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GreCon

Inline Thickness Measurement for Quality Assurance with Laser Technology

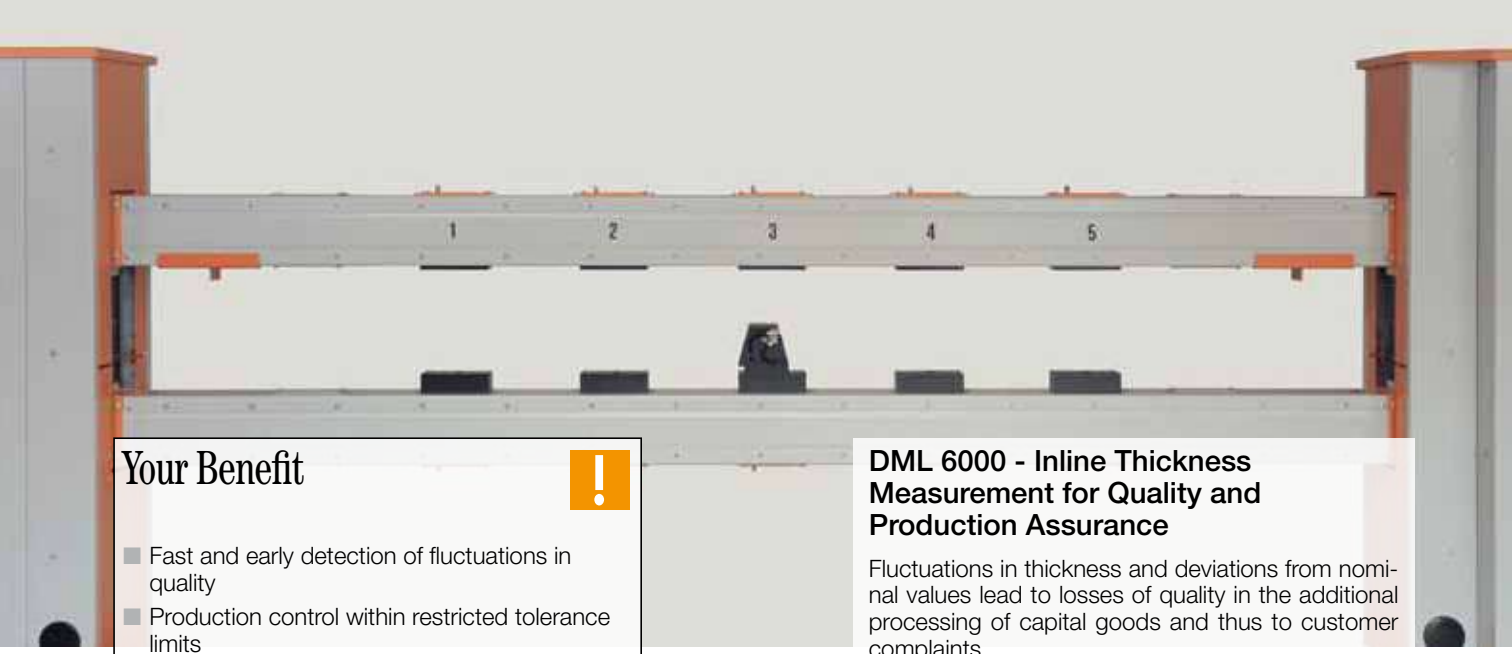
GreCon
Measuring Technology

GreCon
Fire Protection

TEMSOL

DML 6000

EN | R.01 | 2013.04



Your Benefit

- Fast and early detection of fluctuations in quality
- Production control within restricted tolerance limits
- No material required to be added for sanding = reduction of production costs (0.1 mm ~ 0.8 % material)
- Display of optimisation potentials after changes in production (desired or undesired)
- Measuring data to regulate the press

