indicates that the

module is constantly in prime condition and that the operators can trust the readings.

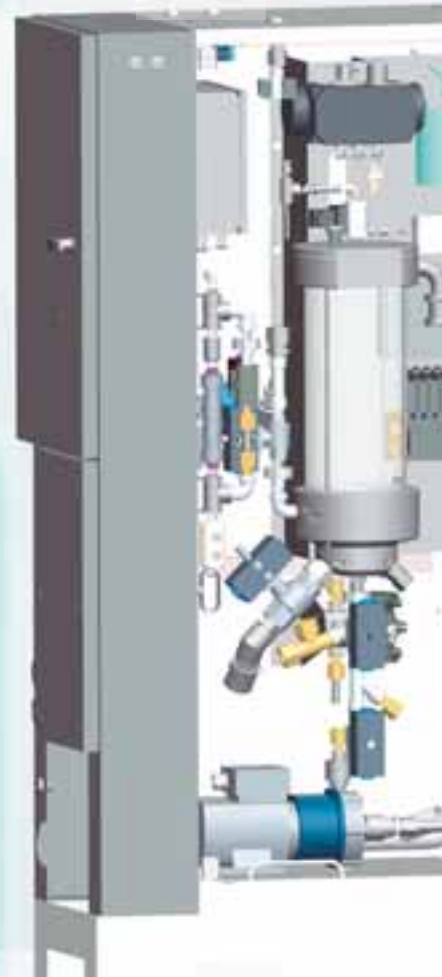
This ultrasonic cleaning ensures reliable, uninterrupted analyzer operation and low maintenance needs, for a maintenance interval of a month or even longer.



In the Freeness module an ultrasonic cleaner ensures that the measuring cell is clean for the next analysis.

kajaaniMAP™ measured values

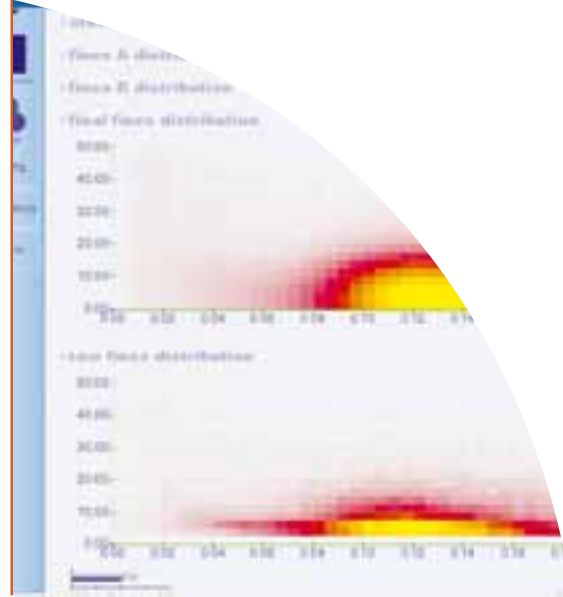
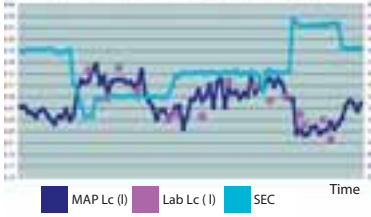
- **Freeness**
 - Accuracy according to TAPPI standard T227 OM-94
- **Shive measurement (% (of weight), n/mg, n/g, n)**
 - Measuring range, width 75–2,000 µm, length 0.3–20 mm
- **Fiber measurement**
 - Measuring range, width 2–500 µm, length 0.01–7.6 mm
 - Averages, distributions and matrix presentations available
 - Length (Lc)
 - Curl
 - HW/SW ratio
 - Fines content
 - Width



Kraft SW pulp - kajaaniMAP CSF vs. Laboratory CSF on different SEC levels



Kraft SW pulp - kajaaniMAP fiber length vs. kajaaniFiberLab on different SEC levels



