

UPU 5000

Inline Delamination Detection and Process Trending
with the Ultrasonic Measuring System



GreCon®

Delamination Detection and Process Trending with the GreCon Ultrasonic Measuring System

Exploit all reserves of your production, homogenise your process, increase the availability of your equipment and increase your profit.

Unused reserves lead to increased costs; blisters to unsatisfied customers and lost profits.

The GreCon Ultrasonic Measuring System UPU 5000 is the optimum measuring system to produce high-quality wood based panels at optimised expense. At the same time, blisters can be avoided thanks to the integrated blow detection system.

Blow Detection and Process Optimisation

Using the trend calculation from the measured values, the plant operator is able to prevent the production of blister panels. This way, the production of rejects can be avoided.

The signal detected by the ultrasonic receivers is influenced by changes in important process parameters, such as press factors, density or material moisture. These process parameters directly influence the quality of a panel. The degree of glue cure is a measure of ultrasound absorption. The higher the degree of glue cure, the lower the absorption of the ultrasound by the panel.

Besides the parameters to optimise the production process, the UPU 5000 presents an integrated blow detection for final quality control and sorting of the measured panels. If blows occur, their size and location is clearly represented. The defective panels are marked, and a signal is given to allow them to be identified for rejection. Different blow definitions allow a graded quality sorting.

Automatic Calibration and Adjustment

Basically, the quality of the measuring results depends on constant conditions during measurement. Because this cannot be permanently ensured under industrial conditions, the GreCon Ultrasonic Measuring System is equipped with a patented automatic calibration and dirt accumulation control. After the first calibration of the measurement transducers to

a reference value, the system is automatically checked for accumulated dirt at pre-determined intervals. If an inspection channel strongly deviates from the adjusted reference value due to this accumulation, a warning is output for the operator. If signal degradation reaches the limiting value, the next maintenance interval is indicated to the operator.

ct-Frame

To achieve a continuous system availability, the UPU 5000 can be equipped with a ct-frame. This basic construction of the measuring system makes an installation after saws or in continuous productions possible. The system can be calibrated and adjusted at any time by moving the ct-frames sideways out of the production line. Maintenance, diagnostics and repairs can be carried out during the running production. Furthermore, the mobile construction of the system allows an escape run in case of big blisters and thus prevents the measuring system from being damaged.



Operational Reliability

Thanks to the automatic calibration, an integrated self-diagnostic system and the construction of the system with a ct-frame, a high availability and operational reliability and, above all, a constant measuring quality is ensured. This leads to high confidence in and acceptance of the system by the operator. The automatic external adjustment and the integrated dirt accumulation control ensure a measurement that is independent of surroundings. It is only an external adjustment of each inspection channel that ensures a permanently reliable measurement. It ensures that the represented information is a reliable basis to regulate and optimise production processes. With the reference values for the measurement transducers remaining constant, it is possible to go beyond a simple yes/no statement and to optimise the process by means of the intelligent, newly developed parameters.

Construction of the System

Up to 22 inspection channels can be mounted on a frame, which is made out of patented aluminium profiles. The cable and compressed air ducts are integrated in the profile and thus protected against surroundings.

Optimised Measurement Transducers

Ceramic transmitters, which are installed below the material to be measured, create the necessary ultrasonic energy. The emitted ultrasonic pulse is directed to the receivers through the panel.

The receivers, installed above the material, can tilt backwards or forwards. Thanks to this hinged mechanism, the receivers are protected against damage by big blisters and mechanical misadjustment.

Combination with Other Measuring Systems

The Ultrasonic Measuring System UPU 5000 is a modular system that can be adapted to changing requirements at any time.

It can be combined with the GreCon Thickness Gauge DMR 5000 and the GreCon Board Scale to a quality assurance station.



Software

The visualisation software of all GreCon measuring systems is based on Windows. The software of the UPU 5000 consists of the following program modules:

■ Recipe Management

This is a product data base in which different panel types and production parameters, which are relevant for the measuring system, can be stored.

■ 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 an intuitive operation possible. Clear information and graphics enable the operator to quickly and effectively adjust the running production process. The measured panels are graphically represented in up to 250 colours. The colour balance gives information on the quality and homogeneity of the panels after pressing.

■ Quality Indicator

A clear indication of the current panel quality is the quality indicator. All measured values of a panel are compressed and represented as a quality key on a scale, similar to a speedometer.

■ Long-Time Graphic

To represent the trend of the panel quality, the maximum value, the quality key as average value and the minimum value of a panel are shown in a long-time graphic.

Furthermore, the homogeneity of the panel and the occurrence of blows and their size, measured over a longer time period, can be compressed and shown in this graphic.