Why GreCon

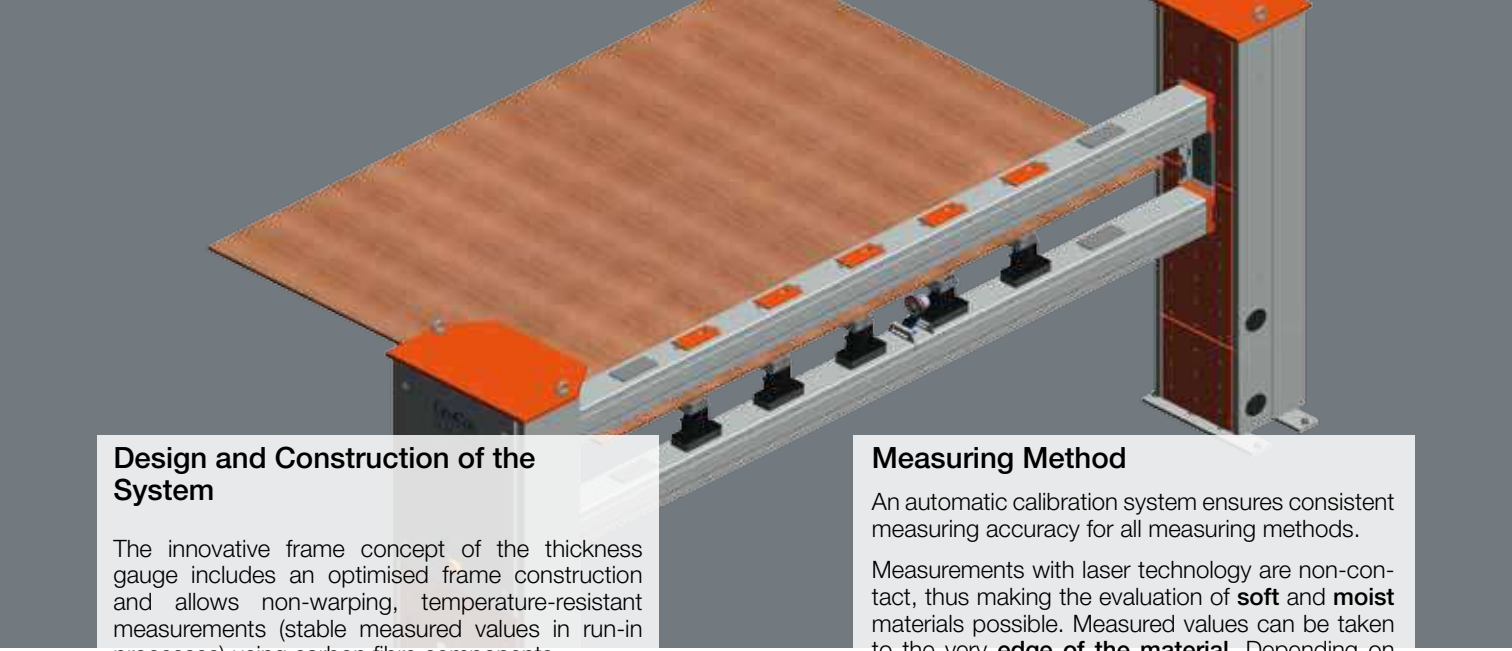
- With ct-frame, calibration, maintenance and service during the running production
- Low maintenance required because of insensitivity to dirt due to closed frame construction
- Optimised frame construction
- Non-warping, temperature-resistant measurement thanks to new solid carbon fibre components
- Measuring system analysis according to MSA
- Combination with board scales and weight per unit area gauges possible to determine the raw density
- Edge sanding monitoring

DML 6000 - Inline Thickness Measurement for Quality and Production Assurance

Fluctuations in thickness and deviations from nominal values lead to losses of quality in the additional processing of capital goods and thus to customer complaints.

The GreCon Thickness Gauge DML 6000 supplies all necessary measured data to ensure a high quality standard through quick adjustment of the production process.

The measuring system can transfer all data to an automatic process control system or a press control. With this data transfer, times for product changes or run-in times can be reduced and rejects minimised with the DML 6000.



Design and Construction of the System

The innovative frame concept of the thickness gauge includes an optimised frame construction and allows non-warping, temperature-resistant measurements (stable measured values in run-in processes) using carbon fibre components.