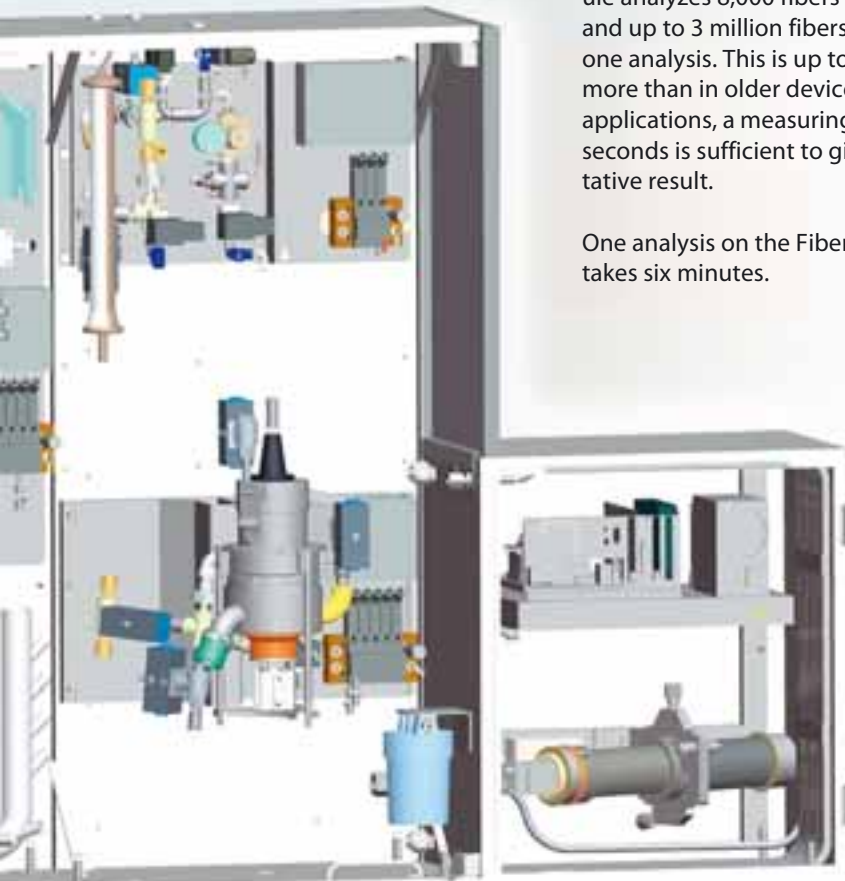
Highest-speed fiber and shive measurements

The new Fiber-Shive module measures fibers and shives, reporting the results either as individual values or as distributions. The measurement is based on image analysis technology, which makes it possible to process and analyze a large amount of data within a short time. The module's wide measuring cell helps prevent plugging even in very demanding process conditions.

Shive measurement gives you accurate information about the shive content and shive size distribution in a sample. About 1 gram of sample is measured each minute, and up to 6 grams may be measured during one analysis. The Fiber-Shive module provides you with measurements about 15 times faster than previous-generation shive analysis applications. Just imagine the comparison to manual laboratory measurements!

Fiber analysis measures the most crucial fiber properties: length, width, fines, curl, and SW/HW ratio. If needed, it also reports them as distributions. The module analyzes 8,000 fibers per second, and up to 3 million fibers per sample in one analysis. This is up to 500 times more than in older devices. In most applications, a measuring time of 30–40 seconds is sufficient to give a representative result.

One analysis on the Fiber-Shive module takes six minutes.



Fiber-Shive module performance highlights

Shives:

- Speed: 1 g/min pulp analyzed: 3 – 6 g pulp analyzed/analysis (15 x previous-generation shive measurement speed)
- Repeatability: 3%

Fibers:

- Speed: 8,000 fibers/second = 500,000 – 3,000,000 fibers/sample (100 – 500 x fiber measurement speed compared to other devices on the market)
- Repeatability: even < 0.5% (0.2% with TMP and 0.4% with SW Kraft)

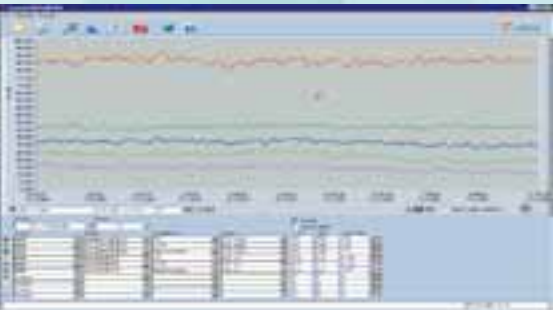


Operation – value through functionality

It's not only the speed and amount of data that make the kajaaniMAP™ analyzer so special – but also the way it works. It is easy to operate thanks to its advanced sampling, calibration, self-diagnostics, and connections to other mill systems. And, if you need help at any point of the device life cycle, our versatile support services are at your disposal.

Sampling consistency up to 15%

kajaaniMAP's measurements are available from up to ten sampling points. If needed, you can program an individual analysis for samples from each process point.



