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GreCon

Inline Moisture Measurement with Infrared Technology

GreCon
Fire Protection

GreCon
Measuring Technology

GreCon
Service

EN | R.02 | 2015.04

IR 5000

Your Benefit

- Avoid faults produced with wrong moisture
- Non-contact measuring system, measurement of chips/fibres within bins/screw conveyors through a glass pane
- Best quality of measured values due to 7000 measurements per minute
- The measuring system is pre-calibrated
- Check of the system‘s stability by Auto Reference Standard (ARS)

Why GreCon

- IR filter for dry and wet chips/fibres included
- Measuring head with dirt accumulation sensor
- Fast-gating function included (gaps or interruptions in the material flow are detected)
- Reliable, drift-free moisture measurement
- Online support via remote system GreCon SATELLITE

Production and Quality Control with the GreCon Moisture Analyser

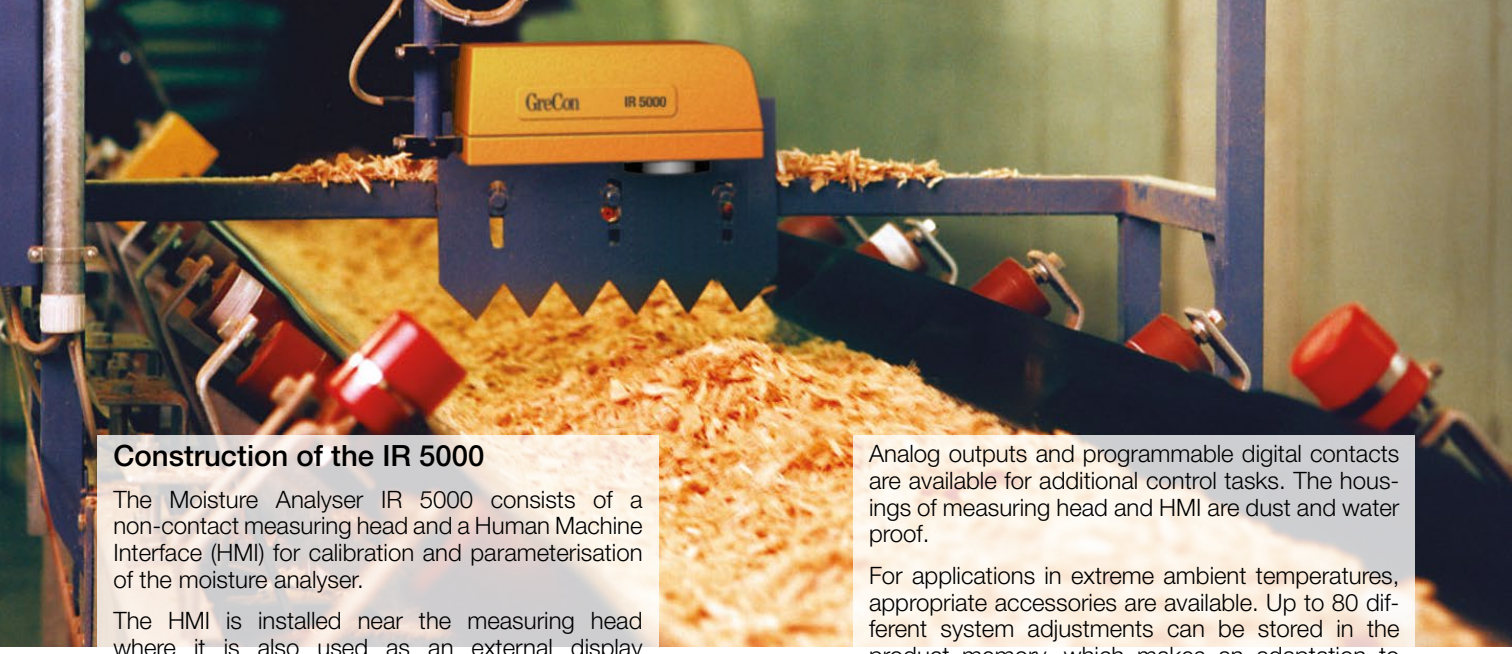
Wherever precise product moisture is required, the inline moisture analysers provide the users with the necessary information.

The continual availability of product properties allows for easy adjustment of the production process to ensure a high product quality standard.

For the production of wood based panels, the moisture content of the material used is of utmost importance. Chips and fibres must be neither too wet nor too dry.

If they are too wet, reductions in panel quality and slower production speeds will occur.

If they are too dry, energy is wasted. The same applies to glued material.



Construction of the IR 5000

The Moisture Analyser IR 5000 consists of a non-contact measuring head and a Human Machine Interface (HMI) for calibration and parameterisation of the moisture analyser.

The HMI is installed near the measuring head where it is also used as an external display in the measuring position. This arrangement makes reading of the measured moisture values easy when taking samples for laboratory measurements.

