GreCon raw density profile measuring system STENOGRAPH installed after Conti press

Example figure

1. Your benefits

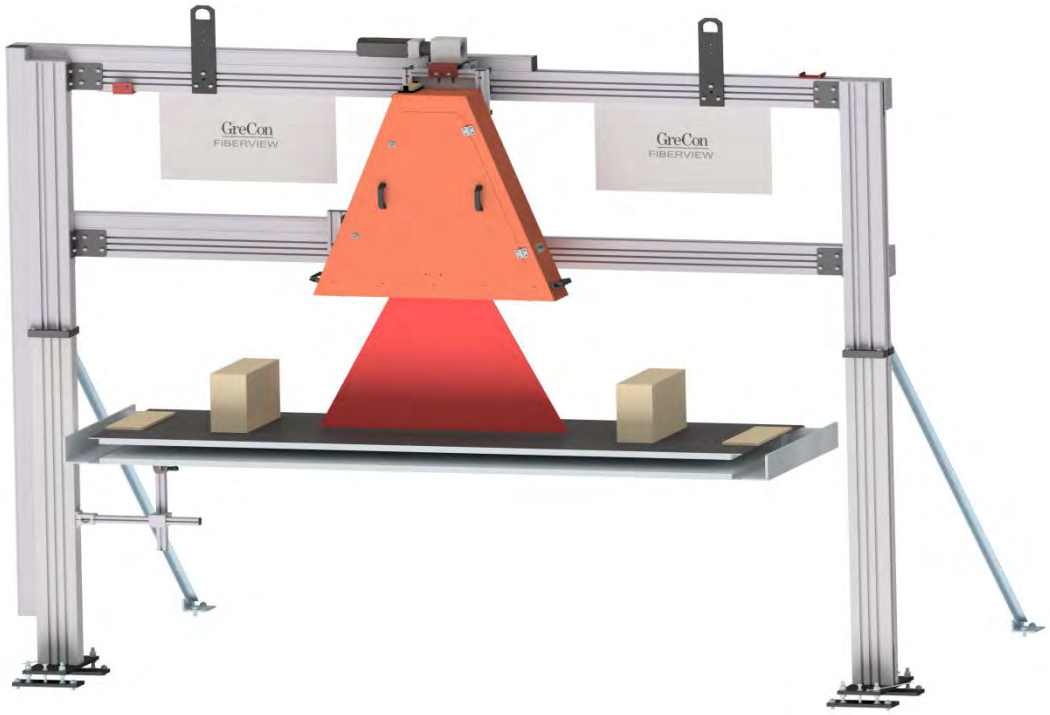
The GreCon raw density profile measuring system STENOGRAPH makes a non-destructive and continuous recording of the density profile during the running production operation possible. A continuous quality control is achieved and the requirement for a quick specific influencing is met. The relatively long distance in time in case of laboratory measurements is thus compensated.
A quick influencing of the upstream production processes which is possible with this new system provides many advantages:

- Process optimisation by specific material saving
- Permanent inline control of the density profile
- Reduction of material and energy costs
- Increase of the production speed and efficiency of the system
- Continuous quality monitoring
- Reduced running-in times (i.a. in case of product change)
- Optimal adaptation of the production to the board type by permanent indication of the characteristics of the raw density profile

2. Installation parameters

Material:	MDF boards
Installation Place:	Press out feed
Requirements for the Installation Place:	Board transport with low vibrations due to pressure rollers possibly to be provided locally. Exact guidance of the supporting table to be provided locally (approx. 1 m length). The design of this supporting table is carried out taking into consideration the local conditions according to our specifications. The design of this guiding table is carried out taking into consideration appropriate measures as saws/crackers and holding-down device.
Maintenance and calibration position:	optionally on the left or right side
Measuring range:	400 to 1.500 kg/m³ (> on demand)
Board thickness:	3-40 mm or 12 – 65mm, (other board thickness on demand)
Measuring step size:	0.01 to 2 mm (variable)
Measuring speed	0.01 to 2 mm (variable)
Boards`passage height at the	100 mm
Max. working width	3.000 mm (> on demand)
Passage width	4.200 mm
Air supply:	6 bar
Protective device to smooth blisters: :	to be provided locally
Ambient temperature:	+5 to +45 °C
Power supply:	3 x 400 V, N, PE, 50 to 60 Hz

