Product Information Note

Honeywell



Experion MX will help improve your business performance in today's challenging economic environment. This fully integrated quality control and process knowledge system provides superior visibility into the papermaking process while it simplifies your operational efforts and is easy and cost effective to maintain and service. Improve paper quality, reduce raw material, energy, services and maintenance costs, and increase production efficiency with a package of solutions that provides the lowest total lifecycle cost available – Experion MX.

Formation Measurement

The Honeywell Formation measurement provides a wider perspective on paper formation than ever before. The sensor is based on advanced illumination and image capture technology that allows a simultaneous measurement of multiple formation characters. These characters are independent of each other and form the basis for an accurate and adaptable formation analysis provided by the sensor.

The formation sensor also adjusts automatically to a wide range of speeds and product light transmission properties, and thus ensures reliable measurement results.

All contributing to improved overall performance.



Features

- The sensor can utilize a comprehensive set of formation characters for analysis:
 - o Variability

- o Light and dark spots
- MD floc size
- CD floc size
- MD/CD floc shape
- Sensor optics and illumination automatically adjust to different basis weights and machine speeds for the best image quality.
- The effect of dust and dirt build-up on the image is eliminated on-line. In case of extensive buildup, an automatic alarm is generated for operator action.
- Standard inboard sensor design allows installation in any free slot inside the sensor carriage.
- There are no moving parts in the sensor, which minimizes maintenance needs and ensures a long lifetime
- Trending and profiling capability is available for all characters.
- The latest captured images are available for operator observation. This feature quickly builds up operator confidence in measured numeric values as the image and related value is easily comparable.
- A typical image with character information representing each reel's average formation is stored for later study. This simplifies operational efforts as reel to reel comparison is very easy.
- Sample feature allows analysis of sheet samples. This information can be used for benchmarking

formation between production units and competitive products.

Superior visibility to papermaking forming process.

Description

The formation measurement is designed for online use in a hostile paper machine environment. A fast image capture allows machine speeds up to 2.200 m/min without any reduction in the analysis accuracy.

The measurement automatically adjusts the illumination for varying basis weights. This enables a reliable sensor operation up to 600 gsm sheet weights (depending on sheet light transmission properties). The intelligent algorithm removes the effect of uneven illumination, ambient light and dirt and dust build-up.

The measurement provides formation analysis based on characters derived from the captured image. Each of these characters provides an independent view of the formation. The measurement reports trends and profiles of all analyzed characters. Short and long term trends of these characters allow process monitoring and adjustment to reach the target formation for each grade in production.

The formation measurement analyzes paper formation by capturing images from a moving paper sheet. The image control unit inside the unit controls both the camera and the illumination for best possible image quality for varying machine speeds and basis weights. The captured image is analyzed with a variety of algorithms, each producing a numerical character that describes a component of formation. All these functions are carried out inside the sensor unit. The characters and a set of images captured during a sensor scan are then available in the Experion MX system.

The system displays the latest captured formation image for operator inspection and stores an image representing the reel's average formation for later study on a dedicated operator display.



Operating principle of the Experion MX Formation Measurement

Formation characters

The Experion MX Formation Measurement is capable of utilizing a comprehensive set of formation characters for analysis, including variability, light and dark spots, MD floc size, CD floc size and MD/CD floc shape.

Variability

Variability of the image is the principal character explaining formation. A low variability value indicates a good optical formation and a high variability indicates a poor formation.

Examples of images representing low and high variability character values.



Variability = 62,14



Variability = 103,63

Spots

The light-dark spots character defines the dominancy and intensity of light spots or dark spots in the captured image. If light spots are dominant, the character value is positive; if there is a dominancy of dark spots, the value is negative. The intensity is shown as an absolute value of the character.

Examples of images showing two different intensities of light spot dominant values.



Spot = +9,94



Spot = +17,90

Examples of images showing two different intensities of dark spot dominant values.



Spot = -11,75



Spot = -25,54

Examples of images with different floc sizes



MD floc size= 1,51mm CD floc = size 1,83 mm Floc shape MD/CD = 82,40



MD floc size= 2,58 mm CD floc size= 2,71 mm Floc shape MD/CD = 161,48

Floc size

The visual floc size on paper is one of the most important formation characters. The floc size is affected by the fiber mixture (average fiber length). The refining degree and water removal process are also important factors in the floc size. The floc shape (MD/CD size ratio) is affected by the jet/wire and is an indication of the MD/CD anisotropy of the paper. The formation sensor analyses the average MD and CD floc dimensions from the image and calculates the floc size ratio.

Diagnostics and Tools

The formation measurement is provided with comprehensive self diagnostics, which automatically monitors sensor performance and alerts operator for reduced functionality, excessive dirt/dust buildup or maintenance need. Maintenance and troubleshooting tools help service personnel plan service activity and guide to the source of the problem. This means easy and cost effective maintainability and service.



Jet/wire influence to Variability and floc shape.

Specifications: Experion MX Formation Measurement – Model Q4221-50

| Category | Specification | | |
|-----------------------------|--|---|---|
| Measurement range | Variability Light/ dark spots MD Floc size CD Floc size Floc Shape | Typical 40 to 150 Typical -50 to 50 Typical 1 to 3 Typical 1 to 3 Typical 70 to 130 | Range 0 to 1000 Range -200 to 200 Range 0,5 to 20 Range 0,5 to 20 Range 20 to 500 |
| Measurement area | 45 x 45 millimetres | | z |
| Measurement speed | 10 hz | | |
| Maximum ambient temperature | See sensor enclosure specifications | | |
| Machine speed range | 50 – 2200 m/min | | |

More Information

For more information on Honeywell's Experion MX Formation Measurement, visit <u>www.honeywell.com/ps</u> or contact your Honeywell account manager.

Automation & Control Solutions

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