



HPIR

The High-Performance Infrared moisture sensor is the latest step in ABB's 50-plus year history of providing innovation to the pulp and paper industry.

With HPIR's highly precise moisture measurement, mill operators can confidently use CD control for faster start-ups and grade changes. Paper-makers can shift their moisture targets closer to acceptable quality limits, saving energy and reducing fibre costs while remaining within the paper grade's quality specifications. Precision depends heavily on the number of measurements made within each databox. HPIR sets a new standard for this precision by calculating measurements 5,000 times per second. The result is less measurement noise per databox. HPIR also continues the industry-leading accuracy performance of ABB moisture measurement across the full range of a customer's paper grades.

High resolution for greater insight

Moisture streaks in a paper machine's cross direction often indicate there are problems with felts, wires, coating stations or CD moisture actuators. High resolution moisture measurement

resolves these streaks, and can also help system engineers define a better process model for improved CD control performance. The HPIR sensor measures moisture streaks as narrow as 4 mm and displays them clearly on the ABB QCS profile displays and contour maps.

Broadband performance advantage

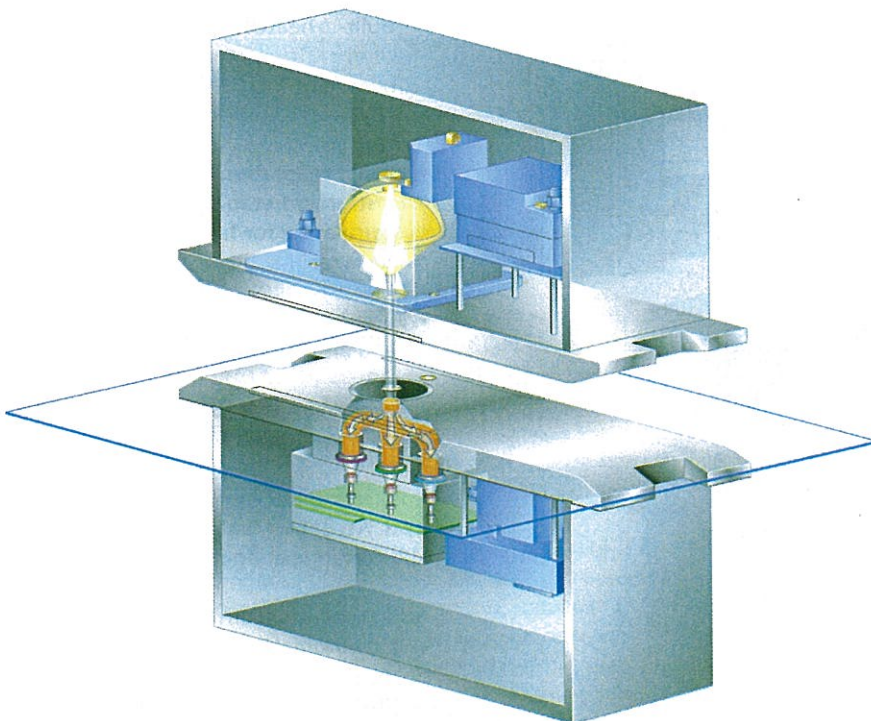
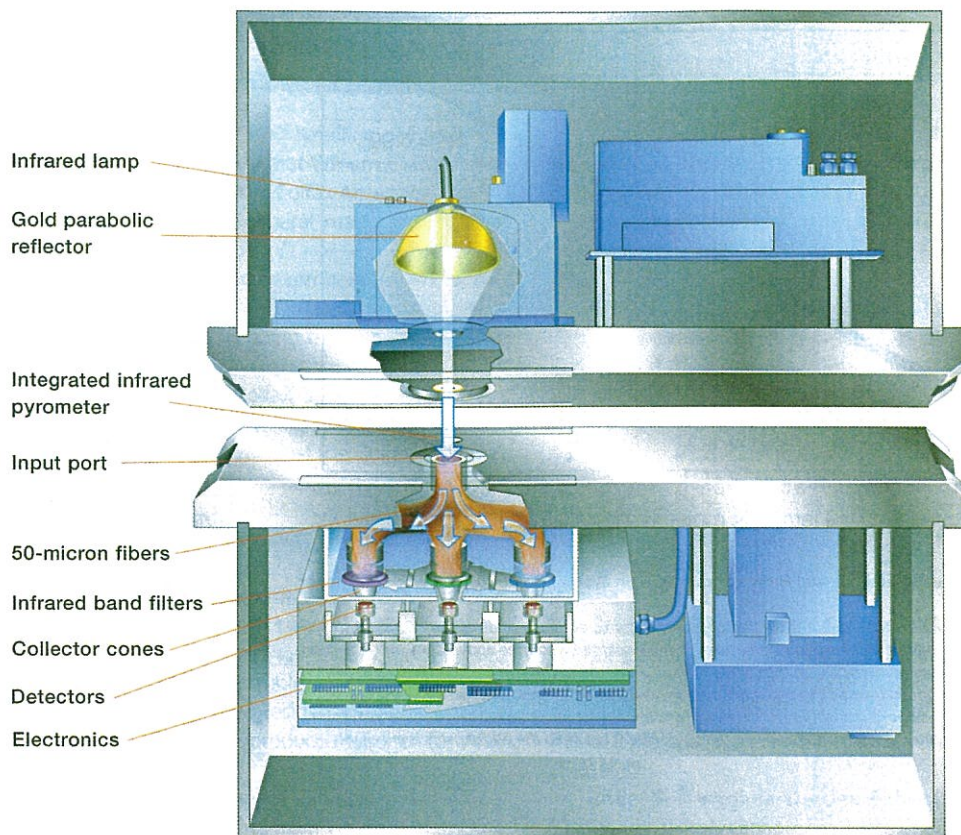
Until now, infrared moisture sensors have been designed to mechanically block the measurement beam at high frequency to suppress background radiation. Known as beam chopping, this method reduces the signal-to-noise ratio by a minimum factor of two. In addition, the chopping frequency places a fundamental Nyquist frequency limit on the measurement bandwidth. HPIR measurement is different – it does not chop. While measuring, HPIR continuously measures and simultaneously compensates for background radiation, boosting signal and measurement rate. This combination of high spatial resolution and high measurement rate ensures that HPIR

