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GreCon

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

GreCon
Measuring Technology

GreCon
Fire Protection

TEMSOL
DIEFFENSOR

EN | R.01 | 2013.04

Your Benefit

- Complete (100 %) non-contact measurement
- High accuracy and flexibility due to fine resolution
- Detection and optimisation of material consumption thanks to analysis of longitudinal and cross profile
- Weight per unit area measurement of the entire mat and grid evaluation in selectable resolution
- Foreign object detection for protection against damages (e.g. steel belt protection, hot spots, wet spots, etc.)
- Process-related, systematic deviations are shown and can be reduced or eliminated. In most cases, material, glue and energy can be reduced by at least 1 to 3 %

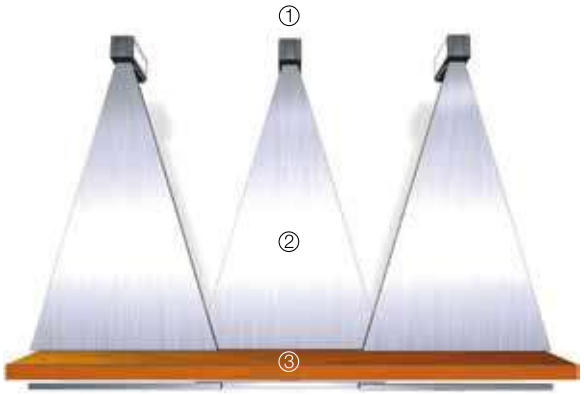
Why GreCon

- Measurement independent of speed
- Automatic calibration
- Longer life of the steel belts
- High-resolution data storage for statistical evaluation

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

The DIEFFENSOR by GreCon is a highly developed mat scanner that measures the weight per unit area distribution of endless materials across the entire width of production online and in high resolution.

The DIEFFENSOR uses the absorption measuring method. One or more x-ray sources are installed above the material flow. Below the material flow, high-precision detectors measure the residual radiation that has not been absorbed by the material. The weight per unit area and the material distribution can be determined from the degree of attenuation and the specific density of the penetrated material.



① X-ray source ② Tube ③ Fibre mat

Function

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

Using a clock-pulse generator, the images taken across the production material are put together to form a 100 % picture across and along the production line.

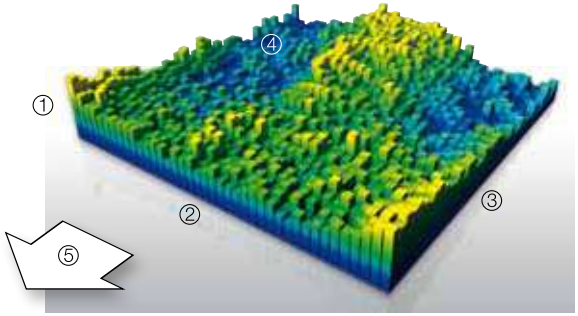
Process fluctuations are indicated by recipe-specific comparison of nominal and actual values. Precise measured values and their clear numerical and graphical representation allow for timely intervention in the production process to ensure consistent product quality while the consumption of material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

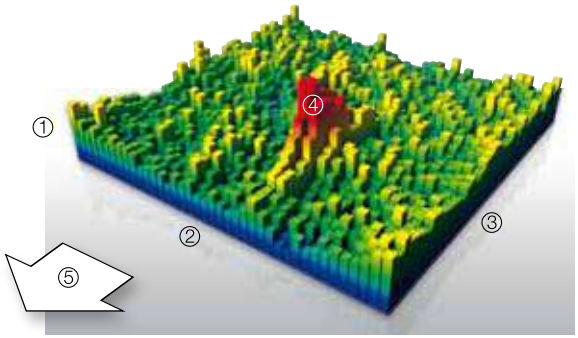
Weight Per Unit Area Measurement

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

Besides cross profiles and a track-related summary of individual sections, values can be averaged over a long time frame to generate long-term trends. Different statistical evaluations are available to analyse the material distribution across and along the production line.