■ DC Long-Time Graphic (Deviation Control)

Provides information on how homogeneous the panel was produced. The higher the DC value, the more inhomogeneous production and the higher the probability for the occurrence of blisters. With an increasing DC value, the deviations of the panel quality within the panel get bigger. The DC value indicates technological problems with glueing, spreading or pressing, for example.

■ SQL Data Base

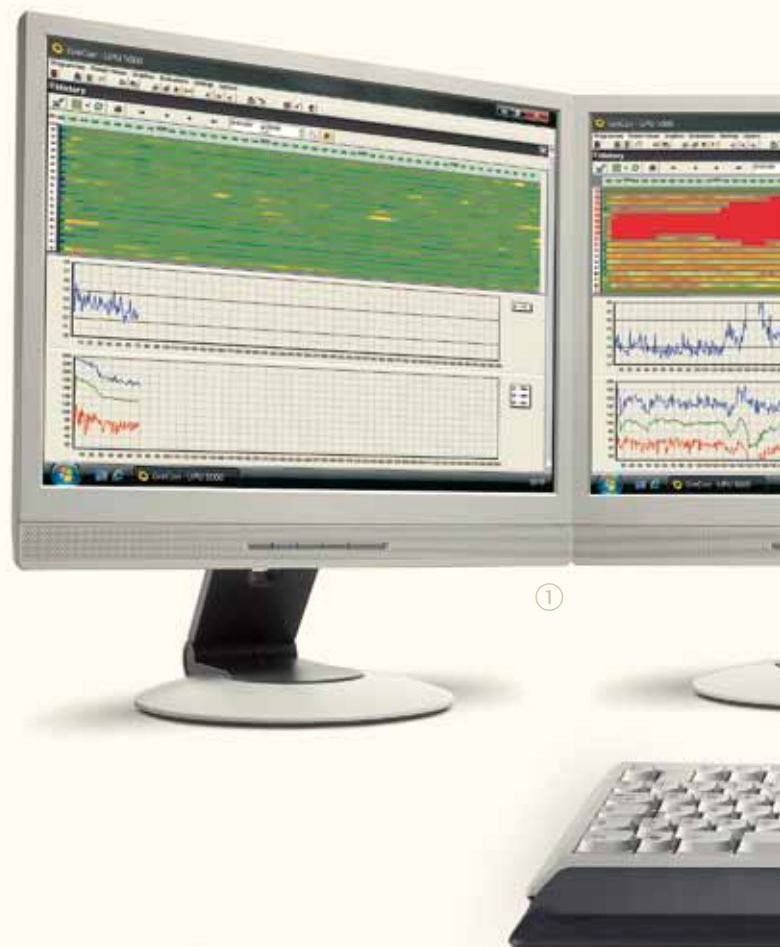
This data base stores the measured values and provides a function to export them to other file formats for further processing and evaluation. A uniform data structure provides easily accessible data for process control systems.

Network Connections

For the data transmission to higher-ranking process control systems, different network connections, such as OPC or ODBC, are available.

Online After-Sales Service

GreCon measuring systems are equipped with a modem or VPN, which provides a direct connection to GreCon service when needed. Support, changes in parameters, software updates and trouble shooting are all possible online.



Production Course

From the measured data, production processes can be easily traced or analysed over time. If this data is combined with other production data, further optimisation potentials can be revealed and taken advantage of.

