

GAMMA BACKSCATTER SENSORS

Model 100

Fixed Point or Scanning Measurement of Thickness or Basis Weight

- Applications:**
- ▶ Blown film
 - ▶ Cast film and sheet
 - ▶ Rubber and vinyl
 - ▶ Coatings and laminates
 - ▶ Textiles and nonwovens
 - ▶ Composites

- Features:**
- ▶ Compact measurement form factor
 - ▶ Single-sided measurement
 - ▶ Continuous measurement without the need for standardization
 - ▶ Stable, accurate product measurement against either air or a steel roll
 - ▶ 100% digital measurement technology



Introduction

The NDC Backscatter Gamma sensor (GBS) is an integrated source and detector instrument that provides a thickness or weight measurement from one side of the sheet. Its compact size allows product measurements to be taken from areas of the process that are often inaccessible to conventional sensors. It can also be configured to either measure in fixed point or to scan the web.

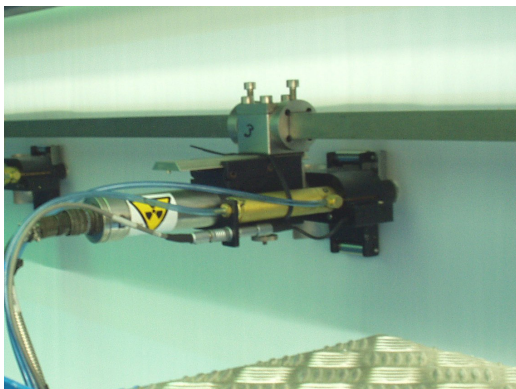
Compared to other gauging techniques, the GBS sensor offers a robust, cost-effective measurement solution that is reliable, accurate and easy to maintain.

Theory of Operation

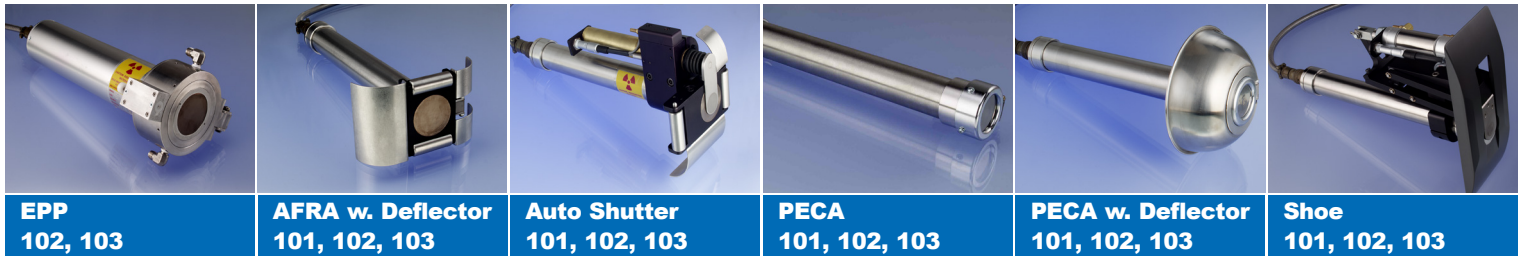
This unique sensor employs the Compton Photon Backscatter measurement principle known as gamma backscatter, or GBS. When gamma rays of photons are directed at a

material, many of the photons are scattered back, losing some of their energy in the process.

These backscattered photons strike a 100% efficient scintillator detector that produces flashes of visible light. These light flashes enter the photomultiplier tube where they are converted into electrons and amplified. The output from the photomultiplier tube is a train of pulses whose height is proportional to the energy of the detected gamma photons, and whose pulse rate (pulses per second) are proportional to the mass (or weight per unit area) of the material being measured.



Technical Specifications



Gamma Backscatter Sensor Product Overview

EPP: Extended Plateau Probe for non-contacting applications.

AFRA: Anti Friction Roller Assembly: Roller Head Assembly to minimize chance of scratching or marking the web

Auto Shutter: Includes an integral automated shutter assembly as required by certain local authorities.

PECA: Position End Cap Assembly for positive measurement contact. Frequently used for blown film applications.

Shoe: Used when a large surface area is required for an application, for example nonwovens.

Linear Calibration

The GBS sensor is inherently easy to set up and calibrate, making it a valuable sensor especially when it is installed in difficult process locations. The linear response of the sensor makes it very easy to calibrate. Often, a single response curve is all that is required, with a straightforward offset or slope adjustment in order to fine tune the measurement to the product.

Long-Term Accuracy

Unlike other types of gauges, the GBS sensor is not affected by air gap temperature changes. Also, the sensor provides continuous measurement, either in fixed point or scanning modes, without the need to standardize. In addition, the GBS sensor family are relatively insensitive to factors that affect other gauges such as source decay, dust, material composition and scanner alignment. This results in exceptionally stable measurement with long-term accuracy that requires very little maintenance.

Specifications

Measurement Ranges*

Model	Weight Range	Thickness Range
103	25-2000g/m ²	25-2000μ (1-80mils)
102	1500-8510g/m ²	1500-8510μ (60-335mils)
102 Steel	1500-6350g/m ²	1500-6350μ (60-250mils)
101	6350-26000g/m ²	6350-26000μ (250-1025mils)

Static Accuracy:

- Model 103: ± 1.0g/m² + 0.2% of reading
- Model 102: ± 2.5g/m² + 0.2% of reading
- Model 101: ± 5.25g/m² + 0.5% of reading

Measurement Response Time: 50ms

Maximum Temperature: 122°F (50°C) without water cooling

Source Characteristics:

- Am-241: activity between 25-150mCi (0.93-5.55GBq)
- Energy: 60keV
- Half life: 455 years
- Recommended Working Life (RWL): 15yrs

Measurement Area: Approximately 0.50ins (12.5mm) for all gauges except EPP which is 1.1ins (28mm)

Options:

- Air purge for hazardous environments
- Automatic, remote activated shutter
- Water cooling for high temperature environment
- Off-roll measurement
- Extended plateau non-contact version

***Notes:** Stated ranges are intended to reflect the typical weight or thickness. It may be possible to make acceptable product measurement outside these limits. In these cases, please contact NDC Marketing regarding your product and measurement requirements.

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