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

Measurements can be quickly verified on a laboratory level using a sample measuring mode. The measured values are visualised in colours according to the weight per unit area for pre-defined sample sizes.

Steel Belt Protection

Software that was specially written for the protection of steel belts allows monitoring of the fibre mat 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).

Foreign Object Detection

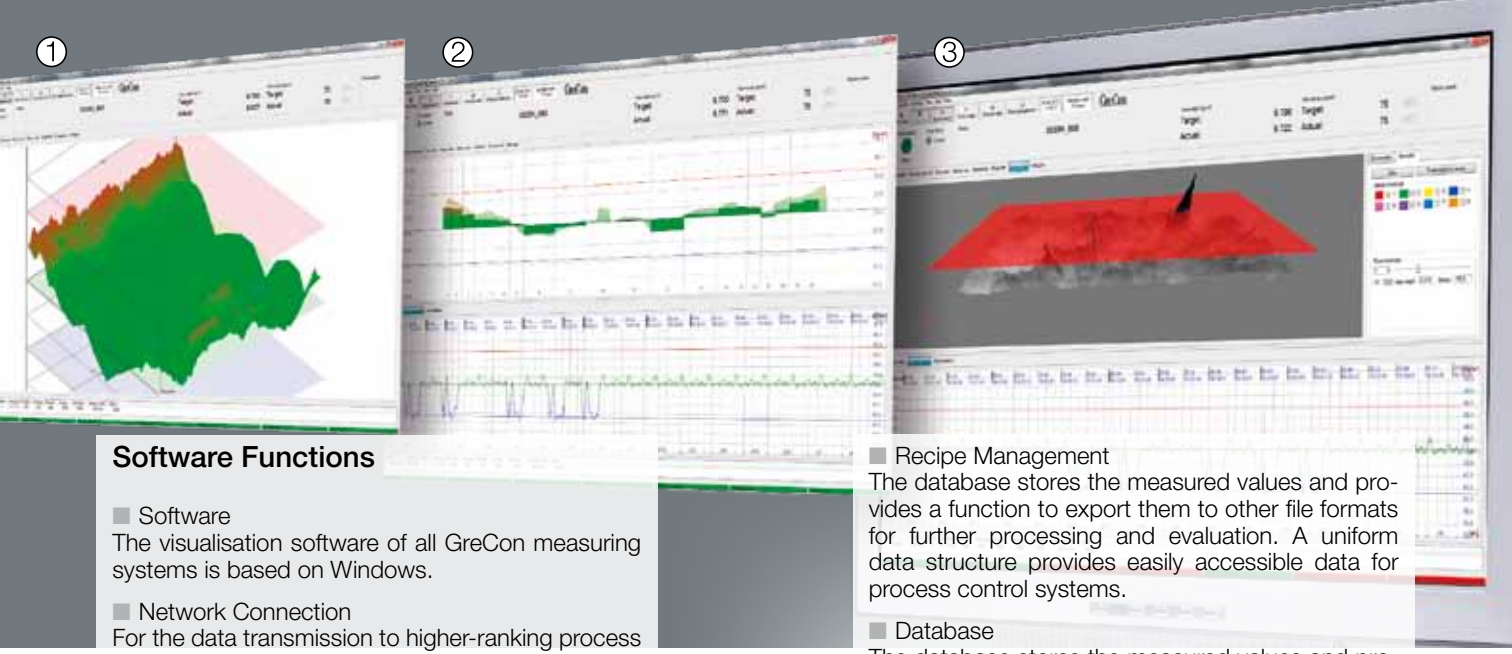
In different production processes, e.g. the insulating material industry, hot spots can cause severe damage to production equipment due to delayed heat release. Missing material can lead to expensive customer complaints or reduced quality.

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 colours.

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

Control console, including visualisation, like in a control room



Software Functions

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

■ 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 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
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.

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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

① DIEFFENSOR in MDF line

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 ..... 0 to 3,000 mm/s (180 m/min)
- Product height.....0 to 500 mm
- Product width.....0 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

② DIEFFENSOR in mineral wool line

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