Product Information Note

Honeywell

Extensional Stiffness Sensor Model 4225

Product Brief

Model 4225 Extensional Stiffness Sensor provides online and non-destructive measurement of paper strength, while production is in progress. It uses a proprietary technique to directly measure the physical strength of paper. Strength measurement is acquired without waiting for additional processing, avoiding waste such as end of reel sampling, lab testing, and inventory holds.

The availability of this information to the production team is very valuable. While production is in progress, Extensional Stiffness information can be used to adjust upstream variables for strength – recycle content, refining, speed, and jet-to-wire ratio. Most importantly, when strength information was infrequently available from the lab, people were less likely to respond to process changes. This real time measurement allows you to drive more value out of your process.

When process knowledge is tribal, efficiencies have barriers. The Extensional Stiffness Sensor removes these barriers. Upon implementing online strength measurements, the papermaking process will have better strength to economy

ratio. More and more process improvement opportunities will follow with the enhanced process awareness.

Manual sampling at the end of reel is infrequent. But they are necessary to qualify the end product. If process improvements are implemented with this form of measurement, a large amount of waste or downgrading will result.

Why not close the loop by measuring strength while paper is still in production?

Features & Benefits

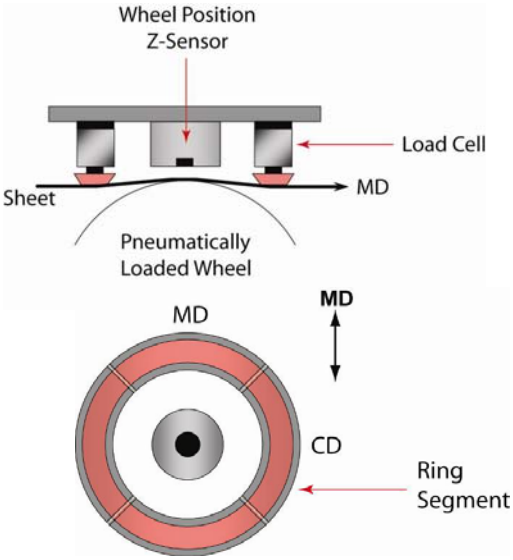
- Scan-by-scan information for online strength every 20 seconds* – no more wait for end of reel information from the lab (typically 30 – 60 minutes after reel is built).
- Calibrates to Tensile (TAPPI T494) and Tensile Stiffness Index (TSI) by non-destructive measurement, online.
- Part of QCS system – can use QCS data analysis tools, control for optimization, see profiles and trends.
- Strength information on the production floor – allows operations to anticipate dips in strength due to variations in the upstream process (OCC quality); affords production time to react during the same reel.
- Avoids overbuilding a sheet – removing the wait times for results and the associated off-production measurement variations removes the conservative behavior to overbuild to avoid rejects.
- Advanced application knowledge is growing – the non-destructive measurement will also predict a range of destructive measurements, without damage to products. This will allow complete scan-by-scan MIS information to be collected, as opposed to the current method of using a 1m (3ft) strip to determine the quality of the entire reel.

**20 seconds is a nominal scan time, actual scan time will vary up to 30 seconds.*

Description

Strength is measured from force response of a moving sheet, while a small repeated stretch is introduced in the paper. This proprietary technique will cancel out any sheet tension. This method of measuring strength does not require additional assumptions (i.e.: ultrasonic strength measurement), small sampling measurement (i.e.: end of reel), and waiting for results (i.e.: send sample to lab).

The measurement value has direct meaning, measured in the force required to stretch a certain amount of the paper [N/m]. The results are available in CD profiles and MD trend measurements. Most of all, the measurement is available immediately. The days of waiting for thousands of meters of sheet to pass by before knowing its strength are over!



Extensional Stiffness

Extensional Stiffness is a precursor to all other strength measurements and controls. The online availability and measurement of physical strength will make Extensional Stiffness the new standard. Controlling Extensional Stiffness will remove the guesswork out of other down-line strength parameters during the converting processes.

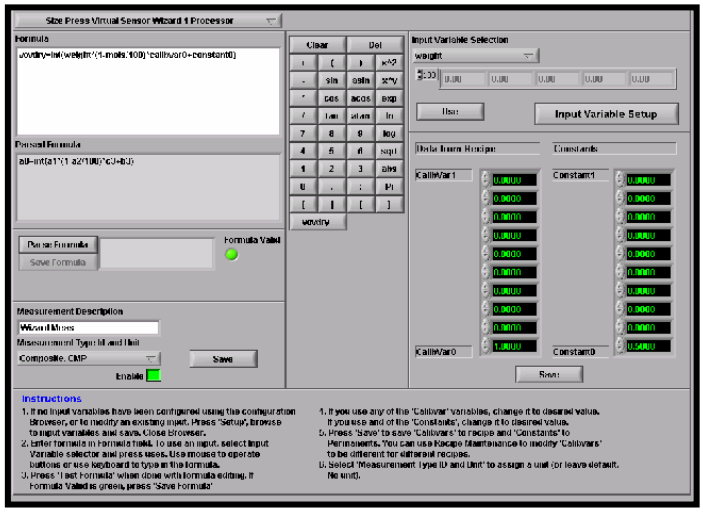
Extensional Stiffness is directly related to modulus of elasticity. This well known property is one of several common parameters to establishing strengths characteristics of materials. For papermaking, it is well suited for on-line measurement as the measurement process is non-destructive.

Other strength methods have meaning related to the way the product is used – bending, crushing, and breaking. There are several more processing and testing steps to realize these strength characteristics, such as cutting, conditioning, mounting, and handling. Undocumented variations will be introduced during these additional process steps. They will add error to the strength readings. The added variation and delays from lab data makes the manual method a poor choice for automation control and online optimization.

Extensional Stiffness Measurement exists for the benefit of Production Management. Non-value added processes, destructive testing, inventorying while awaiting results can be avoided. Testing for strength can now take place at the source, during production, at the Extensional Stiffness Sensor.

Related Products

Extensional Stiffness can be correlated to other downstream strength parameters. The DaVinci Virtual Sensor Wizard (Model 5915) will allow you to take the ESS MD & CD measurement as inputs, specify the relationship to other process variables, and turn it into your own ‘soft sensor’.



The relationships for correlations can be provided by Honeywell process experts as we develop application knowledge with the Extensional Stiffness Sensor. Other sources of application knowledge can be readily entered into the Virtual Sensor Wizard, for prediction on non-native values, as needed by mill.

Output from the Virtual Sensor Wizard can be treated like a real sensor with MD and CD profiles. These profiles can be fed into control tools for closed loop control with traditional or multivariable techniques.

Specifications

Parameter	Value
Measurement range	>100 gsm, board grades
Orientation	Load cell up or down, to suit coated grade operations
Mounting and Dimensions	CD side, 380mm [15”]; **must allow for additional 360mm [14”] personnel safety clearance**
	Total: 740mm [29”] CD; measured from head to endbell
Native Measurement Values	Tensile (TAPPI T494) TSI (L&W)
Prediction Values (non-native)	Short Span Compressive Ring Crush Bending Stiffness
Repeatability	<+/-2% additional to current lab methods

For More Information
Learn more about how Honeywell’s Precision Ash/Mineral Measurement Sensor and its benefits visit our website www.honeywell.com/ps or contact your Honeywell account manager.

Automation & Control Solutions
Process Solutions
Honeywell
2500 W. Union Hills Dr.
Phoenix, AZ 85027
Tel: 877.466.3993 or 602.313.6665
www.honeywell.com/ps

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