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GreCon

Inline Mat Scanner for Weight Per Unit Area Measurement and Protection against Foreign Objects

GreCon
Fire Protection

GreCon
Measuring Technology

GreCon
Service

DIEFFENSOR

EN | R.02 | 2015.04

Your Benefit

- Complete non-contact measurement of the weight per unit area
- High accuracy and flexibility due to fine resolution
- Optimisation of material consumption through analysis of longitudinal and cross profile
- Foreign object detection for protection against damages (e.g. steel belt protection, hot spots, wet spots, etc.)
- Longer life of the steel belts
- Process-related, systematic deviations are shown and can be reduced
- Material, glue and energy can clearly be reduced
- Can be combined with segmented scalper to form a FORMATOR

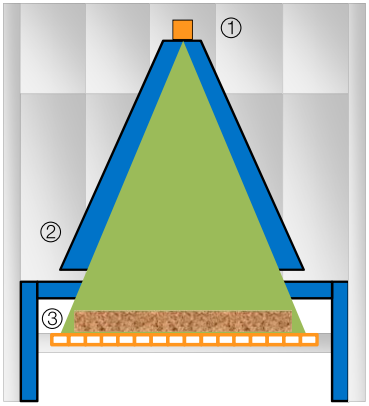
Why GreCon

- Customer-specific system design
- High innovative capacity: more than 10 % of the employees work in the R & D division
- Worldwide customer service network: more than 80 service technicians on duty worldwide
- Efficient sales network: represented in more than 35 countries
- High expertise: more than 40 years of experience in the measuring technology sector

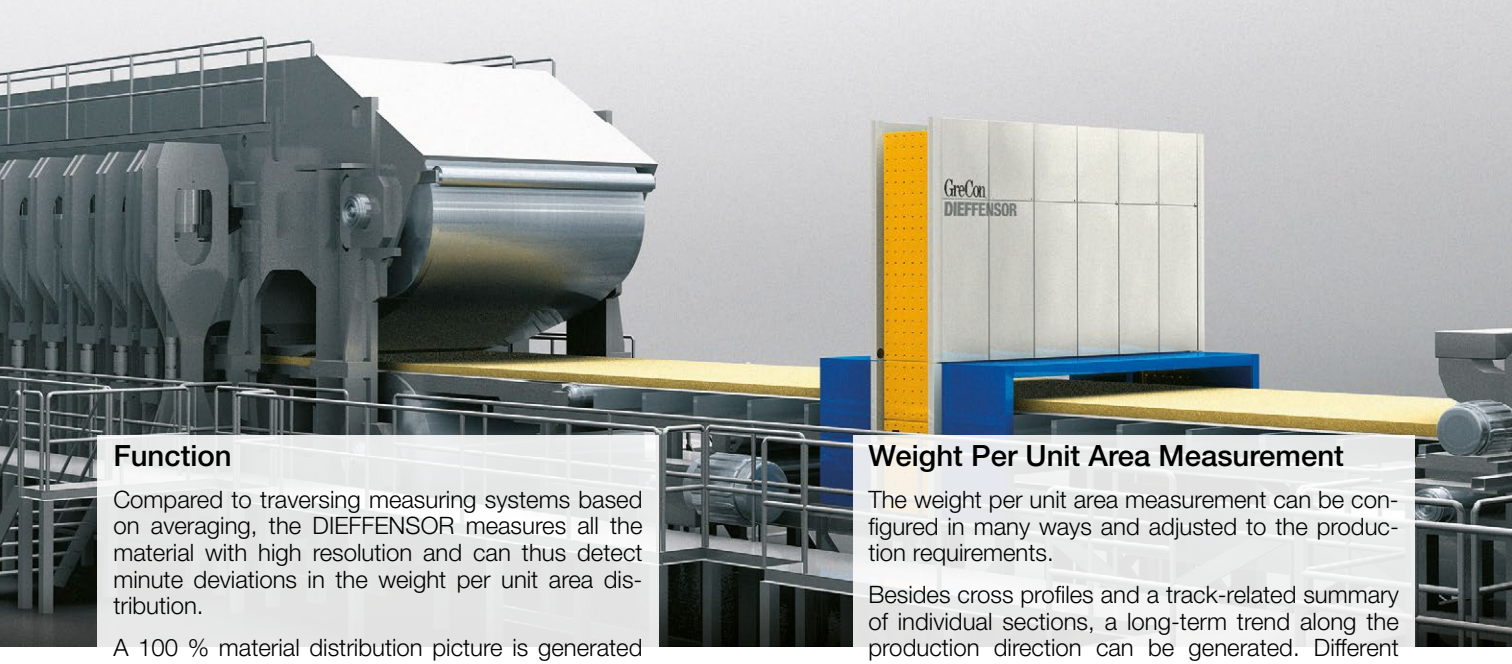
High-Resolution Weight Per Unit Area Measurement and Reliable Foreign Object Detection to Optimise Your Production Process

The X-ray scanner DIEFFENSOR determines the weight per unit area across the width of endless materials on the production line. Compared with usual weighing systems, the operator obtains a complete picture of the material distribution of the endless material directly after forming. The information on the material distribution can be used to intervene in the forming process using suitable tools (e.g. FORMATOR, adjusting tables).