does not miss anything while providing an accurate and precise measurement of transient moisture features.

Elegant simplicity

A more reliable and robust sensor design means less paper machine downtime for troubleshooting or swapping sensors. HPIR is air-cooled and has no continuously moving parts. The sensor's modular design allows for field replacement of modules, avoiding repairs at the manufacturer's shop and eliminating the need to stock a complete spare sensor.

HPIR simultaneously analyzes multiple wavelengths of infrared energy transmitted through the sheet to provide accurate high-speed measurement of percent moisture. The infrared energy is transmitted to three Indium Gallium Arsenide (InGaAs) channels housed in a temperature controlled chamber while an algorithm computes the percent moisture using the three detected signals



High-Performance Infrared (HPIR) sensor—Elegant simplicity

The compact optical and electro-mechanical design is robust and inherently stable, ensuring high performance even in severe environments. The innovative optical design doubles the signal to noise ratio of the instrument, removing bandwidth constraints imposed by chopping to provide an industry leading moisture measurement rate.

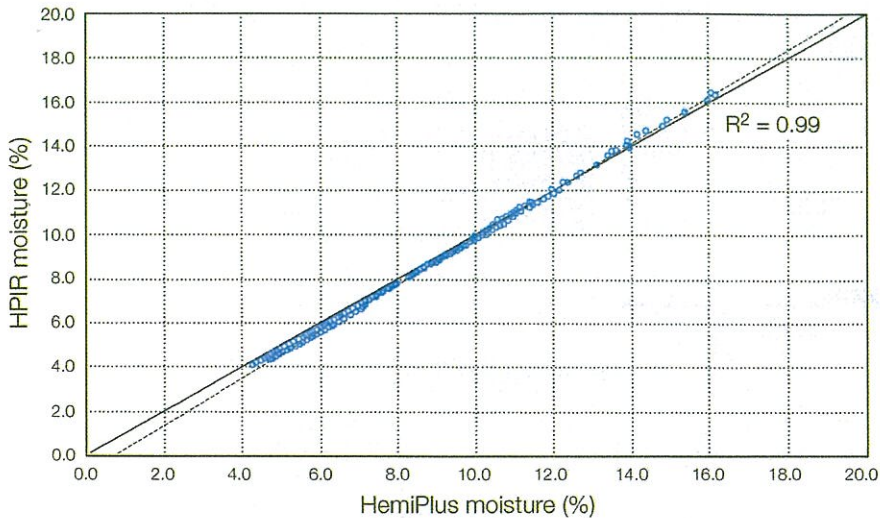
and a fourth channel from the paper's infrared Planckian radiation derived from temperature measurement. This algorithm is used to calculate percent moisture, without the need for a basis weight measurement below 350 g/m² (215 lb/3,000 ft²). The measurement is insensitive to sheet temperature, furnish variations and moisture layering.