You can choose from two different samplers and sampling procedures that cover a wide range of process conditions. Pulp samples can be extracted from consistencies up to 15% and nearly 0 bar pressure. The sample is delivered to the analyzer with water pressure over a distance of up to 100 meters. All sample lines can be connected to one trunk line – a solution that makes installation cost effective.

Sample preparation is gentle

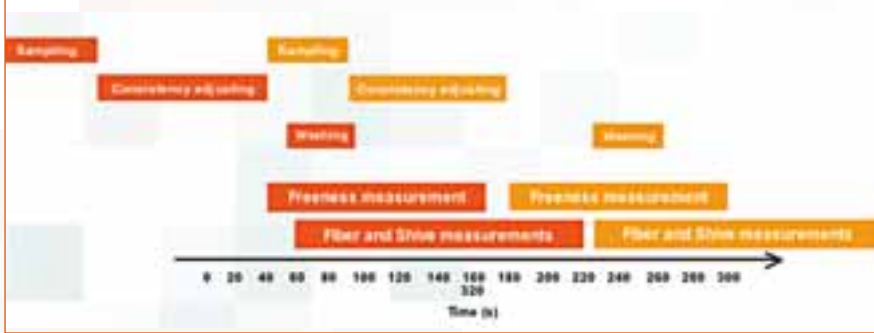
For freeness measurement, the analyzer adjusts sample consistency to 0.3% Cs as required by the TAPPI T227 standard. Sample preparation is so gentle that the properties of the pulp sample correspond exactly to the process conditions. Accurate, consistency-controlled, samples are then fed to the modules for freeness, fiber and shive analyses. If

required, a 0.3% Cs sample from the same batch is also available for laboratory validation.

No more tedious modeling

The kajaaniMAP analyzer's consistency measurement is sweep-calibrated, which ensures quick and reliable calibration for different pulp grades. The freeness module measures according to





The kajaaniMAP measurement cycle. Sampling and measurement sequences are not interdependent, and sequence durations vary according to pulp type.



the T227 standard and requires thus no calibration. The Fiber-Shive module is calibrated with proprietary calibration tools. You don't need any separate calibration pulps or fibers.

Self-diagnostics monitor condition

Suspect measurements or functions that might cause errors in process control cannot be tolerated. You must have

reliable measurement data available at all times to run the process efficiently. This is possible only if the analyzer remains clean and fully operational without any failures.

Analyzer cleanliness, discussed earlier in the section about the Freeness module, is one of the most crucial factors contributing to reliability. Other important factors are the self-diagnostics that constantly monitor the kajaaniMAP analyzer's condition. They keep the operation of sequences and valves, cleaning efficiency, and measurement result reliability under continuous watch. If the self-diagnostics system observes any problems, it notifies the operator and gives guidance for efficient troubleshooting.

Both high cleanliness and self-diagnostics contribute to kajaaniMAP's high availability, long lifetime and low lifetime costs.

Good connections – a must

Interfacing technology is a vital part of kajaaniMAP. Excellent communication connections to other mill systems enable several user groups' easy access to the analyzer data. Production operators use the analyzer's basic measurement data, maintenance technicians need tuning and diagnostics data, and development engineers appreciate the analyzer's most detailed values. Also, a remote connection with Metso Automation's service center is highly useful.

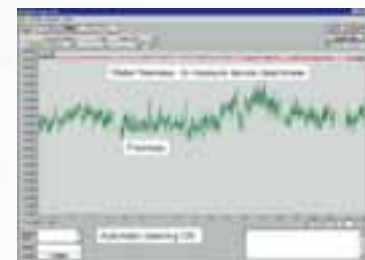
kajaaniMAP can grow from a small system with only a few values to a big system with hundreds of values to be communicated. All tools are available

with everything from traditional hard wiring to modern networking.

Long lifetime based on careful planning

High uptime and low maintenance needs are not obtained by accident, but result from thorough and systematic planning during the product development project. In evaluating the reliability of the analyzer we use the Failure Mode and Effect Analysis (FMEA). It includes reviewing the reliability of individual components and simulating the possible failure mechanisms of proposed design alternatives.

Based on this work, we put together spare part recommendations, service programs and service contracts. These all aim at securing the value of your investment through the whole life cycle of the analyzer.



Operation highlights

- 10 sample lines
- All sample lines connect to one trunk line – lower installation costs
- Also manual sampling possible

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