MICRO-EPSILON

thicknessCONTROL TCP8301.I
Non-contact thickness measurements of strip materials

APPLICATIONS

Measuring the thickness profile in
· extrusion lines

MATERIAL PARAMETERS

· Material width up to 1200mm
· Material thickness up to 45mm
· Thickness accuracy $\pm 10 \mu m$
· Width accuracy $\pm 50 \mu m$
· Thickness resolution $\pm 1 \mu m$
· Width resolution $\pm 10 \mu m$

SPECIAL FEATURES

· Light intersection method
· Integrated inline temperature compensation
· In-situ calibration for monitoring test equipment

OPERATING PRINCIPLE FOR THICKNESS AND WIDTH MEASUREMENTS

The thicknessCONTROL TCP 8301.I profilometer has been designed to measure profile thickness and width in extrusion lines and small calander lines. The system is based on the optical triangulation principle and contains laser light sources in the upper and lower belts that project a line onto either side of the material. These two lines are in parallel and cameras that are also mounted on the system belts will detect their reflections (= light intersection method). The number of cameras will depend on the width and required precision. An automated calibration process transfers the camera signals to a common coordinate system to determine the thickness profile of the measured material based on the differential principle (= difference between the sum of the sensor signals and the gap). Calibration also corrects and optimises the linearity of the camera signals* to ensure that the system provides high-precision results.

* patent pending
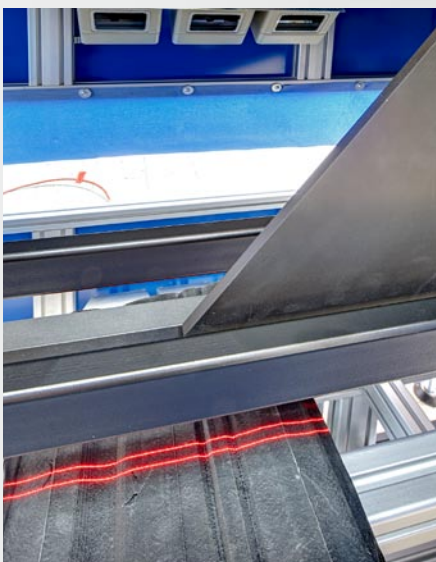
PROFILE MEASUREMENTS USING THE LIGHT INTERSECTION METHOD

The light intersection method measures the material geometry exactly at a time when the camera takes a picture of the laser line that completely traverses the material. This means that neither width measurements nor the positions of the individual profile sections depend on the horizontal transverse movement of the extruded material. For systems that use point-type lasers to scan the profile in a meandering pattern, this horizontal transverse movement is 100% included in width measurements.

SYSTEM INTEGRATION

The measuring system is completely integrated to prevent parasitic influences from external light sources to the measurement process. All optical components can be accessed easily for cleaning. The profilometers are installed directly behind the extrusion head and at the line ends, in front of the profile removal location. There are several options to communicate with the control system, e.g. through TCP/IP or standard field bus interfaces.

ANALYSIS AND CONTROL SOFTWARE

The thicknessCONTROL TCP 8301.I data collection and analysis software uses
- a formula and order database
- a production archive
- statistical evaluations
- threshold value monitoring, including feedback into production
to provide fully automated documentation and control of the production process.
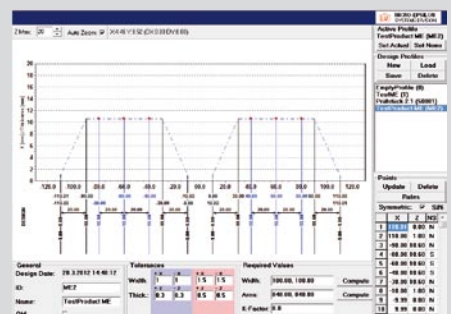
An offline application is used to monitor the measurement results for all profilometers in production and to enter formulas at any computer that is part of the network.
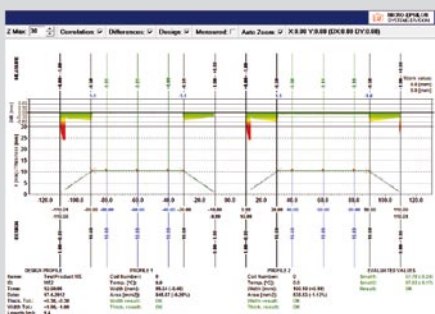
Profile measurement view

Formula database view

Profile editor view

thicknessCONTROL TCP 8301.I			
Name		-350-20-Online	-555-20-Online	-750-20-Online
Article number		4350121.100	4350121.101	4350121.102
Light source		2M		
Max. measuring range	Thickness	50mm		
	Width	350mm	555mm	750mm
Max. material thickness		45mm		
Max. material width		330mm	530mm	730mm
Max. angle α		50°		
Linearity	Thickness	±10µm		
	Width	±50µm		
Resolution	Thickness	1µm		
	Width	10µm		
Sampling rate		40 profiles/sec		
Dimensions (LxWxH)		1882 x 881 x 1763mm	1882 x 881 x 1763mm	1952 x 881 x 1763mm
Approx. weight (without transport crate)		500kg	510kg	530kg
Protection class		IP42		
Ambient temperature		min. + 15°C max. + 40°C		
Relative humidity		max. 75% in the specified temperature range, without condensation		