By using a glass pane, it is possible to measure the moisture of material flows in enclosed conveying systems. The measured values can be transferred to a higher-ranking process control system via a network connection to display the values in the control station.

Analog outputs and programmable digital contacts are available for additional control tasks. The housings of measuring head and HMI are dust and water proof.

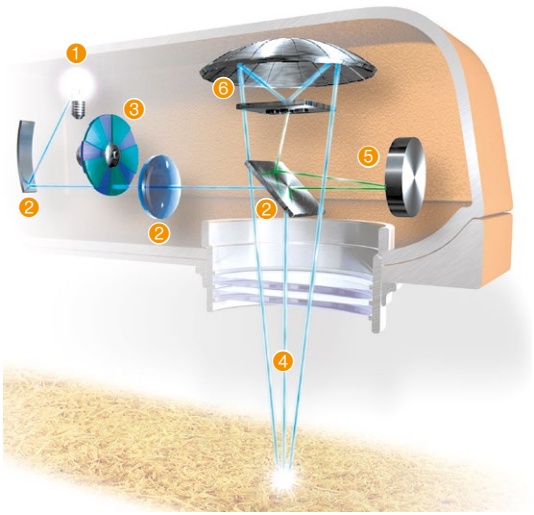
For applications in extreme ambient temperatures, appropriate accessories are available. Up to 80 different system adjustments can be stored in the product memory, which makes an adaptation to different recipes possible.

IR 5000 measuring head

Combination with other Measuring Systems

To make the evaluation of the product or material features easier, the IR 5000 can be combined with other GreCon measuring systems. When connected to the GreCon Weight Per Unit Area Gauge BWQ 5000, further evaluation of the material features can be realised. Using joint evaluation of weight per unit area and moisture, the dry mass of the chip or fibre mat is automatically calculated.

Function principle of the IR 5000



Measuring Principle

The non-contact inline measuring system works with an optical measurement transducer. Light in the NIR region is used, which is absorbed by the material moisture. This means: The more moisture in the material being measured, the less light is reflected. A light beam, which is emitted by a halogen lamp ❶, is divided into several measuring ❹ and reference beams ❺ by means of a mirror-lens combination ❷.

The rays are led through a filter wheel ❸ to filter out the excessive spectral regions of the light. The remaining rays of the NIR region are projected onto the material to be measured. The reflected light, the intensity of which depends on the moisture content, is compared with the reference beams in the measuring head and used to calculate the material moisture. Due to the division into several measuring and reference beams and the dual-detector principle ❻, a high system reliability and measuring accuracy - independent of external influences - is obtained.

Calibration

The IR 5000 is supplied pre-calibrated and equipped with an HMI for calibration and parameterisation of the moisture analyser.

Software Functions

■ Network Connection
For the data transmission to higher-ranking process control systems, different network connections are available.

