Thermo Scientific PROSIS thickness sensor

Infrared measurement and control solution for single and multilayer gauging applications
PROSIS history
The Thermo Scientific™ PROSISTM thickness sensor is one of the most innovative measurement solutions within the range of Thermo Scientific web gauging products. Building off a legacy that started in the 1940s as Tracer Labs to products brought to the market under the LFE, Aeonic, Eberline, Radiometrie, Eurotherm and EGS brands, over 10,000 Thermo Scientific measurement and control solutions have been shipped throughout the world. Each solution provides material savings and increased line utilization over a vast array of applications. Headquartered in Erlangen, Germany with sales and service resources located throughout the world, we have a complete suite of product and services to support the customers’ gauging measurement and control requirements. Whether it is extending the life of a legacy platform, meeting traditional web and metals gauging needs, or adapting our building blocks to address a new application, we are your gauging partner.

Applications
• Paint coatings
• Coil coatings
• Roll coating
• Biaxial extrusion
• Cast film
• Extrusion coating
• Sheet extrusion

The PROSIS thickness sensor is available in both transmission and reflectance modes. The measurement is based on the absorption of light by the materials to determine the resulting thicknesses. Each material exhibits a unique light absorption characteristic and emits a signature waveform (spectra) as light passes through it. As material thicknesses change, the spectra will change throughout the infrared wavelength spectrum. Because of this, the PROSIS thickness sensor is uniquely designed to inspect the entire infrared spectrum to accurately measure thicknesses of both single layer and multilayer products. This technique enables the PROSIS thickness sensor to discriminate between different components even if they exhibit very similar IR absorption characteristics, whereas it is almost impossible for competing filter wheel IR sensors with limited resolution to sense the critical differences. Coupled with state of the art electronics and intuitive, easy to use software, the PROSIS thickness sensor provides the best measurement performance and highest resolution in the industry. It also features a robust design with no moving parts for durability and long life.

PROSIS light source
Organic material
PROSIS spectral analysis
Thickness measurement

Each solution provides material savings and increased line utilization over a vast array of applications.
**Features and design**

**Typical applications for PROSIS IR transmission sensor**

- **Optical grade film – triacetate cellulose (TAC) film**
  - Typical measurement: Best measurement of TAC film in both wet and dry stages for highest optical quality

- **Multilayer lay-flat blown film**
  - PET
  - PE
  - PA
  - Typical measurement: 1. PET layer 2. PE layer 3. PA layer 4. Total

- **Multilayer extrusion coating / lamination**
  - Polyethylene
  - Modified polyethylene
  - Tie
  - EVOH
  - Typical measurement: 1. Barrier layer (EVOH) 2. Total skin layer (PE) 3. Tie layer (i.e. Surlyn) 4. Total structure

- **Nonwoven – spunbond, spunlace, spunlaid, airlaid**
  - For personal hygiene, medical, geotextiles purposes
  - Typical measurement: 1. Fibers (PE or PP) 2. Moisture content 3. Binder (Latex) 4. SAP/SAF 5. Total basis weight

- **Monolayer film – cast film (CPE or CPP), biax film (BOPP, BOPET, BOPA, BOPS)**
  - Typical measurement: Excellent total film measurement

**Typical measurements**

- **Paint coating,** passivation, or oil film on metallic sheet**

- **Optical grade film – triacetate cellulose (TAC) film**
  - Using dual reflection PROSIS IR thickness & beta sensor

- **Paint coating,** passivation, or oil film on metallic sheet**
  - Using dual reflection PROSIS IR thickness sensor only

**Typical measurements**

- **Tandem extrusion coating***
  - 1. Total structure weight
  - 2. Top poly coating (PE)
  - 3. Bottom poly coating (PE)
  - 4. Moisture content

- **Aseptic packaging***
  - 1. Printed raw board
  - 2. Top PE
  - 3. Bottom PE
  - Typical measurement:
    - 1. Total structure weight including aluminum foil & printed raw board using beta sensor
    - 2. Outer PE coating in presence of print
    - 3. Inner tie layer (Surlyn or Primcore)
    - 4. Inner PE coating

