thicknessCONTROL MTS 8202.LLT
Non-contact thickness measurement of metal strips

POTENTIAL APPLICATIONS

Thickness profile measurement in

· Hot and cold rolling
· Splitting lines
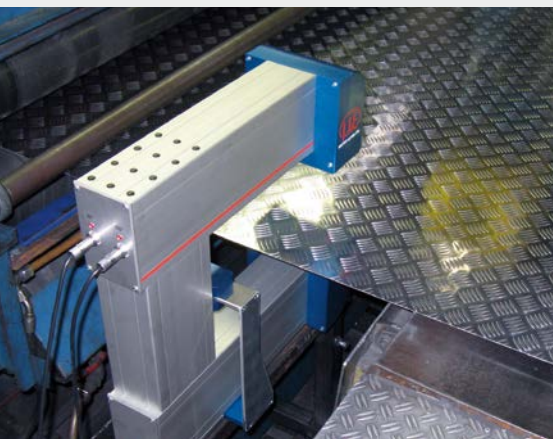· Coating
· Casting
· Cutting

MATERIAL PARAMETERS

· Material width to 1400mm
· Material thickness from <1mm to 50mm
· Measurement accuracy from ±5µm

FEATURES

· No consequential costs due to isotopes or X-rays
· Laser scanner for precise and stable measurements
· Multiple measurement points available on one industrial PC

Different strip thick-nesses detectable

All metals can be detected even in the case of high strip speeds

The laser line comensates tiltings, distorsions and bendings.
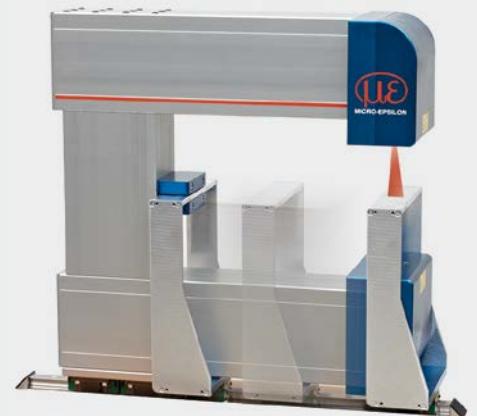
FUNCTIONAL PRINCIPLE THICKNESS MEASUREMENT

Laser line scanners which operate according to the triangulation principle are integrated in the upper and lower flange of the C-frame of thicknessCONTROL MTS 8202.LLT

By using special lenses, a laser beam is enlarged to form a static laser line and is eventually projected onto a target surface. A high-quality optical system projects the diffusely reflected light of this laser line onto a highly sensitive sensor matrix. In addition to the distance information (z-axis), the controller integrated in the sensor also uses this camera image to calculate the position along the laser line (x-axis) in a two-dimensional coordinate system. In order to detect the thickness of the target material according to the differential principle (difference between the sensor signals and the gap width), the coordinate systems of the upper and lower flange are synchronised during the in-situ calibration. In order to achieve precise thickness measurement results both laser lines have to be congruently projected on the upper and lower side of the material. To ensure this, they are precisely adjusted and calibrated by using optoelectronic tools in the factory.
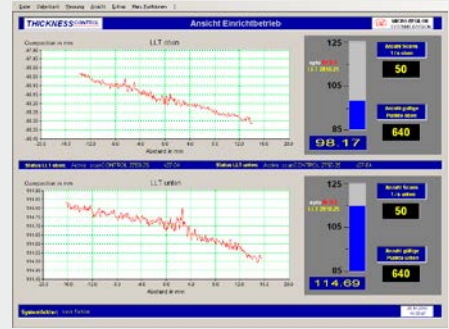
AUTOMATIC CALIBRATION

The system is equipped with an in-situ calibration in order to compensate effects which vary with temperature. During this calibration either the reference or calibration unit as well as the c-clamp can be positioned depending on the application. Additionally, during the in-situ calibration, the perfect functioning of the system can be monitored cyclically and permanently. By means of an analysis software a simple and fast gauge ability monitoring can be effected, automation optionally. Furthermore, monitoring temperature dynamical processes the calibration can be effected automatically using a control software.

The fully-automatic calibration allows long-term stability measurements. A reference object moves in the beam path and therefore provides the compensation of the system.
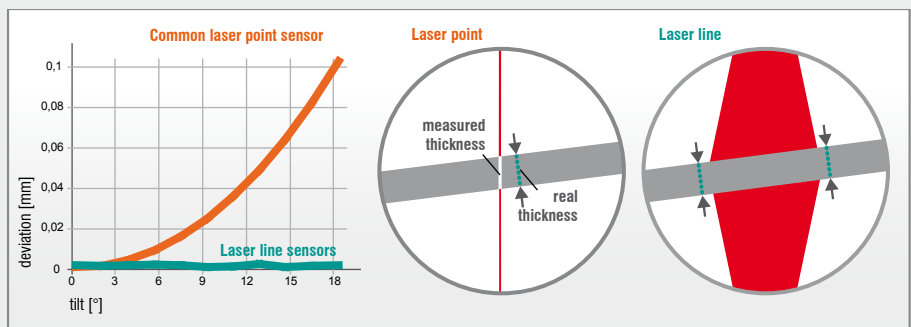
RESOLUTION/MEASUREMENT RANGE

However, the resolution shows the smallest thickness change to be measured during point tri-angulation, it is more complex in the case of the laser line triangulation. Here, several points or even a profile are used in order to determine the resolution instead of a single point. The resolution achieved therefore depends on the individual measurement task in the case of a laser line triangulation. For example, a reference straight line is detected crossing all points of the profile in the case of a thickness measurement on plane material. The smallest thickness change between to corresponding reference straight lines is therefore the resolution and much higher than in the case of point triangulation. thicknessCONTROL MTS 8202.LLT uses this fact to provide a large measurement range despite high resolution. A large measurement range is mostly appreciated for applications in cutting lines.

