IG710S and SR710S Sensors

NIR Measurement Technology for the Coating and Converting Industries

**Applications:**
- PSA labelstock coating
- Tapes
- Coated paper and film
- Laminates
- Thermal lamination films
- Solar films
- PVDC coating
- Laquer on aluminum foil
- Flexible packaging
- Industrial packaging
- Silicon release liners
- Poly coating
- Steel and aluminum coating

**Features:**
- IG710S: A versatile IR gauge for the measurement of moisture, coat weight or coating/laminate thickness on a wide range of paper, board and film-based substrates
- SR710S: Specifically engineered for measuring thin coatings on metal foils, steel coils, metolized paper or plastics using a unique patented design

The IG710S and SR710S non-contacting precision infrared gauges provide high-resolution measurements of coatings, laminates and moisture. Both gauges represent a non-nuclear solution and do not require special licensing or protection guards. These gauges combine high-speed measurement performance with accuracy to achieve robust, reliable measurements on a fast-moving web. Their selective infrared technologies enable either fixed-point or scanning coat weight measurement without the need for the extra hardware required by subtractive methods.

With a 7.5 millisecond measurement speed (up to 10 times faster than other IR gauges), their patented design achieves improved resolution, speed and accuracy. When incorporated into an NDC TDi web gauging system, they provide the industry’s best cross-web and machine direction profiling performance, for superior quality and productivity.

Both the IG710S and SR710S gauges are engineered to be unaffected by changes in process and ambient conditions such as:
- Lighting fluctuations
- Temperature
- Relative humidity
- Air quality: Dust, evaporates content etc.
- Web flutter

This also includes subtle changes that can occur within the substrates from batch to batch.
IG710S
A versatile IR backscatter gauge for measuring coatings, laminates and moisture on a wide range of substrates

IG710S
The IG710S delivers cost-effective measurement solutions through its ability to use selective NIR wavelengths to measure key value-added coatings and moisture content in converted products.

Pre-calibrated Delivery
The IG710S is delivered pre-calibrated for each application and is highly tolerant to the changing conditions found in the converting industry. This gauge combines low cost of ownership with long-term stability without the need for re-calibration, systematic monitoring or correction for drift.

Unique Optical Design
The gauge's patented optics are able to tolerate web flutter of the order of ± 50mm (± 2.0ins) and the robust NDC measurement algorithms provided with each application mean that it is insensitive to within-product variations such as color and basis weight. Gauge adjustments, when required, are very straightforward compared to other gauges offering similar technologies.

Measurement Capabilities
The IG710S has extensive and versatile measurement capabilities, including:

- Moisture in paper, textiles and nonwovens
- Water-based coatings and other organic coatings on paper
- Extruded or laminated polymers on paper or board
- Clear and pigmented coatings

Applications
With its flexible measurement capabilities, the IG710S can be used across a wide range of applications, including the following types of coatings:

- Water or solvent-based
- Solvent-less
- Wax dip
- Impregnation
- Polymer extrusions
- Barrier coatings
- Lacquers
- Hot melt

NDC TDi Systems: Delivering the process visibility and control required to provide greater production, quality and process efficiency.

NDC’s “Total Distributed Intelligence” Systems use a robust, easy-to-install architecture with minimal hardware that is reliable easy to maintain.

As part of the TDi System the IG710S and SR710S function as “i-Sensors”. These are “smart” devices with the signal processing carried out in each gauge’s high-speed embedded processor prior to the operator consoles and control devices on the network.

The same is true for the scanning frames, such that when position data from a scanning frame is combined with measurement data from a sensor, the resulting profile accurately represents the position of streaks and cross-machine control zones.

This provides reliable data for effective process control for a fast return on investment from the system.
SR710S
Incorporates a unique patented design specifically engineered for measuring thin coatings on metals and metalized substrates

High-Precision Performance
The SR710S delivers exceptional measurement precision of thin organic coatings on metals and metalized substrates. These coatings may be just a few microns (or mils) thick, but the combination of more intense mid-IR wavelengths plus the high-sensitivity detector used in the SR710S, means the gauge can accurately measure down to 0.1 microns, while remaining unaffected by changing ambient and process conditions.

Cost-Effective Measurement
The SR710S is able to accurately measure very thin, high value-added coatings that have been difficult to gauge with alternative technologies. The combination of its compact form factor, performance and ability to measure coatings directly, make it significantly more cost effective than alternative measurement technologies; for example multi-scanner X-ray or beta gauge configurations that employ subtractive techniques to calculate the coat weight.