GreCon FIBERVIEW



Example figure

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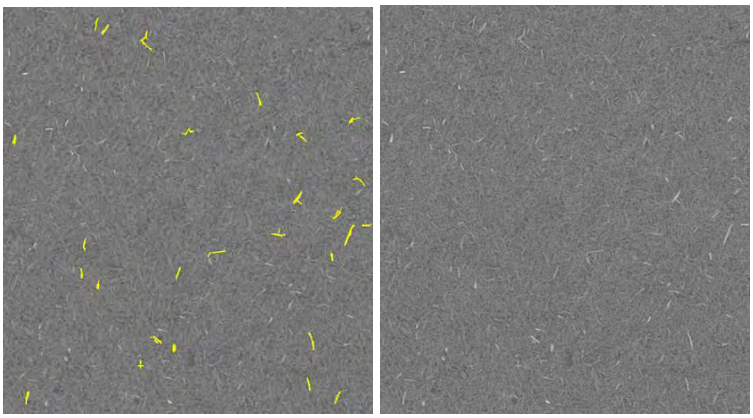
1. Your benefits

Continuous monitoring of the fibre quality

The fibre inspection system FIBERVIEW detects bright fibre bundles which are not open (so-called “Shives”) on the mat surface behind the prepress in the flow and thus guarantees a continuous monitoring of the scattered fibres in the board production. Different trend information, as e.g. the fibre size, makes detailed conclusions on the upstream production process possible.

- Safe, objective and representative analysis of the fibre mat regarding the number of Shives
- Control and optimisation of the defibration process
- Quality assurance and reduction of customer complaints
- Analysis of the fibre quality for different fibre qualities
- Analysis of the surface quality for the further finishing of the board (direct print)
- Optimisation of the life cycle of the refiner slices
- Energy saving at the refiner



Example figure:
Graphic representation of shives within the fibre mat

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Fagus GreCon

GreCon raw board scale CS 5000

Annex
GreCon raw board scale CS 5000

Example figure

GreCon scope of supply and technical explanations

Functional description

The GreCon raw board scale **CS 5000** is installed in an existing weighing table. The measured value is recorded via weighing cells installed with vibration damping in the radial support. The control of the measured value acquisition is carried outCS by light barriers at the weighing table. The preprocessing and filtering of the recorded measured values which are then sent to the analysis unit for further processing and final analysis are realised via a weighing electronics. The evaluation unit is a computer integrated in a touch display.

The touch display can be used directly at the production line to display the current measuring results and to control the scale. Furthermore, specified values can be entered in the stand alone operation.

In combination with a GreCon thickness gauge, the weight values are transferred to the thickness gauge and made available on the visualisation system in the control station. The raw density of the board is calculated with the relevant measured thickness values.

In case of a scale which is separated spatially from the GreCon thickness gauge, the measured thickness values and the scale values are assigned exactly via an optimal board tracking. It is not important whether the scale is provided up or downstream to the thickness gauge. Boards that are fed out in between are identified.

Accuracy and requirements

We have no influence on the design of the weighing table and the measuring inaccuracies relating to it in the dynamic operation. This refers especially to vibrations due to drive units. Therefore, the customer has to ensure that the board to be measured runs smoothly above the scale. The weighing table designs with transport rollers are not appropriate. We recommend using belt conveyors. Vibrations of the weighing table cause a higher filtering and extend the measuring time!

Any occurring temperature changes can result in a measuring error if the scale is not readjusted in regular intervals. Therefore, an automatic taring takes place regularly. In case of very quick board sequences (simultaneous infeed and outfeed of boards), sufficient taring gaps have to be guaranteed in the below described time intervals.

The weighing precision depends on the tare weight of the scale and the board weight amongst others. Therefore the following details are only valid in case of a correct measuring process and observing the previously described installation situation. The times are average values and can vary.