The closed frame concept protects all components, such as cable and air channels, laser or compressed air lines, against surroundings. A modification of the roller conveyor (panel guidance) is only necessary in individual cases. Easily accessible inspection flaps allow optimum access to the measuring system at any time.

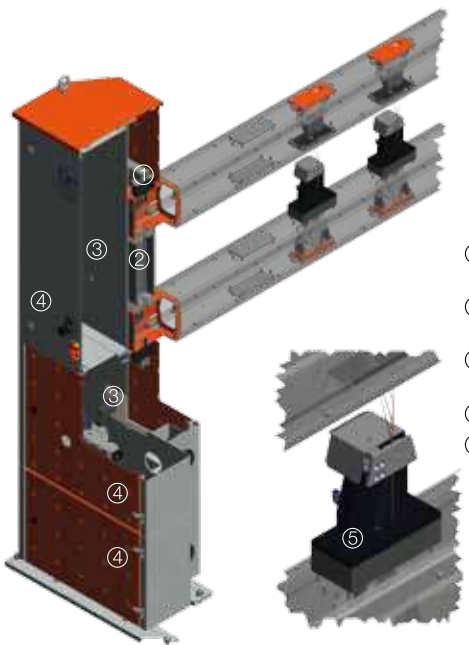
The measuring heads are installed in pairs, opposite each other, above and below the panel to ensure accurate measurements, even during bending or vertical movement of the panel. Measurement is conducted in a non-contact way by an optical laser.

Measuring Method

An automatic calibration system ensures consistent measuring accuracy for all measuring methods.

Measurements with laser technology are non-contact, thus making the evaluation of **soft** and **moist** materials possible. Measured values can be taken to the very **edge of the material.** Depending on the requirements, measurements can be made at stationary points or **traversing** across the whole width of the material. Traverse measurement allows measurement of a maximum amount of material and clearly shows any deformation of the material.

The selection of the laser technology for measurement is specified according to the material to be measured.



① Floating mounting of the measuring frame on the frame uprights

② Temperature-resistant module for minimum calibration expense

③ Integrated pneumatic and electric supply

④ Freely accessible inspection flaps

⑤ Automatic calibration unit

ct-Frame

To achieve continuous system availability, the DML 6000 can be equipped with a ct-frame. Maintenance, diagnostics and repairs can be conducted during the running production.

Additionally, the mobile construction of the system allows an escape run in case of big blisters and thus prevents the measuring system from being damaged.

Measuring System Analysis (MSA), Type-1 Study

GreCon checks the accuracy and repeating accuracy of a DML 6000 during the internal system check after the system is built.

The measurement capability of the system is a calculation of statistical quality parameters based on the measured results.

The operator can repeat this procedure at any time after installation and start-up of the measuring system thus providing a reproducible system check.

User-Friendly, Simple, Robust and Accurate

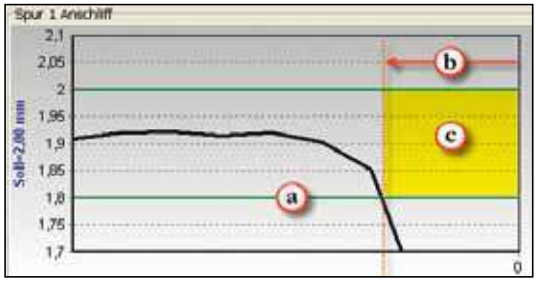
High availability, operational reliability and, above all, consistent measuring quality are ensured by the calibration with integrated self-diagnosis system and the construction of the system. This leads to high confidence in the system and acceptance by the operator.

The MSA ensures that the displayed information constitutes a reliable basis for the monitoring and optimisation of the production process.

Laser thickness measurement of a wood based panel

Edge Sanding Monitoring

The edge sanding monitoring separately evaluates the beginning and the end of a sanded panel according to recipe-specific values. The results are transferred to the PLC by OPC via the data table.



ⓐ This threshold value determines the allowable deviation from the nominal value.

