PulpEye FIBER PROPERTIES ANALYZER

Vessel cell module

ANDRITZ

PulpEye vessel cell module

Based on the patented technology to measure fiber wall thickness, ANDRITZ introduces PulpEye vessel, a module to measure the quantity and size of vessel elements in hardwood pulps.

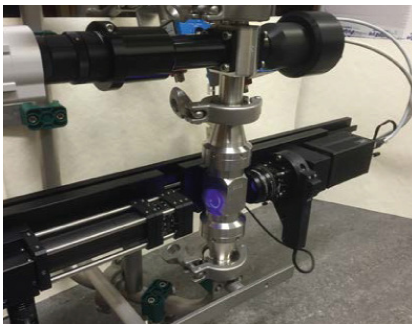
Vessel cells exist in hardwood pulp. These cells are often relatively intact in the pulp process and can have a negative impact on pulp quality. They can reduce print quality by acting like flakes or not take ink the same way as the surrounding fibers. Dust problems can also occur due to vessel elements coming loose during printing.

Measuring the quantity and size of vessel elements in pulp is of interest for pulp manufacturers in order to classify pulp. It is also of interest for papermakers using pulps with big vessel cells or deinked pulp containing vessel cells from hardwood.

CIRCULARIZED POLARIZED LIGHT IS THE KEY

PulpEye Fiber Properties Analyzer can mix and circulate the sample through the flow cell where the camera captures images of the pulp. By using circularized polarized light, the images of fibers and vessel cells can be clearly distinguished from the background.

Fibers and vessel cells have vastly different shapes and various shape parameters can differentiate vessel cells from fibers or noise. With normal light, vessel cells are almost transparent and much more difficult to detect and capture in an image.



The optics for measuring vessel cells in PulpEye vessel cell module.

ADVANCED IMAGE ANALYSIS

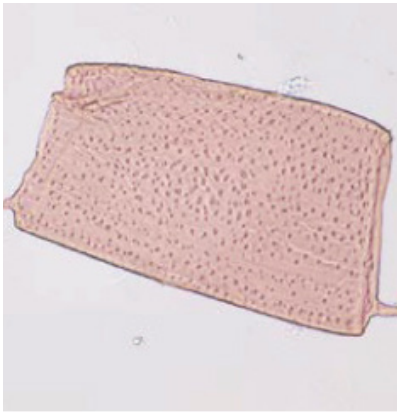
Images are captured at a very high resolution. The size of vessel cells are typically over 100 microns across and for some species, such as eucalyptus and acacia, the vessel cells are even bigger. The resulting images are analyzed using a series of image processing steps.

The analysis results, expressed as e.g. number of vessel cells per a certain amount of pulp, are presented as a separate report in PulpEye Fiber Properties Analyzer. Limits beyond which actions must be taken can therefore be set. Needless to say, the accuracy of PulpEye vessel cell module compared with manual checking on sheets of pulp is much more reliable and the unit delivers results in real time.

MEASUREMENT ONLINE AVOIDS REJECTIONS

Online measurement can early in the process detect variations and by acting on the results presented by PulpEye vessel cell module, costly rejections caused by vessel cells can be avoided.

Traditional technology gives weak contrast.



The optics for measuring vessel cells in PulpEye vessel cell module.

PulpEye VESSEL CELL MODULE

The technical base for PulpEye vessel cell module is the patented technology for fiber wall thickness measurement. Data from the vessel Cell module's unique optics and lightning used in the camera setup are filtered and pre-processed in real time. The pictures are analyzed to separate vessel cells from fiber and by the following image processing the size and number of vessel cells per gram of pulp is calculated and presented.

