S-50

Online Thickness Measurement
**S-50**

The S-50 is an online thickness gauge for blown film which measures the film thickness with nearly no contact.

This gauge is the ideal solution for blown film lines not being equipped with auto profile control. The operator adjusts the die bolts according to the thickness profile. These manual adjustments do already help a lot to optimize profile tolerances. As a next step, the S-50 can help with accurate downgauging efforts which reduces raw material costs.

The S-50 can be mounted anywhere between the haul-off and the winder. Its compact size will allow installation nearly anywhere.

The installation is very easy and can be quickly done by company internal technicians. This plug and play installation leads to a very fast return of investment. The S-50 needs very little maintenance and has a high availability.

The S-50 is the better solution compared with a thickness gauge mounted in the layflat. Nearly no film contact, higher durability and low dirt sensitivity are only some of the many advantages of the S-50.
### Working principle

The capacitive sensor works with an electrical field called the stray field of a capacitor. The film changes the field strength according to its thickness. This change is analyzed and displayed as thickness.

![Automatic edge positioning](image)

After each rotation of the haul-off or the die a torsion compensated thickness profile is transmitted to the attached visualization system. The C shaped thickness sensor measures the sum of an upper and a lower film segment. The easiest way would be to divide this thickness value by two and assign two both segments the half value. The data processors software does it much better. A complex algorithm calculates the exact thickness for each segment.

### Available sizes

Following sizes are standard. Max. $\Delta d_{fl}$ stands for the maximal width difference between maximal and minimal measurable widths for each S-50 size. Web edge position variations of +/- 50mm are taken into account.

<table>
<thead>
<tr>
<th>Size S-50</th>
<th>Max. $\Delta d_{fl}$ [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>440</td>
<td>680</td>
</tr>
<tr>
<td>730</td>
<td>1260</td>
</tr>
<tr>
<td>995</td>
<td>1790</td>
</tr>
</tbody>
</table>

Other sizes on request
Installation

For easy mounting of the S-50 to the machine frame, a spacer bar will be added to the measuring bar. Therefore the whole measuring bar can be mounted centrical like a reel.

The S-50 can be mounted anywhere between the haul-off and the winder.

Film guiding

Two idler rollers; one installed ahead to the S-50 and one after the S-50 guarantee an ideal film guiding which results in a nearly contact free thickness measurement without wearing out the sensors surface.

Mounting orientation

The S-50 thickness sensor is operational in a horizontal and a vertical orientation.
Connections and interfaces

RS-422

All Kundig measuring systems can be connected to a visualization or control system. For this purpose we provide our established PCD-LINK protocol. With this protocol the measurement can be integrated with little effort into any software. The same protocol is used by Kundig visualization systems. These optional accessory systems are the ideal solution for the measurement of thickness and width, quality protocols and long term trending. Additional information is available in the brochure on visualization.

Ethernet

The connection between Kundig measuring systems and visualization / control system is available via Ethernet. The PCD-LINK protocol is carried by information packages over the Ethernet connection.

Analog output

Also available is a connection with an analog signal. In this case the measured thickness value is transmitted as an analog signal, while the rotation signals are presented in digital form.
## S-50 Technical data

**Electrical interface values**
- Power supply: 230 VAC ± 10%, 50-60 Hz
- Power consumption: max. 110 VA
- Nominal current: 0.5 A
- Switch-on peak current: 1.5 A

**Ambient temperature**
- Data processor: max. 55 °C
- Measuring sensor: max. 70 °C
- Transport and storage: -40 °C to 70 °C

**Thickness measurement**
- Measuring principle: Capacitive thickness measurement
  - Suitable for all electrically non-conducting material
- Measuring frequency: 400 kHz
- Measuring range: 5 to 300 μm *
  - > 300 μm on request
- Measuring interval: 200 ms
- Resolution: 0.1 μm *
- Accuracy after calibration: 5 to 10 μm *⇒ 0.2μm
  - > 10 μm * ⇒ 1%
- Temperature drift: compensated