ⓑ This defect length indicates the allowable length if nominal value falls below specified.

ⓒ If no panel is recorded in this area, the threshold value of the edge sanding was exceeded.

Combination with other Measuring Systems

Since the thickness gauge is a modular system, it is possible to change the measuring requirements at any time.

The system can be combined with the Ultrasonic Measuring System UPU 6000 and a Board Scale to provide a quality assurance station.

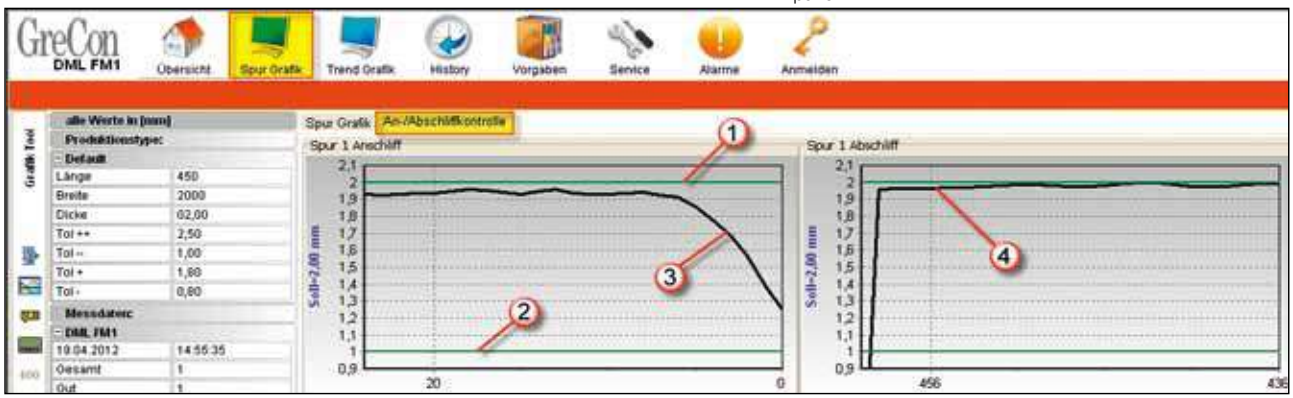
This combination is primarily used after continuous presses.

① Nominal value line

② Allowable threshold value for edge sanding

③ Course of actual thickness in the edge area at the beginning of the panel

④ Course of actual thickness in the edge area at the end of the panel



Software Functions

■ Software
The visualisation software of all GreCon measuring systems is based on Windows. The software of the DML 6000 consists of the following program modules:

■ Network Connection
For the data transmission to higher-ranking process control systems, different network connections, such as OPC or ODBC, are available. Profibus and Profinet are available on demand.

■ Visualisation
The core of the software package is the visualisation software. It records, stores and graphically represents all measured data. The simple menu structure, which is identical for all GreCon measuring systems, makes intuitive operation possible. Clear information and graphics enable the operator to quickly and effectively adjust the running production process. If a board scale is integrated, weight values and average raw densities will be visualised, as well as the thickness values.

■ Recipe Management
This is a product database in which different panel types and production parameters can be stored.

■ Database
The database stores the measured values, thus allowing to call up the panels produced from a history administration for analysis at any time. Furthermore, the data can be exported to other file formats for further processing and evaluation.

■ Report Function
The report function allows automatic production of reports, such as shift or production reports, for freely definable time periods.

Control console and frame of a DML 6000

Service

GreCon measuring systems are equipped with GreCon online support SATELLITE.

This provides safe, simple and fast remote support when there is trouble or to check the system. Each online support is logged and stored in the system‘s history.