Assumption: 4 weighing cells of 1,000 kg, tare 2,000 kg, board weight 100 kg each

Measurement uncertainty over the whole measuring range: Approx... 0.01 % = ± 400 g
Time gap for taring: approx. 300 ms
Time distance between two taring processes: max. 5 min.
Time during which the board must be completely on the scale: approx. 1,000 ms

A) COMPONENTS

GreCon raw board scale CS 5000
consisting of the following individual components:

Evaluation unit
installed in sheet steel housing.
Dimensions (h x w x d) = 600 mm x 380 mm x 210 mm.
Mounted on a feet with 1,200 mm operating height.

- Protection type: casing IP 63, touch display IP 65
- Supply voltage: 230/110 V AC ± 10 %, 50/60 Hz
- Mains type: phase/neutral conductor/protective conductor
- Power consumption: 120 W (without use of the service socket: max 2.5 A)
- Operating temperature: 0 to 50 °C
- Control
- Network connection via Ethernet
- Display and operation via colour LC display 5.7" with touch screen
- 4 potential-free output contacts (measurement active/good/min/max)
- Incl. interface to GreCon DMx 6000

Light barriers for the measured value acquisition
An infeed and outfeed control of the boards as well as an occupation control of the scale at max. three positions on the weighing table can be carried out by means of light barriers mounted at the weight table.
- incl. fastener and respectively 20 m cable for the connection to the analysis unit
- max. 5 light barriers possible

Digital weighing electronics
for the assembly to the scale. This system is necessary as coupling element and signal level converter from the weighing cells to the analysis unit. The weighing signal is filtered in this module.
- Connection of 4 (max. 6) weighing cells in 4 or 6 conductors technology with signal level 2 mV/V or 2.85 mV/V
- Supply 24 V from the analysis unit
- Including 50 m special cable for a connection to the analysis unit
- Including prefabricated special cable to the terminal boxes of the weighing cells

Weighing technology
Consisting of:
- 2 pcs. of terminal boxes VKK to connect the weighing cells and for a connection with the digital weighing electronics.
- 4 pcs. radial supports GÜ/2, completely with upper and lower counterflange for a welding to the weighing table provided by customer and a potential equalisation bridge between the upper and the lower element. The radial supports are provided with:
  - 4 weighing cells 1,000 kg:
  - Protection type: IP 68
  - Operating temperature: -30 to +80 °C
  - Accuracy class: C3 according to the international accuracy classification OIML R60
  - Nominal specific value: 2.85 mV/V
  - Connecting cable length: 5 m (may not be shortened)

The weighing system can be extended by additional weighing cells with accessories at extra cost.

Board tracking
If the scale is separated spatially from a GreCon thickness gauge, the board is tracked on the exact path between the two systems to make a precise assignment of the measured weight and thickness values and thus the raw density of the board possible. The board is tracked by means of light barriers. The minimum distance between the light barriers may not be smaller than the shortest length of the board.
Max. 8 light barriers, incl. fastener and respectively 20 m cable for the connection to the analysis unit.

Extension package double scale
to extend the scale to a second weighing table
Consisting of:
- Digital weighing electronics
- 2 pcs. of terminal boxes VKK to connect the weighing cells and for a connection with the digital weighing electronics.
- 4 pcs. radial supports GÜ/2 including vibration damper
- 4 pcs. weighing cells 1,000 kg

SERVICES

Project planning and construction
During the entire duration of the project, when planning new plants or modernising existing plants and the associated electrical design, you will have a contact person at your disposal who will accompany the project from the initial discussion to commissioning on site. And, of course, beyond that.

Installation
The assembly of your GreCon systems takes place on site.

Please observe the applicable standards and the information in the installation instructions when installing the unit on site.