NDC710S and SR710S Advantages
Both gauges can be installed on NDC’s MiniTrak-S scanners and integrated into an NDC 8000 TDi System. These platforms include operator display and control options that provide tangible financial cost, quality and productivity benefits. These systems are configured specifically for each application and are able to deliver a range of benefits including:

- Reduced product change and start-up times
- Tight machine-direction and cross-direction coating thickness control
- Reduced raw material consumption
- Reduced drying costs
- Enhanced product quality and consistency

Measurement Techniques
The NDC710S and SR710S gauges operate on the principle that water and organic products, such as coatings, absorb near-infrared light (NIR) at specific wavelengths. When exposed to this NIR light, a product will absorb a proportion of this energy depending upon the active constituent that is present.

The gauges generate and emit specific wavelengths using rotating optical filters to transform the energy from a quartz halide (QH) lamp into sequential pulses of NIR light at the desired wavelengths. The reflected light is captured by a special mirror and focussed onto a light-sensitive detector. Before leaving the gauge, a beam splitter diverts a portion of the beam to the secondary detector, to form the reference signal against which the light will be compared.

The difference between the IG710S and the SR710S relates to the substrates they are able to measure. The IG710S captures diffuse-reflected energy, while the SR710S makes use of the reflectivity of metallic substrates to direct infrared energy through the coating.
## Technical Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>IG710S</th>
<th>SR710S</th>
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</thead>
<tbody>
<tr>
<td><strong>Measurement capabilities</strong></td>
<td>- Moisture in paper (40g/m²-150g/m²) basis weight: 0-12%</td>
<td>- Thin organic coatings on foils</td>
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<tr>
<td></td>
<td>- Adhesives and other organic coatings</td>
<td>- Wax or lubricant on steel</td>
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<tr>
<td></td>
<td>- Water-based coatings on paper and films</td>
<td>- Adhesives on aluminium foil or metallized papers</td>
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<tr>
<td></td>
<td>- Resin coatings</td>
<td>- Lacquers on metals/metallized substrates</td>
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<tr>
<td></td>
<td>- Extruded coatings on paper and board</td>
<td>- Extruded polymers on metals</td>
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<tr>
<td></td>
<td></td>
<td>- Organic based coating on steel</td>
</tr>
<tr>
<td><strong>Gauge to product distance</strong></td>
<td>200mm (8 inches)</td>
<td>28mm (1.1ins)</td>
</tr>
<tr>
<td><strong>Accuracy</strong></td>
<td>±0.10% : Moisture 0-12%</td>
<td>±0.05g/m²: Coatings up to 2g/m²</td>
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<tr>
<td></td>
<td>±0.20g/m²: Coatings up to 50g/m²</td>
<td>±0.10g/m²: Coatings up to 5g/m²</td>
</tr>
<tr>
<td></td>
<td>±0.50g/m²: Coatings 50g/m² up to 500g/m²</td>
<td>±0.20g/m²: Coatings 2g/m² up to 20g/m²</td>
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<tr>
<td></td>
<td></td>
<td>±0.30g/m²: Coatings 10g/m² up to 40g/m²</td>
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<tr>
<td><strong>Repeatability</strong></td>
<td>±0.10μ 2-sigma over 48hrs</td>
<td>±0.01μ 2-sigma over 48hrs</td>
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<tr>
<td><strong>Product pass height tolerance</strong></td>
<td>±50mm (±2 inches)</td>
<td>±5mm (±0.2ins)</td>
</tr>
<tr>
<td><strong>Beam spot size</strong></td>
<td>25mm (1 inch) circular 10mm (0.4ins)- square (optional)</td>
<td>30mm x 15mm (1.2ins x 0.6ins elliptical)</td>
</tr>
<tr>
<td><strong>Response time</strong></td>
<td>Up to 7.5 milliseconds based on application</td>
<td></td>
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<tr>
<td><strong>Calibration</strong></td>
<td>SpeedCalTM pre-calibrated. No routine re-calibration required</td>
<td></td>
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<tr>
<td><strong>Reliability</strong></td>
<td>Sensor MTBF of 10yrs</td>
<td>Lamp and motor have 5yr warranty</td>
</tr>
<tr>
<td><strong>Network connectivity</strong></td>
<td></td>
<td>Industrial Ethernet</td>
</tr>
<tr>
<td><strong>Electrical</strong></td>
<td></td>
<td>Power 24V at 42 Watts</td>
</tr>
<tr>
<td></td>
<td>CE compliant to low Wattage directive eurostandard: EN61010-01</td>
<td>and for electro-magnetic compatibility: EN50081-1 &amp; EN50082-2</td>
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<tr>
<td><strong>Environmental</strong></td>
<td></td>
<td>Ambient temperature: Up to 50°C (Cooling optional)</td>
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<td></td>
<td></td>
<td>Cast alloy sensor housing</td>
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<tr>
<td><strong>Maintenance</strong></td>
<td></td>
<td>No routine maintenance is required</td>
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<tr>
<td></td>
<td></td>
<td>Active diagnostics and integral window contamination monitor included</td>
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In line with its policy of continuous improvement, NDC reserves the right to revise or replace its products or services without prior notice. The information contained in this document may not represent the latest specification and is for indicative purposes only.

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