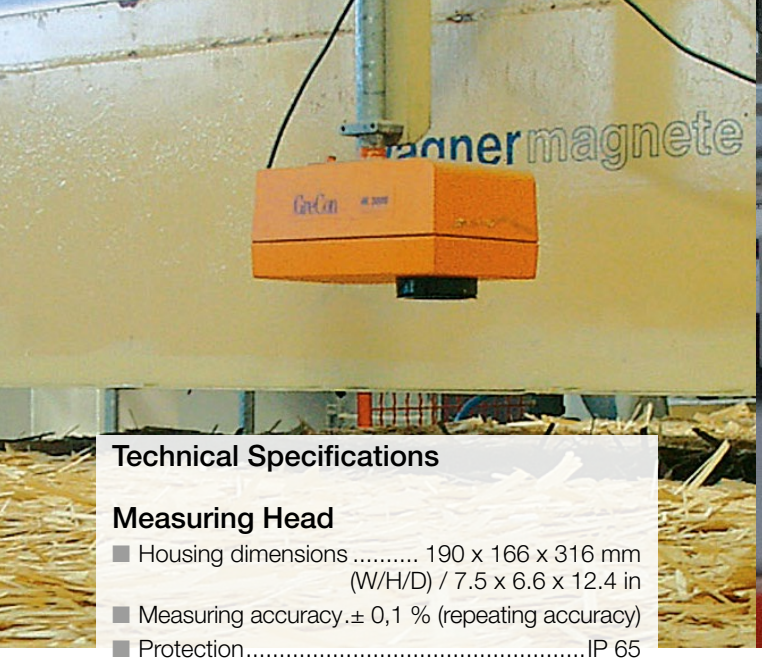
Service

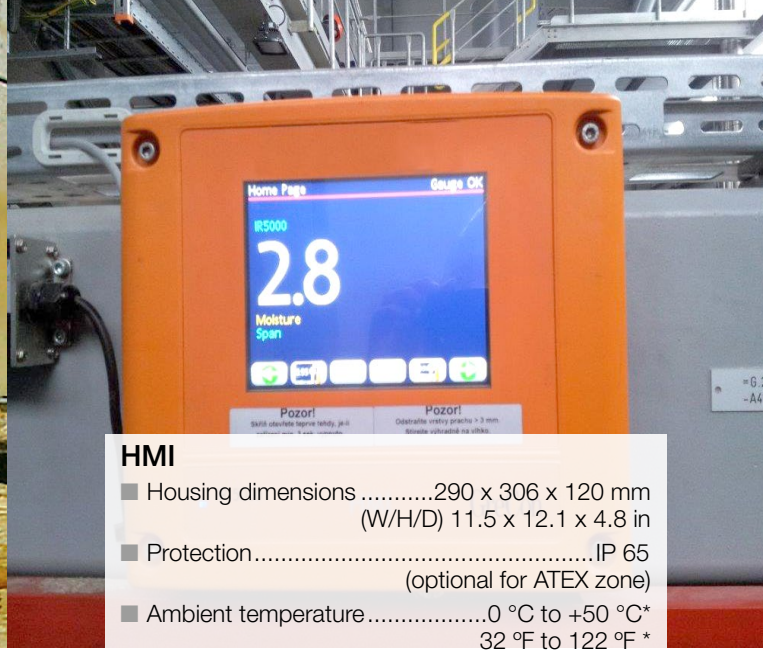
■ Online Support
GreCon measuring systems are equipped with GreCon online support SATELLITE.

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.

Moisture measurement in running process

IR 5000 in operation





Technical Specifications

Measuring Head

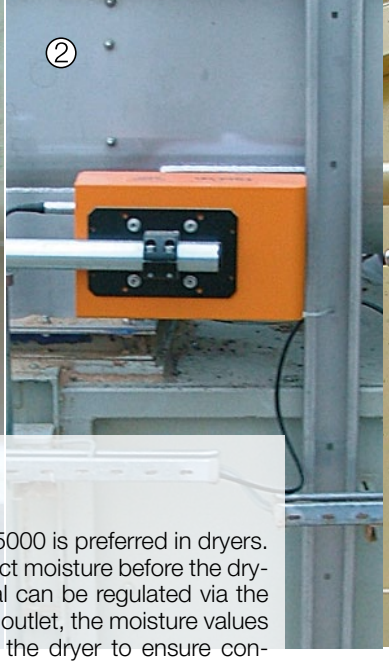
- Housing dimensions ..... 190 x 166 x 316 mm (W/H/D) / 7.5 x 6.6 x 12.4 in
- Measuring accuracy .± 0,1 % (repeating accuracy)
- Protection .....IP 65 (optional for ATEX zone)
- Product temperature.....+1 °C to +120 °C 33 °F to 248 °F
- Ambient temperature ..... 0 °C to +50 °C* 32 °F to 122 °F *
- Measuring ranges .....easily selectable 0 to 5 %, 0 to 10 %, 5 to 20 % and 35 to 100 %
- Measurement output ..... % atro or % absolute
- Measuring distance ..... approx. 250 mm
- Max. material height fluctuation .± 100 mm / 4 in
- Power.....24 V DC

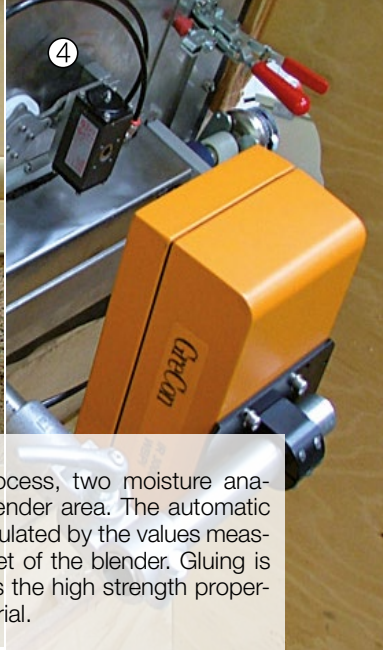
* with heating/cooling devices
-30 °C to +70 °C / -22 °F to +158 °F are possible (option)

HMI

- Housing dimensions .....290 x 306 x 120 mm (W/H/D) 11.5 x 12.1 x 4.8 in
- Protection.....IP 65 (optional for ATEX zone)
- Ambient temperature.....0 °C to +50 °C* 32 °F to 122 °F *
- Representation .....LCD touch screen
- Analog outputs .....2 outputs 4 to 20 mA
- Digital outputs .....2 alarm outputs
- Product memory.....up to 80 product recipes
- Power input ..... 90 to 264 V universal
- Frequency ..... 47 Hz to 63 Hz
- Power consumption .....42 VA
- Ethernet.....Profibus, Profinet, DeviceNet, Modbus TCP, Ethernet IP

Deviations on demand





Applications

■ Dryer
A combination of two IR 5000 is preferred in dryers. With the measured product moisture before the dryer, the amount of material can be regulated via the feed velocity. At the dryer outlet, the moisture values can be used to regulate the dryer to ensure constant product moisture, and to save energy through control of the drying process.

