PRESS RELEASE

Measuring paper thickness fast and reliably

The Fraunhofer Institute for Laser Technology ILT is unveiling its "bd-2" sensor for thickness measurements of paper and board webs. Within a measurement range of 8 millimeters, the system can accurately measure the thickness and embossed depth with a precision better than 200 nm. The small sensor head coupled with high-speed data processing facilitates inline measurements in the production line. At CONTROL 2016 in Stuttgart, Germany, visitors can experience the "bd-2" sensor live.

Materials and quality control must meet increasingly stringent requirements in the paper processing industry. To provide thickness measurement, for instance, sensors must now be accurate down to the sub-micron range yet nonetheless operate in the production line as fast as possible and with minimal maintenance.

To meet these requirements the optical thickness measurement system "bd-2" (for bidirectional measurements) was developed at Fraunhofer ILT. The sensor sends a measuring beam onto the material surface and the reflected signal allows the distance to be measured with a precision of 200 nm. The sensor has been previously used, e.g. for surveying cold-rolled metal sheets.

A special feature of the system is the 70 kHz sampling rate. This allows for an absolute and continuous measurement of the distance to the surface during running production. The thickness measurement system "bd-2" comprises two sensing heads mounted in a C-frame to measure the thickness of the product passing by.

"bd-2" is suited to measure the thickness of paper and board webs in the range of 10 µm to several millimeters. Untreated surfaces are measured as safe as painted, embossed, smoothed or supercalendered.

A new sensing head simplifies the entire measurement process

Compared with established methods – such as radiometric, capacitive or inductive methods – the new sensor offers several advantages:

Since irradiated and reflected beams are propagating along the same line, alignment efforts are eliminated as transmitter and receiver no longer have to be adjusted to each other.

Editorial Notes
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To send and to receive the backscattered radiation only a small measuring head with a weight of 100 g is needed. It uses a small window with a 2 mm diameter, the cast protected by an air stream in harshest environments reliably against contamination. Compared with conventional sensors its spot diameter is about 100 microns, so that even the smallest structures can be detected.

Control processes safely

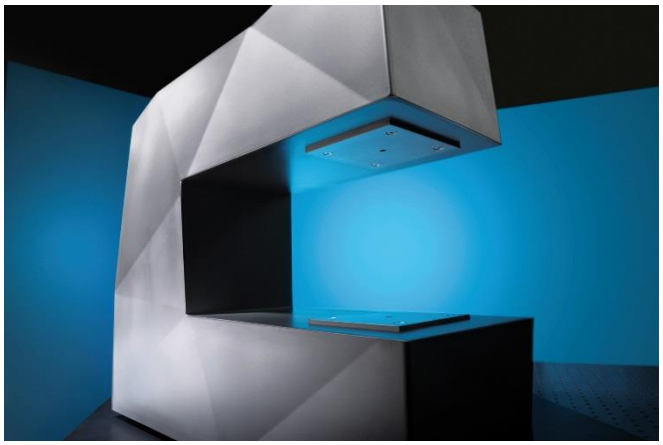
The new sensor »bd-2" provides the accuracy of interferometric measurement methods and is significantly faster than the established measurement technologies. The complete system processes up to 70,000 thickness readings per second. So, inline measurements are possible even at high product speeds that enable fast feedback loops to control and optimize production processes.

Sensor sets new standards for industrial manufacturing

In terms of speed and integrability, "bd-2" sets new standards for process control and quality assurance in various industry segments. The process paves the way for the transition from laboratory-based individual measurement to continuous inline production control. This is why the Fraunhofer ILT experts are targeting industry customers looking to meet higher accuracy requirements in series production, offering them not just complete systems but also extensive consulting in relation to process integration. The sensors were tested extensively in pilot plant operation, first industry partners have already carried out test runs with the system in their production lines.

Fraunhofer ILT at CONTROL 2016

The interferometric thickness sensor »bd-2« will be showcased at this year's CONTROL in Stuttgart, Germany on the stand 1502of the Fraunhofer Alliance Vision in Hall 1.



Picture 1:
The "bd-2" thickness measurement system based on bidirectional sensors.
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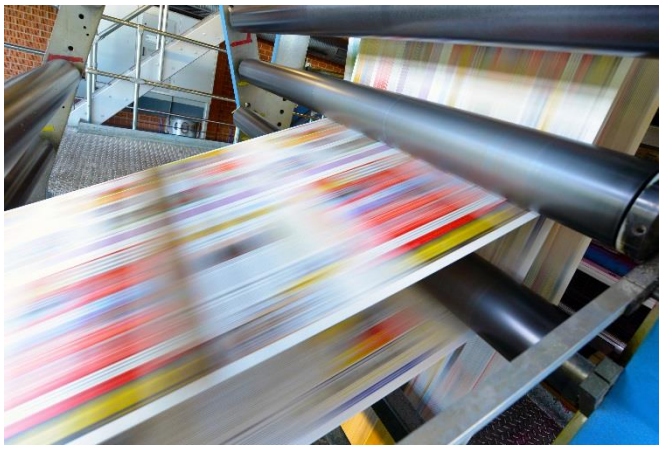

Picture 2:
Paper webs in production process.
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