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thickness**CONTROL** 8X01.EO Non-contact thickness measurement

POTENTIAL APPLICATIONS

Thickness profile measurement in

- Tire installation, particularly innerliner lines
- Melting calender lines
- Rollerhead installations
- Doubling installations
- Extrusion lines for cast and thermoforming film
- Blown film lines after collapsing

MATERIAL PARAMETERS

- Material width to 4,000 mm
- Material thickness from $<100\mu\text{m}$ to 20mm
- Measurement accuracy from $\pm 5\mu\text{m}$
- Resolution $<1\mu\text{m}$

SPECIAL FEATURES

- No consequential costs due to isotopes or X-rays
- Material independent calibration
- Integrated system for monitoring inspection





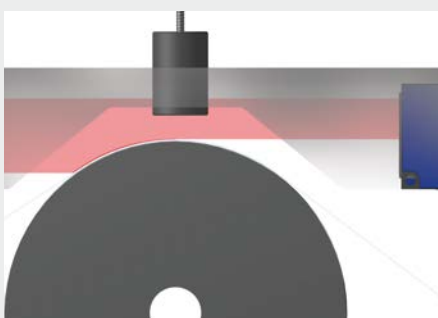
FUNCTIONAL PRINCIPLE THICKNESS MEASUREMENT

The system thicknessCONTROL 8X01.EO operates according to a combination principle consisting of a thru-beam sensor, an eddy current sensor and a measuring roll. The eddy current sensor and the thru-beam sensor are applied on an innovative measuring frame. Since the sensor measures the distance from the frame to the roll, the lower side of the material is detected. Since the sensor performance is specially aligned with the measuring task a huge measuring gap is possible while offering highest precision. The thru-beam sensor detects the upper side of the material. During this method, a parallel light curtain which strikes a receiver is generated. If the sensor head is positioned in the measuring position, the material which is guided on the roll enters and therefore interrupts the beam of light. The resulting shadowing effects are detected by the receiver and output as geometric value. The thickness of the target is the difference between the two signals. The measuring frame is equipped with a pneumatically cleaning mechanism and therefore ideal for the application in harsh environment.



AUTOMATIC CALIBRATION & TEMPERATURE COMPENSATION

The system is equipped with an in-situ calibration in order to compensate effects which vary with temperature. During this calibration, the measuring head is moved to the edge of the roll in order to measure the blank roll. With this result, changes of the measuring frame which have been caused by temperature can be compensated for. In order to adapt to the environment of the system, the calibration interval can be adjusted. Therefore, thicknessCONTROL 8X01.EO ensures precise measurement results even under harsh conditions.



MATERIAL-INDEPENDENT THICKNESS MEASUREMENT

A lot of systems for thickness measurements such as X-ray or isotope or ultrasonic require a calibration which depends on the material since the thickness measurement is effected by means of material characteristics. Therefore, the measurement also depends on temperature, humidity and other time-relevant characteristics. Since two dimensional signals are calculated (see above) thicknessCONTROL 8X01.EO is completely material-independent. This allows an easy handling and avoids an often cost-intensive production and storage of a huge amount of masters.



OPTIMISED EDDY CURRENT SENSOR TECHNOLOGY

In the thicknessCONTROL 8X01.EO a second eddy current sensor which also operates in the differential principle is added to the eddy current sensor which measures the surface of the roll. Both sensors are especially aligned with the measuring roll. With this, offset distance and measurement range are optimised in such a way that a large measuring gap with high precision is offered which allows to monitor thicker material such as doubled rubber webs with μm precision.

SYSTEM INTEGRATION

thicknessCONTROL 8X01.EO is equipped with a flexible interface in order to connect it to the control desk of a production process. Besides the support of different media (serial interfaces, field buses, network) – to allow an easy integration to the line – it is also possible to align the protocol to the customer or application.

INTERFACES



ANALYSIS AND CONTROL SOFTWARE

The data acquisition and analysis software thicknessCONTROL offers

- Article and order databases
- Production archive
- Customer-specific evaluations
- Limit value monitoring including production return (field bus interfaces optionally)

Therefore, a fully-automatic documentation and control of the production process is guaranteed.

Displays and evaluations which are aligned to customer process are planned for the installation in different applications

The machine can therefore be applied as

- TIP 8301.EO in innerliner installations
- FTS 8101.EO in extrusion and calender lines for flat and thermoforming film
- BTS 8101.EO in blown film lines after collapsing
- and RTP 8301.EO for rubber thickness measurement in different processes.

Optionally, the software can be enlarged by special features for thickness measurement of calenders or extruders.



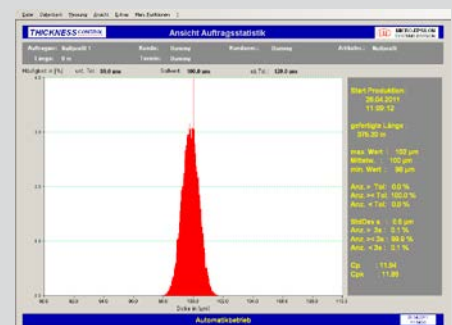
Combination profile TIP 8301.EO; vertical cursors show the points which are used for calender control



Set-up mode sensors and system control



Longitudinal trend for 5 tracks TIP 8301.EO



Statistical evaluation FTS 8101.EO

thicknessCONTROL 8X01.EO							
Description	-1000	-1500	-2000	-2500	-3000	-3500	-4000
Article no.	4.350.039.100	4.350.039.101	4.350.039.102	4.350.039.103	4.350.039.104	4.350.039.105	4.350.039.106
Light source	red LED						
Traversing width (Gross width)	1200mm	1700mm	2200mm	2700mm	3200mm	3700mm	4200mm
Material width max. (net width)	1000mm	1500mm	2000mm	2500mm	3000mm	3500mm	4000mm
Threading gap	100mm						
Measuring gap	12mm						
Measuring range max.	10mm						
Linearity in % nom. MR	0.06 % *						
Linearity nom. MR	$\pm 3\mu\text{m}$ *						
Roll diameter	$\leq 200\text{mm}$						
Band angle	$> 60^\circ$						
Sampling rate max.	$\leq 4\text{kHz}$						
Traversing speed	6000 to 15000 mm/min						
Lateral spatial resolution	0.025mm						
Dimensions (LxWxH)	2000x500x900	2500x500x900	3000x500x900	3500x500x900	4000x500x900	4500x500x900	5000x500x900
Protection class	IP54						
Ambient temperature	min. $+15^\circ\text{C}$ max. $+40^\circ\text{C}$						
Relative air humidity	75% max. within temperature range stipulated without condensation						

MR = measuring range * in relation to standard roll (higher linearity can be achieved using special rolls)