TILT COMPENSATION

Contrary to point triangulation, tiltings, distortions and bendings of the target material permanently occurring for example in cutting lines in the metal processing industry are detected in compensated during measurements by means of line triangulation. Therefore thicknessCONTROL MTS 8202.LLT provides reliable measurement results in the micrometre range even in the case of sheets several mm wide.

By means of the laser line triangulation, tiltings, distortions and bendings are reliable compensated.

ANALYSIS AND CONTROL SOFTWARE

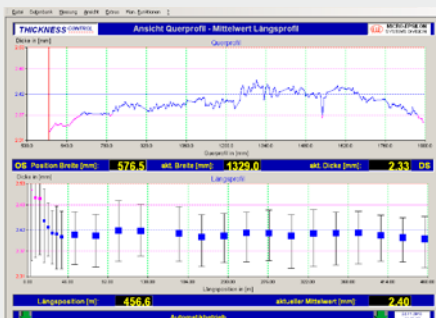The data acquisition and analysis software thicknessCONTROL MTS offers
- Article and order databases
- Production archive
- Customer-specific evaluations
- Limit value monitoring including production return (field bus interfaces optionally) fully-automatic documentation and control of the production process.

A division of the scanner line in more zones of the product wide is also possible as monitoring characteristics such as wedge shape and crowning.
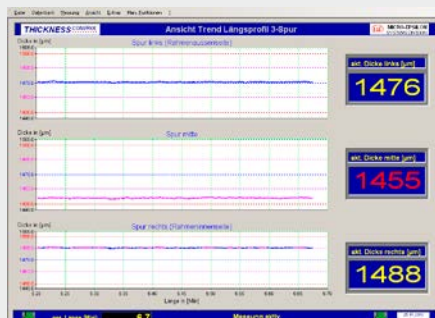
Optionally, the software can be upgraded by an automation package for traversing controlling as well as by special features for the support of cutting lines such as:
- Thickness and profile measurements for each ring cut- Width measurement for each ring
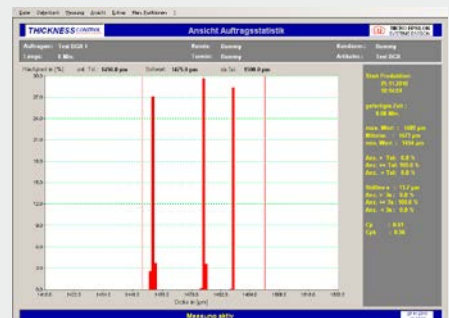- Documentation for each ring

INTERFACES

Combined profile traversing measurement
(Cutting line 8 single rings)

Longitudinal profile, line divided into three sections

Statistical evaluation of a coil

thicknessCONTROL MTS 8202.LLT							
Description	-25/250	-50/250	-25/500	-50/500	-25/800(CFK)	-25/1000(CFK)	-25/1200(CFK)	-25/1400(CFK)
Article nr.	4350127.21	4350127.22	4350127.23	4350127.24	4350127.61	4350127.62	4350127.63	4350127.64
Orientation	Laser line transverse towards material							
Laser class	2M							
Measuring width	250mm		500mm		800mm	1000mm	1200mm	1400mm
Working gap	190mm	420mm	190mm	420mm	166mm	166mm	166mm	166mm
Nominal measuring gap	25mm	50mm	25mm	50mm	25mm	25mm	25mm	25mm
Measuring gap max.	40mm	100mm	40mm	100mm	40mm	40mm	40mm	40mm
Start of measuring gap	306mm	391mm	306mm	391mm	500mm	500mm	500mm	500mm
Linearity nom. MG	$\pm5\mu m$	$\pm10\mu m$	$\pm5\mu m$	$\pm10\mu m$	$\pm5\mu m$	$\pm5\mu m$	$\pm5\mu m$	$\pm5\mu m$
	$\pm0.4\%$							
Sampling rate max.	0.25ms							
Dimensions (WxDxH)	568x204x601*	568x204x831*	818x204x601*	818x204x831*	1820x417x825	2020x417x825	2220x417x825	2420x417x825
Weight	approx. 80kg packaging included							
Protection class	IP54 (higher on request)							
Ambient temperature	min. + 15 °C max. + 40 °C							

MG = measuring gap   *=length without linear axis

Radiation
Neither look into the laser beam nor use optical instruments
Laser class 2M
according DIN EN 60825-1:2001-11
$P\leq10mW$; $E\leq55\ W/m^2$; $\lambda=658nm$

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