Technical Specifications

- Suppy voltage ..... 230 V / 115 V
- Frequency ..... 50 Hz / 60 Hz
- Max. number of measuring tracks per electronics evaluation 11

Resolution

Triangulation differential measurement:

at 60 mm = measuring range 1 µm

at 400 mm = measuring range 4 µm

Triangulation against reference piece:

at 60 mm = measuring range 0.5 µm

at 400 mm = measuring range 2.0 µm

Shadow method:

at 25 mm = measuring range 2 µm

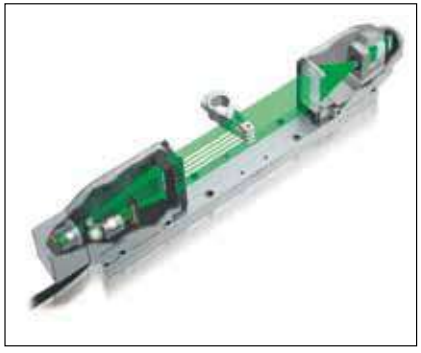
at 60 mm = measuring range 3 µm

The accuracy depends on the product and the surroundings. Deviations on demand.

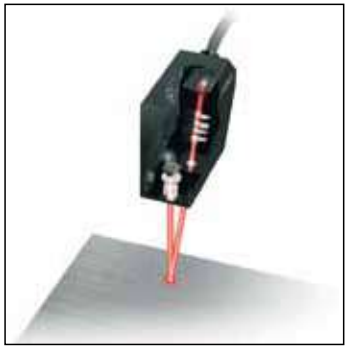
Calibration

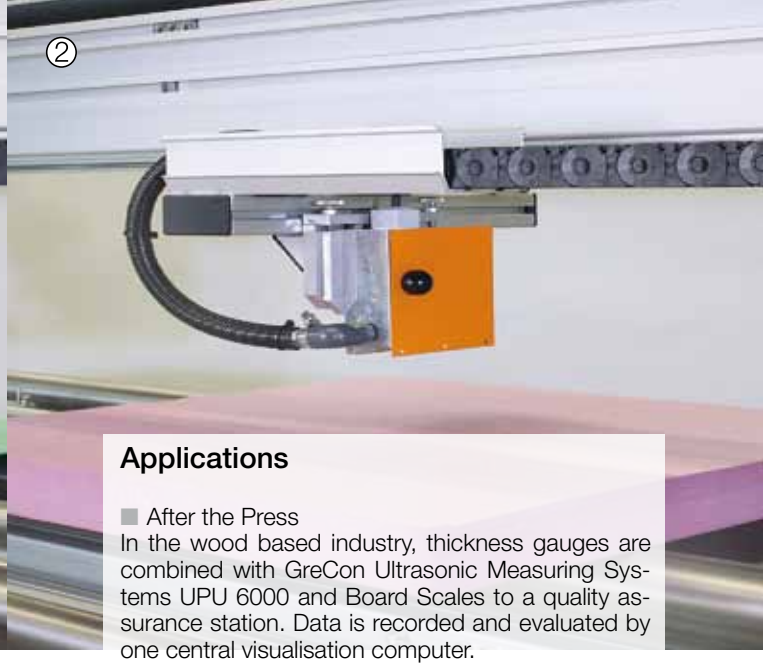
The DML 6000 is equipped with a calibration function. Calibration is done outside the material flow and ensures consistent measuring accuracy for all measuring principles.

Shadow method



Triangulation method





References

The DML 6000 is used in the following applications:

- Bitumen sheeting
- Gypsum board
- Rubber sheeting
- HR-foam board
- Wood based panel industry
- Scotch tape
- Plastic boards or endless plastic foils
- PVC flooring

Applications

■ After the Press

In the wood based industry, thickness gauges are combined with GreCon Ultrasonic Measuring Systems UPU 6000 and Board Scales to a quality assurance station. Data is recorded and evaluated by one central visualisation computer.

■ Sanding Line

A combination of up to three thickness gauges is used for final quality control in the sanding line. For example: a 1-track thickness gauge is installed before the calibration sander, a 2-track system after the calibration sander and a 3-, 5- or 7-track system after the finishing sander. Besides quality control, the measured data can be used to adjust the sanders to the desired thickness values.

① Thickness measurement of impact sound insulation with the DML 6000

② Thickness measurement of foam material with the DML 6000

Selection of different materials
that can be measured with the DML 6000