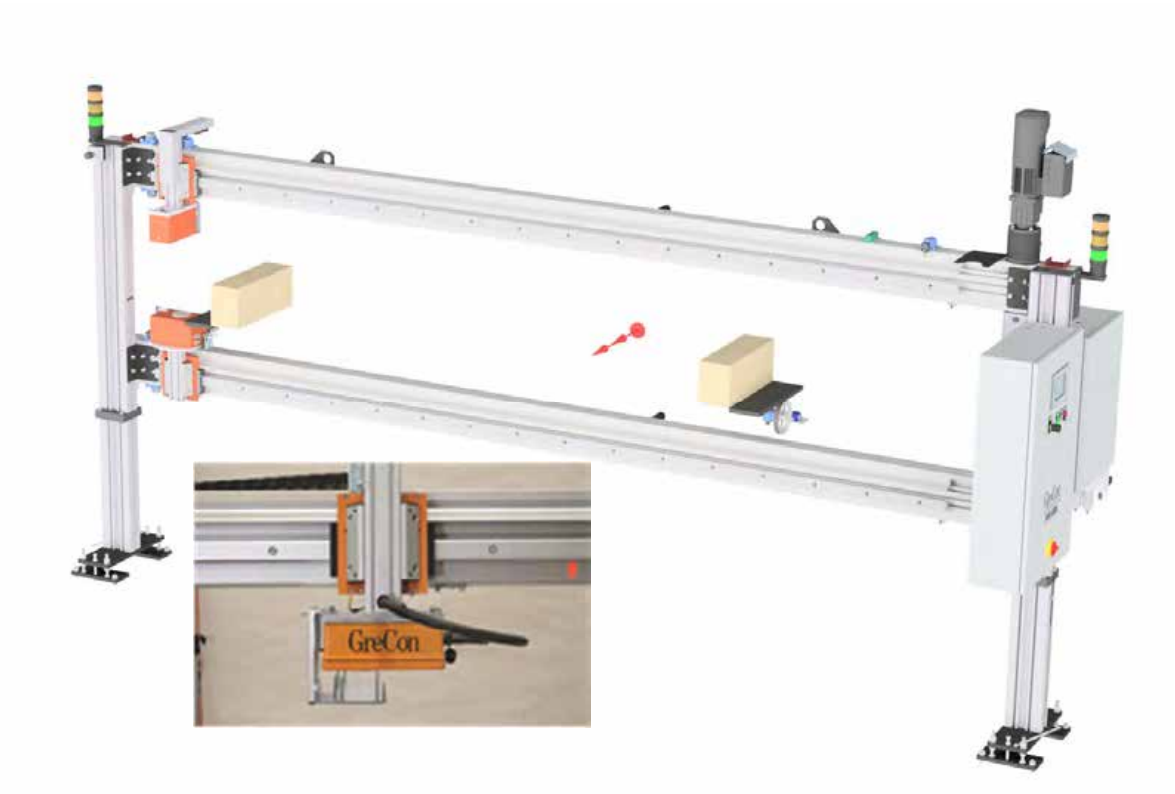
Installation supervision
With professional installation supervision by our service technician, you ensure during these decisive phases that your GreCon system is properly installed by your employees and that the Start- UP can take place smoothly.

- Smooth operation and professional installation is guaranteed
- Trouble-free and cost-effective commissioning ensured
- Solid basis for production operation