- **Paint coating,** passivation, or oil film on metallic sheet**
  - Top paint coat
  - Metal sheet
  - Bottom paint coat
  - Oil film
  - Metal sheet
  - Oil film

**Typical measurements**

- 1. Top paint coat
  - 2. Metal sheet
  - 3. Bottom paint coat
  - Oil film
  - Metal sheet
  - Oil film

**Typical measurement:**

- Top & bottom paint thickness
- Primer on metal
- Lacquer on metal
- Top and bottom oil film thickness
- Chrome free passivation on galvanized metal

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* Using dual reflection PROSIS IR thickness & beta sensor
** Using dual reflection PROSIS IR thickness sensor only
Features and benefits

Support you can depend on

Thermo Scientific products are supported by our extensive network of qualified application engineers who will work closely with you to understand and evaluate your specific production parameters. Our experts will help you choose the right instruments for your application, then keep them performing to spec. Their goal is to optimize your process today, and also lay the foundation for easy upgrades in the future.

Education and training
We offer multiple training options to help you increase productivity by optimizing the use of your instruments and expanding the skills of your operators. You can receive hands-on instruction in your plant or at one of our training facilities in the USA, Europe and Asia. Our range of courses covers:

- Basic operation
- Calibration
- Routine maintenance
- Troubleshooting
- Certification

We will also work with you to develop a custom program that meets your specific training objectives, often incorporating your own operating procedures.

Professional services
Our certified engineers are available to review your process, perform benefit analysis and recommend improvements to help you meet your best-practice goals. We will develop an implementation plan that integrates all Thermo Scientific systems, as well as third-party components including:

- System commissioning
- System calibration
- Preventative maintenance
- On-site repair
- Depot repair

You can rely on us to manage the entire installation and start-up if you choose, including serving as a liaison with licensing agencies where necessary.

Parts and upgrades
Our spare parts are designed specifically for your Thermo Scientific system, and we make it easy for you to secure high-quality, low-cost replacements by maintaining offices around the world that respond quickly to your phone or online requests. You can also extend the lifetime of your older instruments with our add-on system enhancement and retrofit packages, which adapt your instruments for new uses and eliminate the time and cost to retrain operators on new equipment.

Features
- Easy to use and calibrate
- Low cost of ownership
- Exceptional performance for both single and multilayer product structure
- Ideal for multilayer coating on board
- Completely safe solution

Benefits
- Best measurement performance
- Raw material savings
- Improved product quality
- Increased yield while reducing scrap
- Low cost of ownership

Transmission model – performance spec (test material: 23-100µ PET)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Performance</th>
</tr>
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<tbody>
<tr>
<td>Repeatability 2o</td>
<td>± 0.15 gsm or ± 0.05% whichever is greater</td>
</tr>
<tr>
<td>Reproducibility 2o</td>
<td>± 0.2 gsm or ± 0.05% whichever is greater</td>
</tr>
<tr>
<td>Scan average repeatability 2o</td>
<td>± 0.15 gsm or ± 0.05% whichever is greater</td>
</tr>
<tr>
<td>Passline variation 2o</td>
<td>± 0.6 gsm or ± 0.5% whichever is greater</td>
</tr>
<tr>
<td>Measurement response time</td>
<td>18mS (100% new data)</td>
</tr>
<tr>
<td>Measurement air gap</td>
<td>18mm</td>
</tr>
</tbody>
</table>

Reflectance performance spec (test material: PR with adhesive (17-26 gsm) on foil)

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<th>Specification</th>
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<tbody>
<tr>
<td>Repeatability 2o</td>
<td>± 0.1 gsm or ± 0.25% whichever is greater</td>
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<tr>
<td>Reproducibility 2o</td>
<td>± 0.2 gsm or ± 0.05% whichever is greater</td>
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Find out more at thermoﬁsher.com/gauging

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