



TEXTILE



NONWOVENS



PAPER

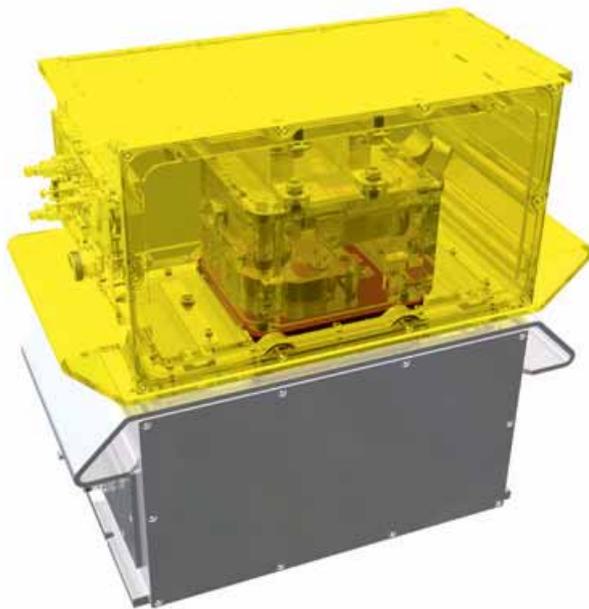


PLASTIC

## SENSORS

# GRAVIMAT DFI

BASIS WEIGHT (MASS PER UNIT AREA) / THICKNESS



### Applications

The Mahlo® DFI (Dynamic Flutter Independent) beta sensor uses a revolutionary new sensing technique that allows:

- Complete insensitivity to web flutter throughout the entire measurement gap.
- The smallest beta sources and the highest measurement performance.
- Very fast scanning speeds with ultra-narrow web defect detection.
- Long-term trouble free, cost effective operation in the harshest environments.

Virtually all web processes have problems with maintaining consistent flatness. Cast, extruded and calendered film and sheet exhibit ripples and flutter due to line tension changes, static electricity or in-line vibration. Paper and coating converters must deal with baggy substrates, edge curl and distances of unsupported web. Nonwovens and textile manufacturers see variations in the loft, density and thickness of their webs which result in center of mass changes.

### Product-highlights

- ✓ Intelligent sensor with ultra-fast microprocessor for pre-processing measurements
- ✓ Precise measurements as a result of using extremely efficient beta radiation detectors
- ✓ Four temperature-compensation sensors along with air pressure compensation
- ✓ Robust, sturdy emitter housing meets the most stringent safety regulations
- ✓ Variable measuring gaps to suit customer requirements

All of these conditions result in measurement errors with traditional transmission sensors like X-ray or beta gauges. Backscatter sensors like gamma or X-ray are even more sensitive to web movement and some are even required to contact the web!

The new Mahlo® patented DFI Beta Sensor is not affected by web flutter, passline change, ripples, sag or edge curl. The DFI measures accurately throughout changes in loft, density or thickness.

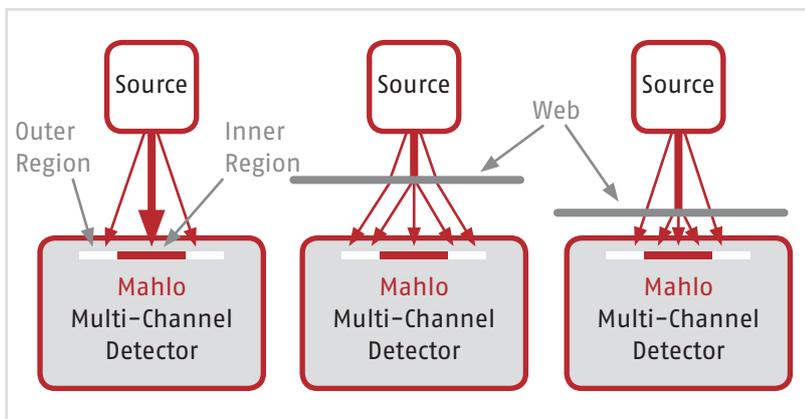
### Principle of operation

The Mahlo® DFI uses a multiple detector technique that captures the full measurement signal regardless of where the web is within the gap. The resulting measurement is determined only by the basis weight, not by the position of the web in the measurement gap. This solution is quite simple and industrially rugged, but it is completely effective. So effective in fact, that Mahlo® has been awarded international patents for the DFI.

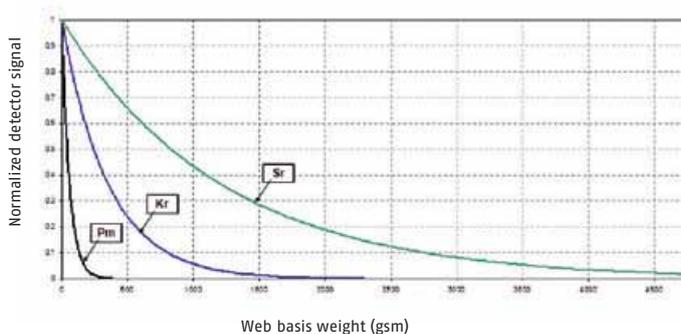
No heavy absorbers or highly radioactive sources are necessary. Mahlo® supplies its Kr85 DFI with only 260 mCi or smaller sources, yet the accuracy, speed and resolution of the Mahlo® DFI are the best yet offered.

