Thickness gauges

KAPA - IR

NON-CONTACT THICKNESS MEASURING DEVICE FOR BARRIER SHEET

This non-contact thickness measuring device is for film up to a total thickness of 3 mm and a maximum width of 4 m. It is equipped with 2 different sensor systems. A capacitive sensor (KAPA) is measures the total thickness and an infrared sensor (IR) determines the EVOH layer thickness.

Scanner composed of:

- O-frame with integrated control cabinet
- Traversing unit with electrical drive
- Measuring sensors mounted on a pneumatic lift-off-device on the traversing unit

Visualisation

In control cabinet with industrial PC, 17" touch-monitor, keyboard drawer

- Thickness profile diagram for total thickness as bolt and line chart
- EVOH layer distribution
- Trend and SPC analysis
- Roll protocol
- Recipe storage
- Alarm and history

Technical Data:	KAPA	IR
Measuring system	capacitive/eddy current	infrared
Thickness range	up to 3000 µm	>10µm
Measuring gap	4,5 mm	35 mm
Sensor dimension	circularly Ø 30 mm	rectangular 50x60 mm
Measuring spot diameter	12 mm	10 mm
Sensor resolution	0,1 µm	1 µm
Repeatability	≤ 0,5 µm	≤ 5 µm
Measurement speed	10 – 300 mm/s adjustable	
Calibration	necessary for each material	
Diameter of the reference roller	200 mm	
Dimension of control cabinet	600x600x1960 mm	
Colour:	RAL 7035/7022	

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Electrical Supply:	KAPA 4G
Supply voltage:	115/230 VAC ± 10 %
Supply frequency:	50/60 Hz ± 1 %
Max. power consumption:	1000 W
Max. current consumption:	5 A
Electrical equipment to EN 60204	

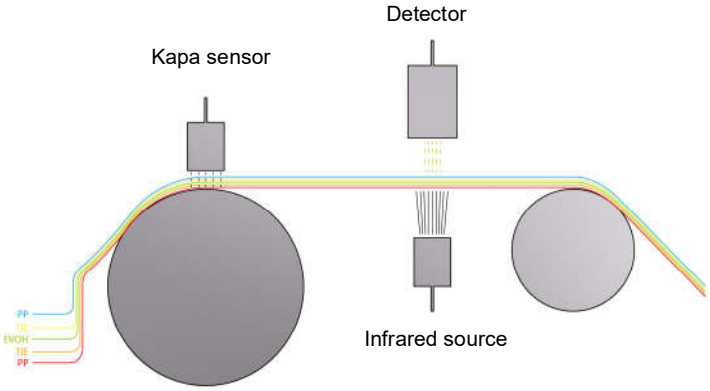
Supply compressed air:	
Operating pressure:	6 bar

Ambience:	
Max. ambient temperature:	40°C
Max. air humidity:	95%, without condensation
Max. sheet temperature:	90°C
Documentation:	Every EU Language

Measuring principle:

KAPA (for total thickness):
It is based on a non-contact, indirect thickness measurement principle.
The capacitance between sensor and roller depends on dielectric of measured sheet and distance between sensor to roller. To eliminate the influence of distance-fluctuations between sensor to roller this distance is measured permanently with an eddy current sensor (located together with capacitive sensor in the same casing). According to this measured distance the result of capacitive sensor is corrected.

IR (for the EVOH layer):
It is based on a non-contact, transmission measurement principle.
For the determination of the EVOH layer thickness, a wide infrared spectrum of the plastic is recorded and the resulting absorption of the EVOH polymer molecules is evaluated by using our modern analytic methods.



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Calibration:

KAPA:
In calibration the mode the sensor is placed in a fixed position (traversing stopped) during production. Measurement happens along a line of the sheet in extrusion direction. A piece of sheet needs to be cut out along this line and measured manually. This manually measured value needs to be keyed in the software as calibration value. Calibration is only required once per material or formulation and can be stored in the recipe.

IR
During calibration, the sensor is moved to a sample holder.
In this holder, there must be a sample placed from the same material recipe which has to be measured with the EVOH gauging system. The EVOH layer thickness of this calibration sample needs to be previously determined by a microtome cut and has to be keyed in the software as calibration value. It is only necessary once per material and can be stored as a recipe.

Features/Screen frames:

Description of most important screen shots

Line chart:
- Current thickness profile displayed over measuring width
- Average profile of last 3 scans
- Current EVOH thickness profile is displayed over measuring width
- Reference curve: freeze actual profile for comparing with future profiles – reference curve can be stored and reloaded.
- Net width

Bolt diagram:
- Current thickness profile displayed over bolt numbers
- Average profile of last 3 scans
- Reference curve: freeze actual profile for comparing with future profiles – reference curve can be stored and reloaded.
- Net width

Numeric displays:
- Current thickness (µm) according displayed sensor position
- Average thickness according cross profile, 2 Sigma value, min. and max. thickness
- Tolerance set values
- Thickness set value
- Net width set value

Inspect mode:
Zoom in graphics (thickness profile and bolt diagram) for close inspection

Trend diagram:

- Trend diagram shows process over 24 hours
- Most important values like set value, actual/average thickness according cross profile, min. and max. 2 Sigma, tolerances and line speed will be displayed in a line diagram.

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Buttons:

- Production parameter (opens frame: production parameter)
- Calibration (opens frame: calibration)
- Analysis (opens frame: analysis)
- Password (enables setting of passwords for different protected frames)
- Alarms (displays alarm in readable text)
- Print
- Roll changing (reset parameters of frame production parameters, running meter e.g.)
- Roll protocol (report of every roll can be displayed, stored and printed)

Production parameter

Frame for setting production parameter

- Data of order: order nr., customers name, article nr., ….
- Production parameter: thickness set value, + and – tolerances, resolution of displays, net width, etc.

Analysis:

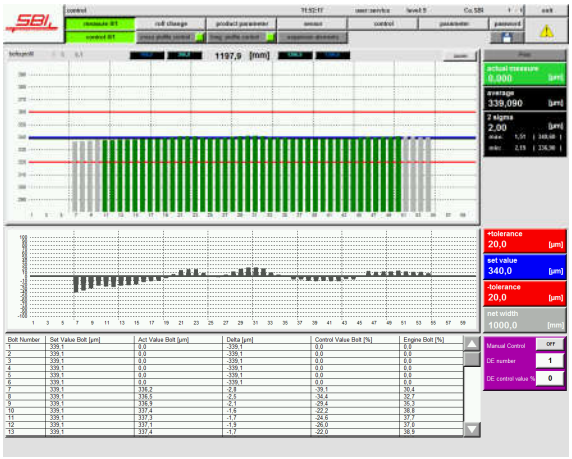
This frame displays production data and trends

- Production data: time of start, time since start or roll changing, running meter since roll changing, weight, speed, etc.
- Trend: Displays trend graphics of last 24 hours, older trends are stored and can be loaded for viewing and printing. Trend graphics shows thickness average, set value and tolerances.

Thickness Control

Optional frames for control of thickness with automatically adjusted extrusion dies.

Main screen: total and EVOH thickness- and bolts diagram



Thickness control (optionally)

Subject to technical changes and mistakes! Dec. 2019