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The Network Platform Service Workstation software monitors the health and performance of the HPIR sensor and provides robust diagnostics.

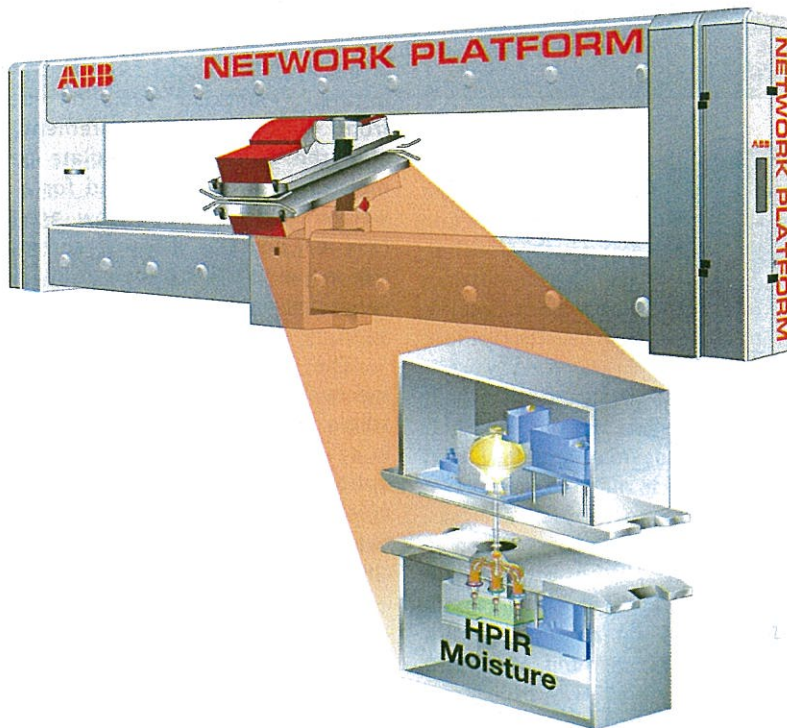
HPIR features

- High bandwidth response for each wavelength channel (minimum 5,000 moisture calculations per second).



HPIR results - Correlation between HemiPlus and HPIR 24 hours of scan averages on uncoated woodfree paper 102 to 290 g/m²

The HemiPlus Moisture sensor is well-recognized in the industry for its dynamic accuracy and minimal need for grade-dependent correlation, thus it is a suitable standard for comparison. In this uncoated woodfree application, both the HPIR and the HemiPlus sensors were operated in parallel on the same scanning platform. In this comparison, each data point is a scan average. The basis weight ranged from 102 to 290 g/m² over several grade changes. Each sensor is using a single grade-dependent calibration (single slope and offset) over the several grades. A wide moisture range was observed, from 4 to 16%. Even under these challenging conditions, it is clear that the agreement between the two sensors is excellent.



Rock solid foundation

ABB sensors, such as the HPIR, are given a rock solid foundation by ABB Network Platforms that provide scanning sensor support on processes of all sizes. Working with ABB sensors and scanners gives you outstanding process visibility coupled with the most advanced control in the industry.

Each calculation is statistically independent resulting in precise, high resolution measurement that is not affected by scan speed or sheet speed

- Continuous measurement while scanning with no beam chopping, ensuring optimum signal-to-noise ratio and maximum measurement rate
- High speed, low-noise Indium Gallium Arsenide detector technology
- Efficient optics and continuous measurement improve signal-to-noise ratio while unique high-transmission fibre optics deliver the same signal to each channel so that each channel is measuring exactly the same spot on the sheet with minimal signal loss
- Small measurement spot size (4 mm)
- True edge-to-edge measurement within 1 cm of the edge
- Temperature control of detector and source assemblies (no water-cooling), for long life and increased stability
- Built-in heated air wipes normalize the temperature in the measurement gap, eliminate condensation and prevent dust accumulation
- Linear calibration range and excellent instrument stability minimizes online correlation for fast startups and long-term results
- Factory pre-calibration for base curve and inter-instrument agreement
- ABB diagnostic tools provide easy set-up and detailed service interface

It is To find out more, contact your local ABB Account Manager and visit www.abb.com/pulpandpaper.

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