**Ambient conditions**
- Ambient temperature: 23 °C ± 2 °C
- Measured film: LDPE-film, at 50 °C approx.

* thickness of single film

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## Calculation of amortization

\[
\text{Material output} \times \text{Operation time day} \times \text{Operation time day/year} \times \text{Material price e/kg} = \text{Material throughput e/year}
\]

\[
\text{Material throughput e/year} \times \text{Optimization %} = \text{Material savings e/year}
\]

\[
\text{Investment e} \div \text{Material savings e/year} = \text{Amortization time years}
\]
# Questionnaire application technology

<table>
<thead>
<tr>
<th>Company</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>Zip Code</td>
<td>City</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact person</td>
<td>E-mail</td>
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</table>

We are interested in

- [ ] Online thickness gauge
- [ ] Online thickness gauge and automatic profile control
- [ ] Offline system for film thickness
- [ ] Width measurement
- [ ] Width measurement and control
- [ ] Meter weight control

## Specifications of existing line

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Film width</td>
<td>_______ mm</td>
<td>_______ mm</td>
</tr>
<tr>
<td>Film thickness</td>
<td>_______ µm</td>
<td>_______ µm</td>
</tr>
<tr>
<td>Throughput</td>
<td>_______ kg/h</td>
<td>_______ kg/h</td>
</tr>
<tr>
<td>Line speed</td>
<td>_______ m/min</td>
<td>_______ m/min</td>
</tr>
<tr>
<td>Extrusion</td>
<td>[ ] Monoextrusion</td>
<td>[ ] Coextrusion ___ Layers</td>
</tr>
<tr>
<td></td>
<td>___ Components</td>
<td>___ Components per layer</td>
</tr>
<tr>
<td>Processed materials:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IBC:</td>
<td>[ ] Yes</td>
<td>[ ] No</td>
</tr>
<tr>
<td>Gusseted films:</td>
<td>[ ] Yes</td>
<td>[ ] No</td>
</tr>
<tr>
<td>Die:</td>
<td>[ ] Fixed</td>
<td>[ ] Reversing</td>
</tr>
<tr>
<td>Haul-off:</td>
<td>[ ] Fixed</td>
<td>[ ] Reversing</td>
</tr>
<tr>
<td>Width of roll at haul-off:</td>
<td>_______ mm</td>
<td></td>
</tr>
<tr>
<td>Rotation time:</td>
<td>Min. _______ min</td>
<td>Max. _______ min</td>
</tr>
<tr>
<td>Power supply:</td>
<td>______ VAC ______ Hz (single phase)</td>
<td></td>
</tr>
<tr>
<td>Existing measuring</td>
<td>[ ] Thickness gauge</td>
<td>[ ] Profile control system</td>
</tr>
<tr>
<td>and control units:</td>
<td>[ ] Width measurement</td>
<td>[ ] Width control</td>
</tr>
<tr>
<td>Brand of existing line:</td>
<td>[ ] Meter weight control</td>
<td>[ ] Line speed control</td>
</tr>
</tbody>
</table>

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E-mail: kcs@kundig-hch.ch
Fax: +41-55-250 36 01
Product overview

K-300 Rotomat KT
Online thickness gauge with rotating scanner

KNC-400 Rotomat KT
Online thickness gauge for sticky and sensitive films

KNC-600 Linear Scanner
Online thickness gauge for cast film

K-NDC Rotomat KT
Nuclear online thickness gauge for barrier films

K-300 CF Gauge
Online thickness gauge for quality supervision

S-50
Online thickness gauge for quality supervision

S-100
Capacitive online thickness gauge for barrier films

FE-8
Width measurement and control for lines with or without IBC

FILMTEST
Offline measurement for quality control

PROFILSTAR.NET
Visualization for quality supervision and control