Because of the high resolution in a square millimetre range, an exact determination of the size and position of foreign objects is possible. Both metallic and non-metallic materials that are out of the density tolerance of the measured product (e.g. glue or fibre lumps, plastics, light metal parts or material overspreading) are detected. Even hot spots and wet spots that may impair the production process of insulating materials, can be detected.



① X-ray source ② Tube ③ Fibre mat



Function

Compared to traversing measuring systems based on averaging, the DIEFFENSOR measures all the material with high resolution and can thus detect minute deviations in the weight per unit area distribution.

A 100 % material distribution picture is generated across and along the production line.

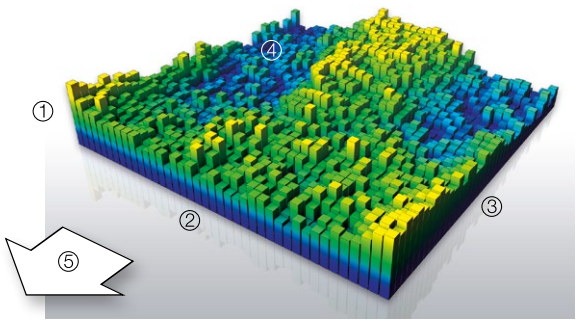
Process fluctuations are represented by recipe-specific comparison of nominal and actual values. Precise measured values and their clear numerical and graphical representation allow for timely intervention in the production process to ensure consistent product quality while the consumption of material and energy is optimised.

The measured values allow a quick view of the production trend at any time. Long-time evaluations graphically show the effects of changes in production parameters. Reports for further analysis can be generated from the evaluated process data.

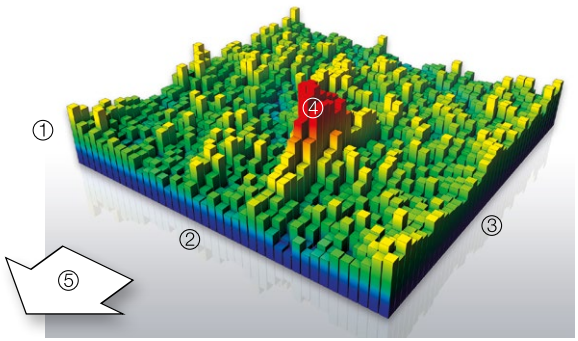
Weight Per Unit Area Measurement

The weight per unit area measurement can be configured in many ways and adjusted to the production requirements.

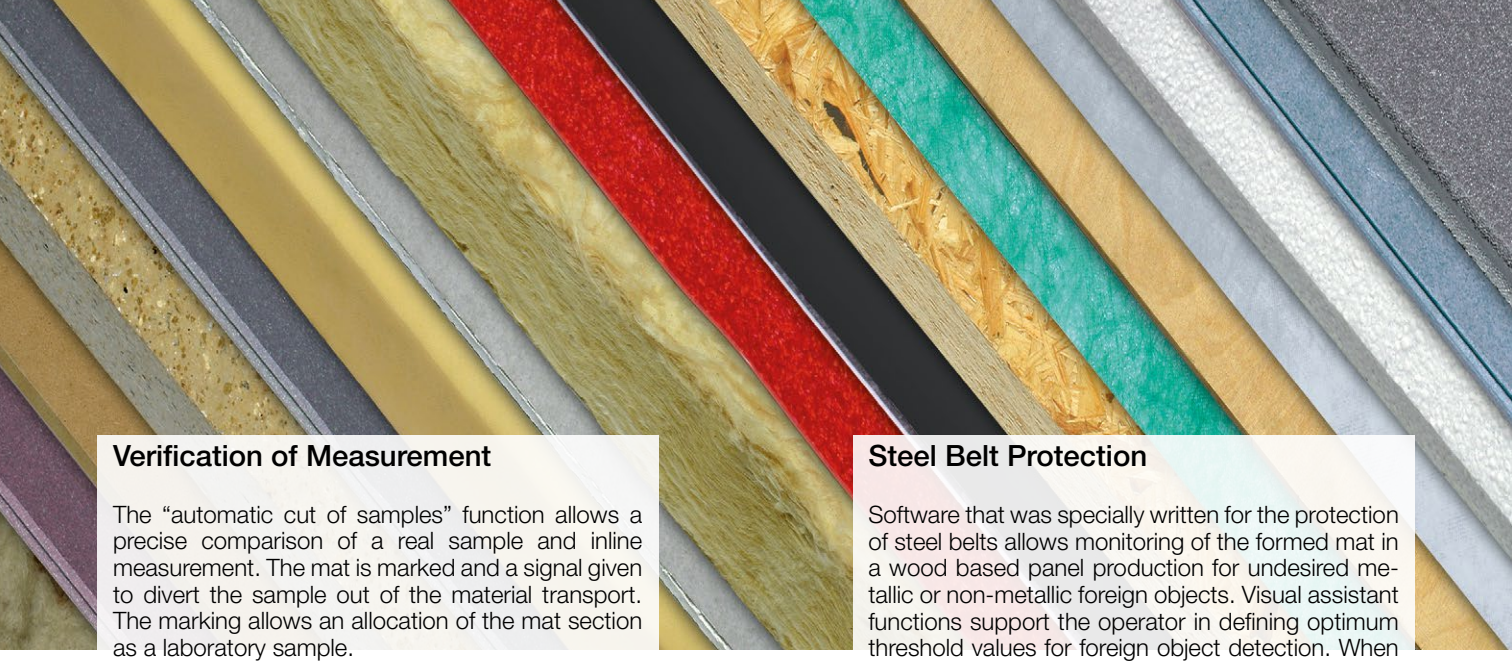
Besides cross profiles and a track-related summary of individual sections, a long-term trend along the production direction can be generated. Different statistical evaluations are available to analyse the material distribution.