■ Screw Conveyor
In screw conveyors, the moisture is measured directly in the material flow through a glass pane.

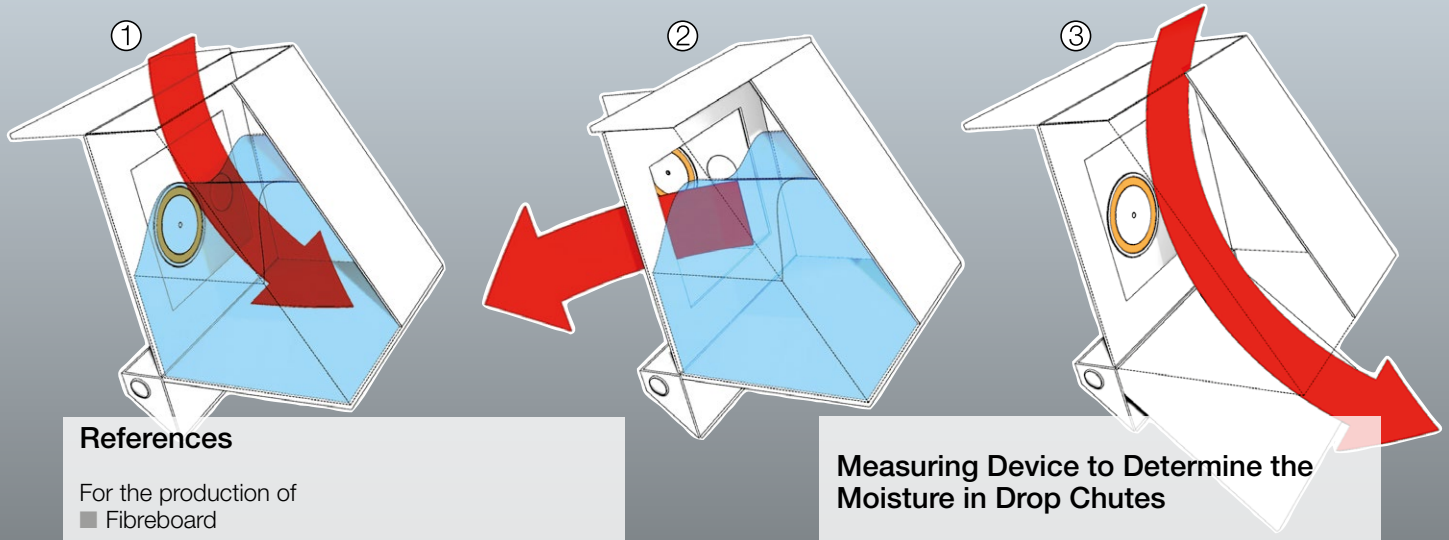
■ Conveyor Belt
The IR 5000 can be installed in or after conveyor belts for continuous moisture measurement.

■ Drop Chute
In drop chutes, e.g. after dryers, the IR 5000 is used with a measuring device (MV). With the integrated collecting basin of the MV, material is collected and measured. This method allows the measurement of freely falling materials with the IR 5000.

■ Blender
Similar to the drying process, two moisture analysers are used in the blender area. The automatic supply of glue can be regulated by the values measured at the inlet and outlet of the blender. Gluing is optimised, which ensures the high strength properties of wood based material.

■ Forming Line
The use of a moisture analyser in or after the forming line gives final data about the spread chip or fibre mat. Automatic control of upstream processes of chip or fibre processing is possible.

① Trough of screw conveyor
② Forming belt, belt scale or conveyor belt
③ Side wall of dosing bin
④ MV in drop chute underneath dryer cyclone



References

For the production of

- Fibreboard
- Gypsum board
- HDF board
- Hardboard
- OSB board
- Particleboard
- Wood cement
- Wet fibreboard
- Mineral fibre
- Poplar insulating board
- as well as for recycling for energy generation

Measuring Device to Determine the Moisture in Drop Chutes

The measuring device is especially suitable to determine the material moisture.

With the measuring device, the material is collected and measured in a special collecting basin. After each measurement, a flap mechanism is opened, and the measured material is returned to the production process. At the same time, new material is taken and measurement starts again.

The measuring device has an access port to the outside which makes the taking of samples and a check of the IR 5000 measuring system possible at any time (even during production).

This development gives you reliable moisture measurement directly after the dryer. A further advantage is the ability to check the measured results at any time.

① Filling of measuring device
② Taking of samples
③ Emptying of measuring device