

LOW ENERGY X-RAY SENSOR

Model 312B-L for On-Line Thickness and Basis Weight Measurement

The intelligent Low Energy X-ray Sensor is a new member of NDC's portfolio of productivity solutions. Ideally suited for thickness measurements of light weight products such as stretch film, flexible packaging, battery separators and nonwovens, this X-ray transmission sensor brings a new level of performance while not requiring licensing in most countries.

Applications:

- ▶ Extruded Film and Sheet
- ▶ Coating & Converting
- ▶ Calendered Products
- ▶ Aluminum Foil
- ▶ Nonwovens

Features:

- ▶ High reliability, fast and accurate measurement
- ▶ Wider operating weight/thickness range than comparable isotopic gauges
- ▶ Precisely regulated high-voltage supply for excellent measurement stability
- ▶ High scan speed (up to 500 mm/20 inches per second)
- ▶ Non-nuclear gauge minimizes regulatory requirements
- ▶ Low-energy X-ray requires minimal shielding
- ▶ Zero radiation hazard when powered down
- ▶ No degradation of measurement accuracy over time



Optimized for the Highest Performance

NDC's X-ray transmission sensor is designed to provide measurement performance that meets the exacting requirements of plastics extrusion, converting, calendering, nonwovens and textile applications.

Three versions of X-ray sensors are available with different measurement capabilities. The high-resolution 312B-N-L offers excellent, narrow streak resolution and is suitable for most measurement applications.

The ultra-high resolution 312B-XN-L offers even narrower streak resolution down to 0.5 mm. This small beam size enables sharp streak detection and is well suited for calendering applications. Its optimized geometry provides precise measurement through its ability to tune the X-ray tube for maximum resolution.

The ultra low-noise 312B-W-L has a larger measurement patch size of 10 x 19 mm and offers excellent performance in applications such as nonwovens and thin films.

How it Works

The X-ray absorption properties of the material permit accurate measurement over a wide range compared to nucleonic sensors.

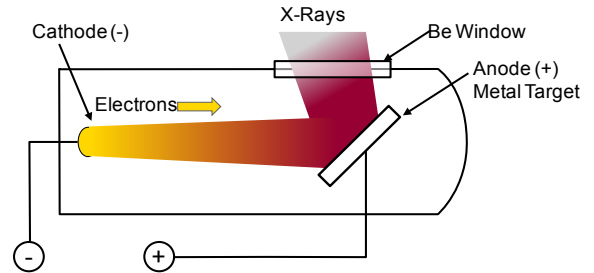
NDC's X-ray tube features a stable, precisely-tuned power supply running at or below 5 keV that provides high signal-to-noise characteristics and optimum measurement performance. The high-voltage power applied to the X-ray tube cathode generates a stream of electrons that are accelerated toward a metal anode target. Once the electrons hit the metal target, X-rays are released at energies proportional to both the voltage applied and the nature of target material used.

X-ray Tube Operation

The X-rays pass through the product and into an ion chamber where the residual photon energy is converted to an electrical signal that is inversely proportional to the product weight. In common with most thickness and weight sensors, the X-ray sensor calibration is optimized

according to material composition via a simple recipe factor. This is significant in cases where the material to be measured contains additives with high atomic number elements. Please consult NDC to determine whether the X-Ray sensor is the most appropriate gauge for the application.

Head Size: 220 W x 195 H x 330 L mm (8.7 x 7.7 x 13.0 in) top & bottom



Specifications

Operating Temperature: NDC X-ray transmission sensors require cooling water supplied by the user. In applications where ambient on- or off-sheet temperatures at the X-Ray sensor location do not exceed 50°C (120°F), clean demineralized cooling water must be supplied at a minimum flow rate of 2 Liter (0.5 Gallon) per minute at a maximum temperature of 21°C (70°F).

Air Supply Requirements: All NDC X-ray sensors use an air-actuated shutter for safety and operation purposes. The actuator requires that clean, dry oil-free "instrument quality" compressed air be supplied by the user in order to operate properly over its life.

Construction: The exterior housing is an aluminum casting. The interior houses a precisely regulated power supply and X-ray tube (transmitter) and a high-efficiency ionization chamber (receiver).

| Parameter | 312B-N-L | 312B-XN-L | 312B-W-L |
|---|--|--|--|
| Measurement Range* | 1 - 1,000 g/m ² | 1 - 1,000 g/m ² | 1 - 1,000 g/m ² |
| Nominal X-ray tube energy (Tuneable) | less than 5 keV | less than 5 keV | less than 5 keV |
| Window | 6 x 19 mm (0.24 x 0.75 in) | 3 x 19 mm (0.12 x 0.75 in) | 10 x 19 mm (0.4 x 0.75 in) |
| Air Gap | 20-25 mm (0.79-0.98 in) | 20-25 mm (0.79-0.98 in) | 20-25 mm (0.79-0.98 in) |
| Static & Dynamic** Reproducibility | ±0.05 g/m ² or ±0.035% whichever is greater | ±0.05 g/m ² or ±0.035% whichever is greater | ±0.05 g/m ² or ±0.035% whichever is greater |

NDC published specifications conform to CEI/IEC 1336:1996.



CAUTION X-RAYS: Model 312B-L Series
This device produces ionizing radiation when energized. For operational safety, the customer must agree to comply with local government regulations regarding X-ray devices and to follow NDC-provided safety shielding guidelines.

* The measurement range can be extended to 2,600 gsm.

Consult NDC for specific applications and measurement performance.

** The dynamic reproducibility specification reflects the weighted mean of all possible sources of dynamic error, including the maximum allowable sensor X-, Y- and Z-Axis misalignment, passline/flutter variation, temperature change, etc.

NDC Technologies is represented in over 60 countries worldwide. www.ndc.com

a **spectris** company

NDC Americas

Tel: +1 626 960 3300
Email: info@ndc.com

NDC Belgium

Tel: +32 4 239 90 10
Email: sales@ndcinfraed.be

NDC Japan

Tel: +81 3 3255 8157
Email: ndcjapan@ndc.com

NDC Italy

Tel: +39 0331 454 207
Email: ndcitaly@ndc.com

NDC India

Tel: +91 9890800697
Email: ndcindia@ndc.com

NDC United Kingdom

Tel: +44 1621 852244
Email: enquiries@ndc.com

NDC China

Tel: +86 21 6113 3609
Email: info@ndcinfraed.com.cn

NDC Germany

Tel: 08001123194
Email: info@ndcinfraed.com

NDC Singapore

Tel: +65 91994120
Email: apacsales@ndc.com



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