An additional advantage of the Mahlo® DFI is that measurement gaps can now be substantially increased without worrying about additional web movement. Soft, easily damaged webs, or wet coatings no longer need to run the risk of contacting the sensor due to a narrow gap. The Kr85 DFI can use measurement gaps of 2 inches and more while measuring even light weight webs!

Principle of operation, unaffected by web position



Gravimat DFI sensor response curve



**RELIABILITY**

Our components do exactly what we build them for: hour after hour, year after year. Our design team ensures that the central nervous system of our equipment always works without interruption. So that you always reach your objective.

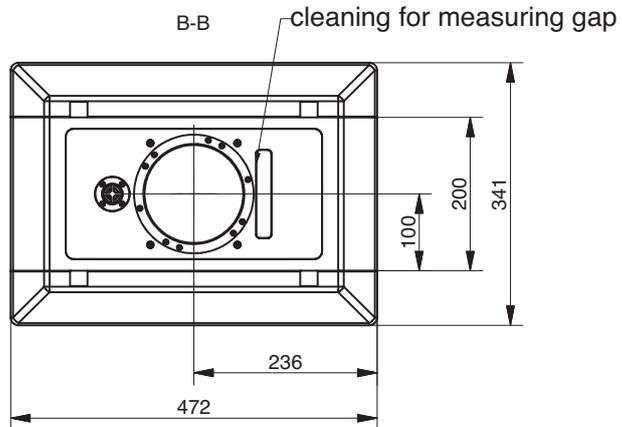
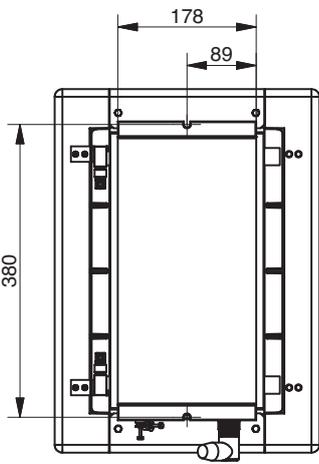
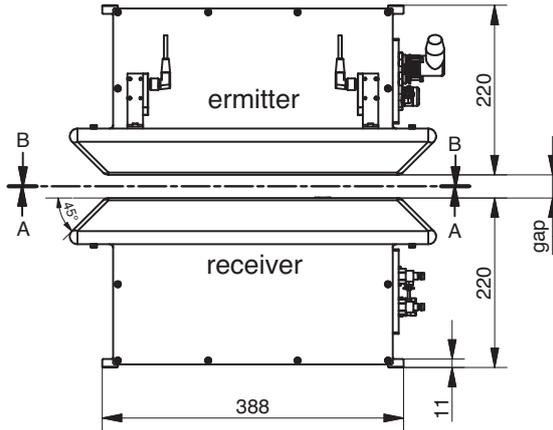
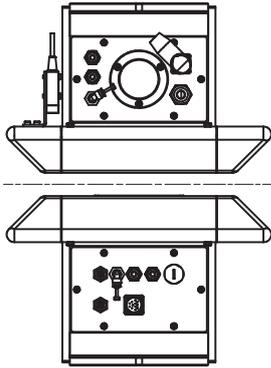
**Customer benefits**

- ✓ Non-destructive, continuous determination of the weight per unit area of product webs
- ✓ Highly stable and accurate measurement along with a minimum need to calibrate
- ✓ The DFI allows wider measurement gaps and avoids damage to soft webs or wet coatings
- ✓ Wide measuring range through use of various isotopes

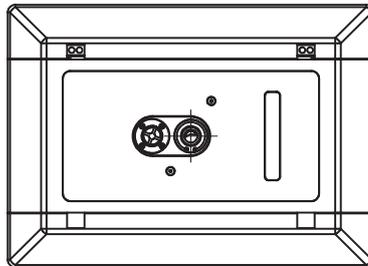
## TECHNICAL DATA | GRAVIMAT DFI

Sensor	Gravimat DFI		
Isotope	Promethium-147	Krypton-85	Strontium-90
Activity	1000 mCi (37 GBq)	400 mCi (15 GBq) or 260 mCi (9.6 GBq) or 80 mCi (2.9 GBq)	20 mCi (750 mBq)
Range (basis weight) (grams / square meter)	2.5 - 160 g/m <sup>2</sup>	10 - 1400 g/m <sup>2</sup>	100 - 5000 g/m <sup>2</sup>
Repeatability (2 $\sigma$ , 1 s) (the greater)	$\pm 0.05$ % or $\pm 0.05$ g/m <sup>2</sup>	$\pm 0.1$ % or $\pm 0.1$ g/m <sup>2</sup> (80 mCi: t = 4 s)	$\pm 0.3$ % or $\pm 0.5$ g/m <sup>2</sup>
Measurement gap	10 - 20 mm	10 - 100 mm	10 - 100 mm
Temperature compensation	At 4 locations (source and detector enclosures, measurement gap at source and detector faces)		
Barometric compensation	Electronic, included in C&D console		
Passline / Flutter tolerance	100 % of measurement gap from 10 - 40 mm (minimum of 2.4" within larger gaps)		
A/D conversion resolution	16 bit (1/65536 FS)		
Power supply	24 V DC		
Maximum ambient conditions	Max. 60° C, 0 - 95 % relative humidity (non-condensing) higher temperature applications upon request		
Maximum current useage	Source max. 1 A (continuous: 0.5 A)	Detector max. 2 A (continuous: 0.3 A)	

Dimensions



A-A



GRAVIMAT DFI sensor  
91-015583