① Weight per unit area
② Product width
③ Product length
④ Weight per unit area deviation
⑤ Production direction



① Weight per unit area
② Product width
③ Product length
④ Foreign object
⑤ Production direction



Verification of Measurement

The “automatic cut of samples” function allows a precise comparison of a real sample and inline measurement. The mat is marked and a signal given to divert the sample out of the material transport. The marking allows an allocation of the mat section as a laboratory sample.

In addition, a sample measuring mode is available. The measured values recorded are displayed in different colours in the visualisation software according to the size of the laboratory samples.

Foreign Object Detection

In different production processes, e.g. the insulating material industry, hot spots can cause severe damage to production equipment due to delayed heat release. Missing material can lead to expensive customer complaints or reduced quality.

With high-resolution evaluation, the DIEFFENSOR is able to detect foreign objects, such as glue lumps, hot spots, wet spots as well as metallic and non-metallic elements. Even areas that are too light, such as air voids or missing material, can be detected.

The detection of foreign objects or air voids is done by eight threshold values that can be configured independently of each other. Each measurement exceeding threshold values can be allocated to a digital output. Thus, the signals can be directly integrated in the plant control as suitable protection measure. Faulty areas can also be marked in different colours.

All detected excesses over threshold values are stored in a database for later analysis.

Steel Belt Protection

Software that was specially written for the protection of steel belts allows monitoring of the formed mat in a wood based panel production for undesired metallic or non-metallic foreign objects. Visual assistant functions support the operator in defining optimum threshold values for foreign object detection. When foreign objects are detected, the fast signal transfer to the machine control allows the use of steel belt protection measures (e.g. opening the discharge).

Control console, including visualisation, like in a control room

Software Functions

■ Software
The visualisation software of all GreCon measuring systems is based on Windows.

■ Visualisation
The core of the software is the visualisation. It allows the configuration of the measurements and, because of its clear structure, offers a quick view of all information in numerical form as well as diagrams (curve, bar graph, 3-D representation). Deviations from the regular production process are clearly indicated and enable the operator to intervene quickly and effectively. Detailed reports can be produced for additional analysis.

■ Recipe Management
In the product database any number of different panel types and production parameters can be stored.

■ Database
The database stores the measured values and provides a function to export them to other file formats for further processing and evaluation. A uniform data structure provides easily accessible data for process control systems.

■ Reporting
Individual reports can be generated from the database. Available reporting types are time-related reports, such as shift or monthly reports, and order-related reports that can be selected according to requirements.

■ 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 request.

DIEFFENSOR installed in the mineral material industry

① Lateral distribution of the weight per unit area, 3-D
② Lateral distribution of the weight per unit area, 2-D, with long-term trend
③ Foreign object detection, 3-D

Service

GreCon measuring systems are equipped with GreCon online support SATELLITE. This provides safe, simple and fast remote support where there is trouble or to check the system. Each online support is logged and stored in the system‘s history.

Technical Specifications

- Measuring range.....up to 50 kg/m²
- Product speed ..... up to 3,000 mm/s (180 m/min)
- Product height.....up to 500 mm
- Product width.....up to 4,000 mm

Deviations on demand

Calibration

The system is equipped with an automatic calibration. The DIEFFENSOR is calibrated to a reference sample at regular intervals.

Applications

In the wood based panel industry, the DIEFFENSOR is used before the press to measure weight per unit area and material distribution and to protect the steel belts. For example:

- Particleboard
- MDF board
- HDF board
- OSB board

In the insulating material industry, the DIEFFENSOR is used as follows:

Rock wool plants

- in the primary mat
  for weight per unit area measurement (material distribution) and foreign object detection
- in the secondary mat
  before the furnace to control the pendulum and the transport speed in dependence of the measured weight per unit area and for foreign object detection
- in the secondary mat
  after the furnace for quality control and foreign object detection

Glass wool plants

- after the furnace
  for quality control and foreign object detection

Wood wool plants

- before the dryer
  for quality control

Further industries:

- in gypsum plants
  after drying for quality control
- for transformer board
  in the quality line for foreign object detection
- for plastics
  to detect air voids and to measure the weight per unit area

① DIEFFENSOR in wood based panel line
② DIEFFENSOR in mineral wool line