OPERATION

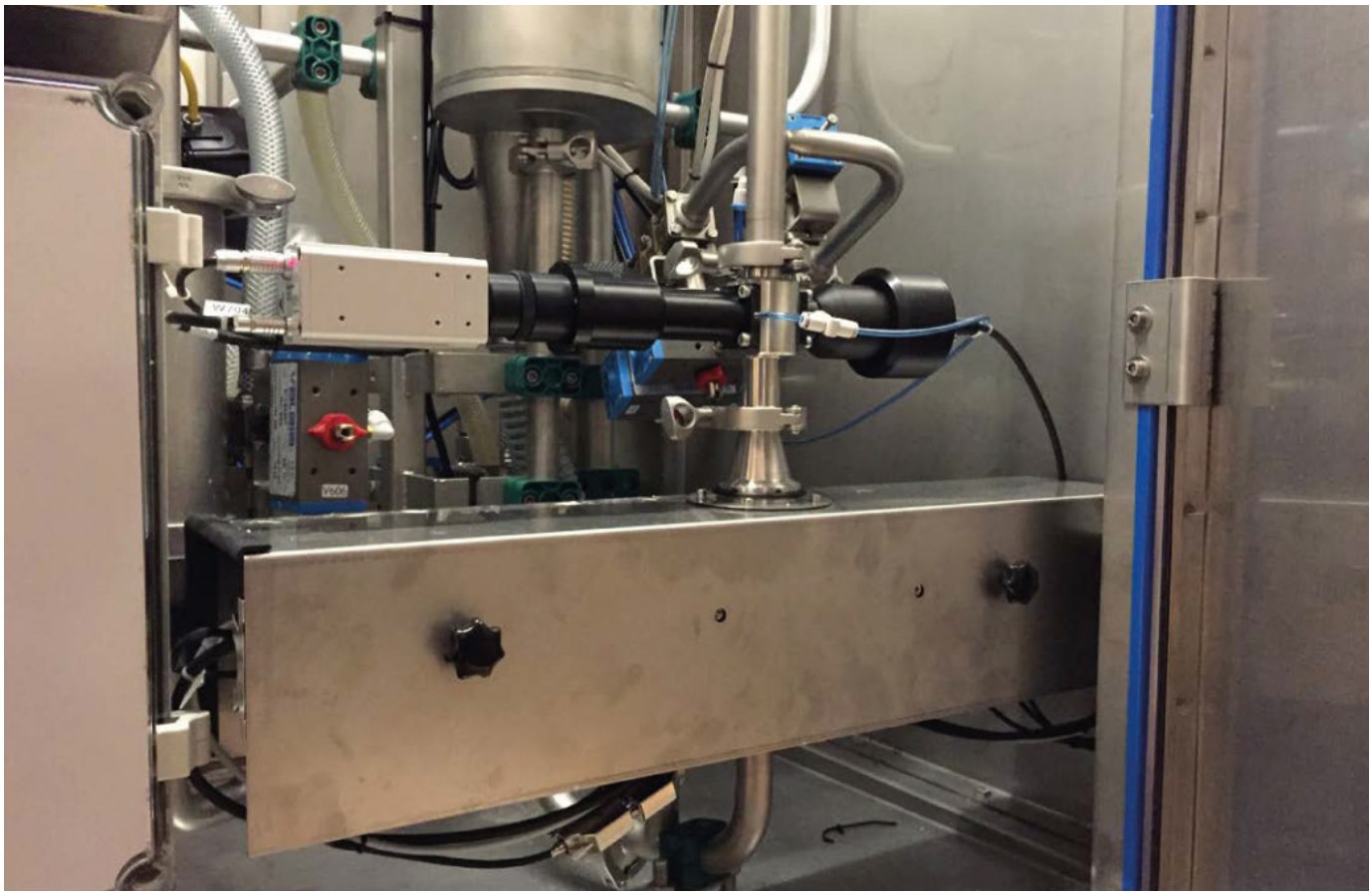
The module is integrated into the PulpEye Fiber Properties Analyzer base unit and measurements are activated from the PulpEye user interface. The PulpEye fiber/shives module is required.

OUTPUT VESSEL CELLS ANALYSIS

- Length
- Width
- Area
- Perimeter
- Volume (estimated)
- #Vessels/gram of pulp
- Estimated weight percentage
- Size distribution
- Size matrix with # vessels/gram of pulp

OUTPUT VESSEL CELLS ANALYSIS

- Optical unit including camera, RGB-LEDs, optics, rotation stage and cuvette
- Electronic box unit including computer
- LED-controller, stage-controller, switch and 24/12 VDC converter
- All parts are mounted into the PulpEye Fiber Properties Analyzer base unit



The complete optics mounted in a PulpEye cabinet.

CONTACT US FOR MORE INFORMATION

Advancing autonomous operations is our vision and is becoming an integral part of industrial processes. ANDRITZ is at the forefront of this transformation, leveraging digital innovations along with deep operational and technical expertise to improve process efficiency, quality management, and production reliability and availability.

We focus on developing autonomous pulp mills and process optimization, to support efficient and sustainable operations by combining automation, electrification, intelligent instrumentation, and digitalization to create measurable value throughout the full life cycle and the entire value stream.

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