① Starting Process

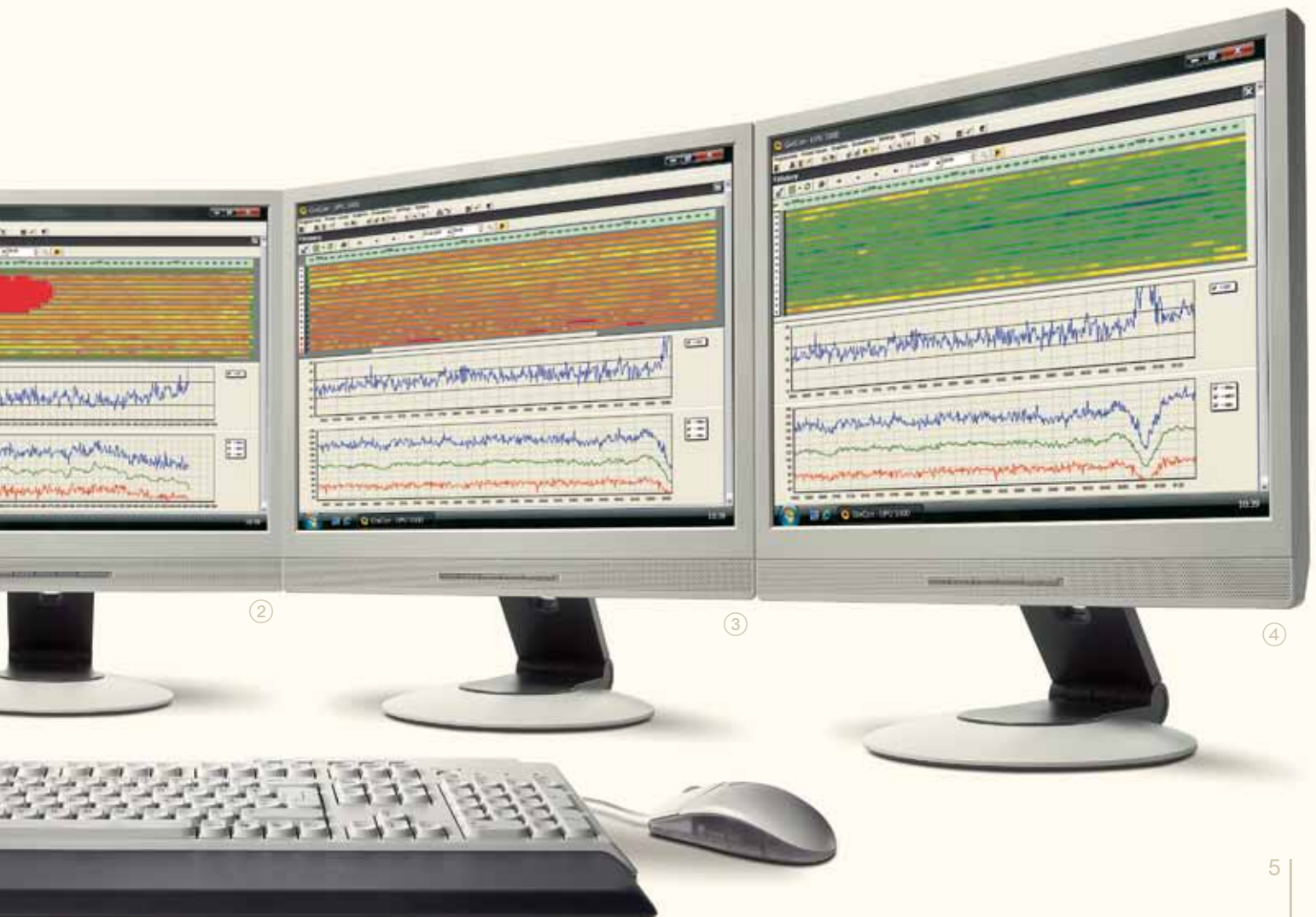
The starting process was stabilised and optimised to the required speed over a production period of about 30 panels. The minimum value and the average value clearly show the stabilisation of the panel quality. This fact and the falling risk of blisters are also represented in a falling DC value.

② Change in Speed

In the last third of the observation period, the production speed was continuously increased by up to 11 %. The increasing risk of blisters can be clearly seen from the increasing DC value. The production process can be deliberately run to the blister limits. A maximum capacity work-load is ensured.

③ + ④ Change in Moisture

A clear increase in material moisture, caused by a dryer extinguishment, leads to a negative peak of all quality indicators in the long-term graphic. The DC value jumps into the blister area. The second picture shows the normalisation of the production process after passage of the humid material. The maximum allowed steam pressure in the panel centre, before blisters occur, can be made visible by the visualisation and the trend indicators.



Technical Specifications

- Mains voltage: 230 V / 115 V
- Frequency: 50 Hz / 60 Hz
- Power consumption: 750 VA
- Compressed air supply: 6 bar / 90 psi
- Compressed air consumption: approx. 145 l/h / 0.1 cfm
- Max. number of inspection channels per electronics evaluation: 22
- Panel thickness: 1 to 45 mm / 0.04 to 1.77 in
- Conveying velocities: max. 250 m/min / 750 fpm
- Minimum detectable defect size: 25 mm x 25 mm / 0.98 in x 0.98 in
- Diameter of measuring spot: 50 mm / 2 in
- Mechanical width per inspection channel: 110 mm / 4.33 in

Technical Features

- Automatic calibration and adjustment
- Automatic dirt accumulation control
- Closed ceramic transmitters
- Integrated self-diagnostic system
- Receivers movable forwards and backwards
- Patented calibration
- Modular design
- Operation via control console (option)
- Recipe data base for automatic production change-over

- Graphical representation in up to 250 colours
- Quality indicator
- Long-term graphic to show the quality trend
- Storage of the measured data in a SQL data base
- Preparation for network connection is standard
- Interface to online after-sales service

Applications

■ After the Press

In the wood based industry, ultrasonic measuring systems are combined with GreCon Thickness Gauges DMR 5000 and Board Scales to Quality Assurance Stations TRI. An optimum evaluation of the production process is achieved by further measurement of the cool panel. For this purpose, an additional UPU system is installed after the last cooling zone.

