THERMO SCIENTIFIC BASIS WEIGHT SENSOR KR-85

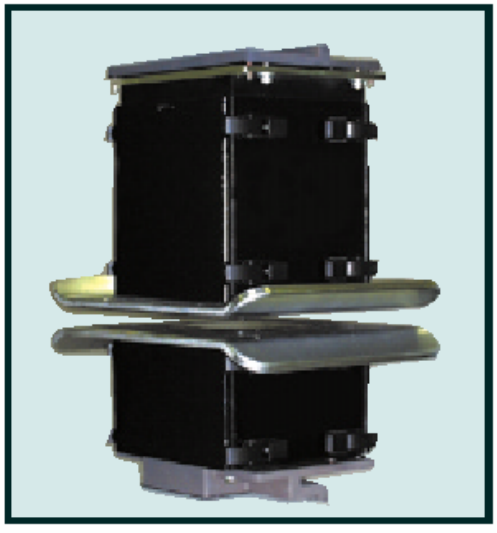
PRODUCT CLS10-00

The Basis Weight Sensor provides fast, accurate profiles of a moving web. The transmission sensor, utilizing a Krypton 85 source, is suitable for light to medium weight film, plastic and rubber sheet, coated substrates, paper, textiles, nonwovens and composite products. With reliable density information, the sensor can provide a non-contacting thickness measurement as well.

The Basis Weight Sensor is designed to provide high cross-direction resolution at fast scan speeds, without compromising absolute sensor accuracy.

Unique optics enhances the cross-direction resolution of the sensor, allowing streaks as narrow as 1.5 mm to be detected in a single traverse.

The intelligent sensor design permits advanced compensation techniques to be executed in real-time, providing accurate basis weight measurements scan-to-scan, roll-to-roll, and run-to-run. High accuracy (± 0.25%) provides tighter specifications, consistent control, and a repeatable, reliable online quality reference.



FEATURES AND BENEFITS

- Transmission sensor measures the basis weight of a suspended web
- 1250 millicurie enriched Krypton85 source provides excellent signal-to-noise characteristics and high repeatability
- Digital Signal Enhancement improves signal-to-noise ratio by a factor of four. Sensor exhibits 50–70% less noise than conventional designs
- Unique elongated source and receiver optics provide 1.5 mm streak detection
- Infra-Ray Temperature Compensation utilizes measurements at 4 points to monitor and correct for air density variations
- Measurement plateau eliminates sensitivity to dynamic offset between source and receiver
- Periodic standardization continually compensates *full* calibration range for dirt, environment, and sensor drift
- Time-based model compensates for source decay, ensuring continual accuracy over complete system life cycle

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DESCRIPTION

The Basis Weight Sensor measures the weight per unit area of a suspended web by monitoring the intensity of beta radiation, which is transmitted through the product. A Krypton 85 isotope emits beta particles (excited electrons) as a function of nuclear decay. The concentration of beta particles transmitted through the web into the ion chamber is related to the basis weight of the product. The distributed processor based upon position feedback from the scanner encoder monitors the ion chamber signal. Discrete measurements are allocated into profile segments for display, control, and reporting. Profiles are converted into customer units according to product specific calibration data.

High Intensity Source

An enriched 1250 millicurie Krypton 85 source provides high signal strength, resulting in excellent repeatability (0.1% repeatability). The sensor exhibits 50-70% less noise than conventional designs. The unique source geometry, which is elongated in the machine direction, allows high cross-direction resolution without compromising absolute accuracy.

Streak Resolution

The sensor exhibits a time constant of less than 10 milliseconds; allowing high-resolution profiles to be generated at fast scan speeds. The sensor processor utilizes a unique enhancement algorithm, which improves the signal-to-noise ratio by a factor of 4 without a degradation of sensor response. The digital enhancement techniques, fast sensor response, and elongated source enable detection of streaks as narrow as 1.5 mm.

Measurement Plateau

Proprietary sensor optics provide a measurement plateau that exceeds the mechanical frame runout tolerances by 300%. The plateau eliminates sensitivity to X, Y, and Z spatial deviations between the source and receiver heads, which can occur as the sensors traverse.

Temperature Compensation

Infra-Ray Temperature Compensation monitors the temperature at four points and corrects for air density changes in real-time. Two high-speed thermotectic devices, smooth-sealed in each sensor head, continually monitor the temperature in the air gap. The temperature of the source and receiver head is monitored as well, allowing the system to compensate for air density changes, which can occur in the internal air columns.

Standardization

In order to ensure accuracy scan-to-scan, roll-to-roll, and run-to-run, the system periodically executes a standardization procedure which compensates for dirt buildup on the windows, environmental and electrical dynamics, and source decay. Open-shutter air gap and closed-shutter measurements monitor the effect of dirt, environmental changes, and electronic drift. A time-based model calculates the impact of source decay, so that the *full* calibration curve can be modified in order to compensate for any dynamic effects. This compensation ensures accuracy throughout the full sensor measurement range, guaranteeing that the system always provides a standard quality reference.

SPECIFICATIONS

Source strength:	1250 mCi Kr-85
Measurement range	0-1000 g/m2
Repeatability	± 0.1 g/m2 or ± 0.1%
Accuracy	± 0.15 g/m2 or ± 0.25% (2 sigma)
Measurement footprint:	7.6 mm x 38.1 mm (0.3 in x 1.5 in)
Response time: @ Preamp	10 msec
Streak resolution: -	1.5 mm (1/16 in) in the cross-direction
Air gap:	16 mm (5/8 in)

For use on SFM10-XX Mark III Industrial Scanner

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