■ On the Sanding Line

For final quality control of the finished wood based panel, the UPU 5000 is installed after the sanding line.

References

- MDF board, HDF board, hardboard, OSB board, particleboard, plywood, composite materials



ct-frame, left side in measuring position

Why GreCon

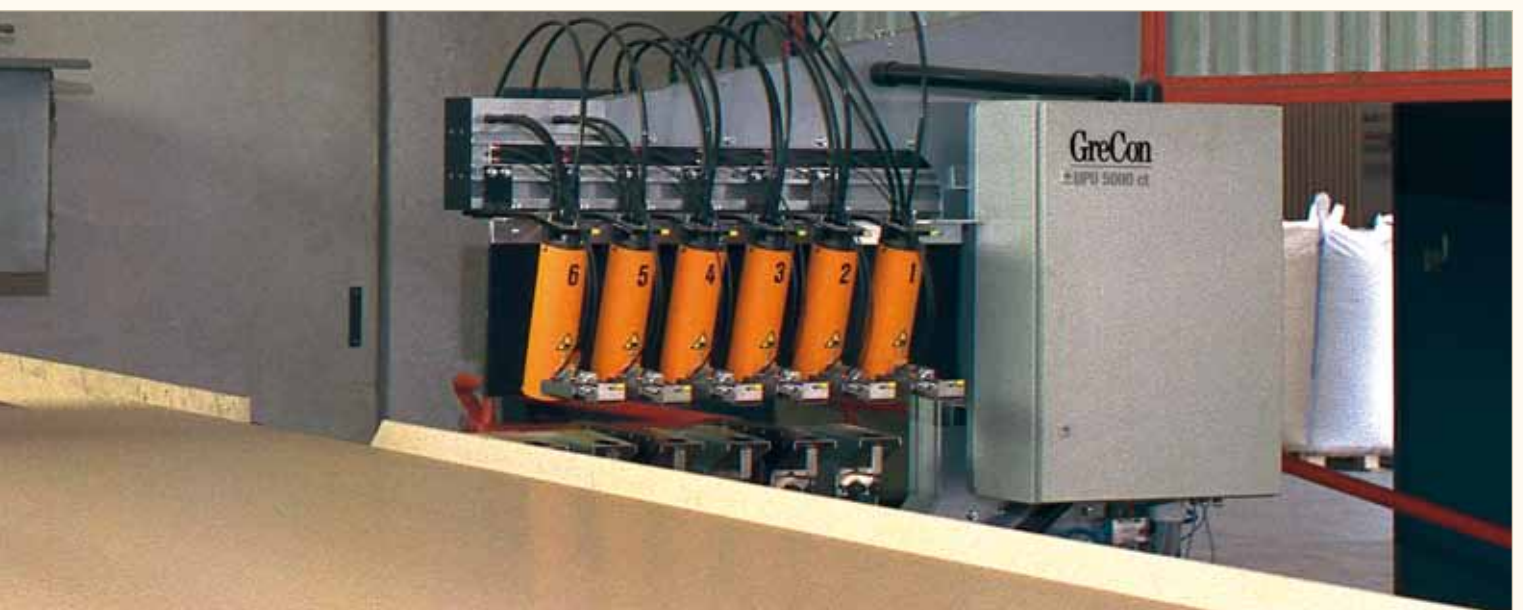


- Fast and early detection of quality fluctuations
- Detection of blisters and indication of exact position
- Visualisation of the effects of changes in the production process (intentional or unintentional)
- Automatic calibration with integrated dirt accumulation control
- Revelation of optimisation potentials
- With ct-frame: calibration, service and maintenance during running production
- Data base for recipes, measured data, calibration data, system adjustments
- Continuous evaluation - long-term graphic
- Reliable measured values
- High availability with ct-frame
- Flexibly usable for different products and product versions
- Minimisation of production costs
- Avoidance of rejected material
- Optimisation of the production process
- Low maintenance expense

Your Benefit



- Reduces (eliminates) complaints
- Reduces the rate of rejected material to < 1 %
- Shows irregularities in the production process and the panel homogeneity, process trending
- = quick rectification
- = saving of production costs
- Warns before blisters occur
- Optimisation of pressing times
- Cutout of defective panel sections
- Combination with ct-frame possible
- Quick production change-over
- Revaluation of existing production lines
- Quick amortisation
- Revelation of reserve capacities and hidden costs



ct-frame, right side in calibration/maintenance position



OUR HEADQUARTERS AT ALFELD - BUILT BY WALTER GROPIUS IN 1911

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