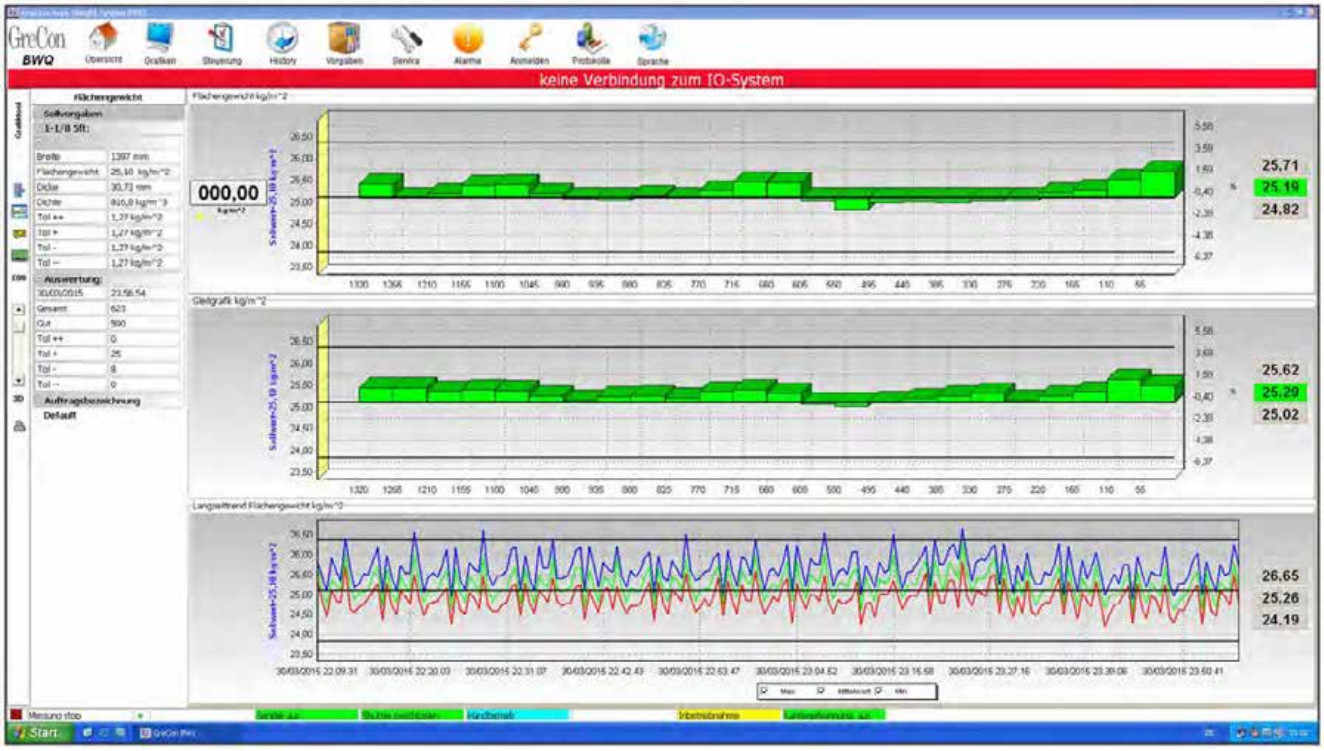
Startup
Benefit from a fast and professional commissioning of your GreCon system by our service technician.
A successful commissioning is the basis for a successful production operation.

- The installation is checked and corrected if necessary.
- Our service technicians adjust your new measuring system optimally and save the software with the settings in the form of a backup.
- All settings are documented for later use

Traversing GreCon weight per unit area gauge BWQ 5000



Annex
GreCon weight per unit area gauge BWQ 5000



Example figure

GreCon scope of supply and technical explanations

Functional description

The weight per unit area gauge is used for a non-contact and continuous measurement of the mat weight of the loosely spread fibre cake referring to the surface. With a stationary adjustment, the weight per unit area is measured on a line parallel to the work flow.

With a traversing adjustment of the cake edge to the cake edge, the weight per unit area is measured over the entire width. The measurement is carried out in the flow and the return flow.

The profile measured last is displayed on a screen. This profile is compared with a sliding average value profile. The sliding average profile is generated based on many consecutive individual profiles.

COMPONENTS & OPTIONS

GreCon weight per unit area gauge BWQ 5000
consisting of the following individual components:

Measuring unit
consisting of:
- X-ray components
- Measuring chamber

- Measuring range: 2 to 40 kg/m²
- Repeatability: ± 10 g/m² (± 1 σ)
- Display resolution: 10 g/m²

O-frame
to take up the X-ray tubes and measuring chamber.
Working width adapted to your production system
Working height: 670 mm
Foundation (concrete) locally by customer

- O-frame design, screwed, profile: aluminium design
- Angle feet with fixation drill holes 24 mm and jack screws M 16, substructure or foundation by customer
- 2 measuring cars at the top and at the bottom by internal toothed belt drive, drive unit clad by protection hoods.
- Drive: electronically controlled
- Torque safety coupling
- Feeding speed: 1.5 to 30 m/min.
- Transmission of the drive forces by toothed belts and tooth lock washer Thereby both measuring cars are synchronised.
- Limit switch for the measuring range and the calibration position
- Rotary encoder for the measuring position

The above mentioned dimensions are adapted to the local conditions. The working height (foundations made of concrete) must be adapted by the customer.

Foot extension of the O-frame
incl. struts to increase the stability for a working height of up to 2,500 mm if no local concrete base or a corresponding substructure is available.

Control console
In the mounting housing, firmly mounted to the O-frame, prewired

Dimensions (w x h x d?:400 x 900 x 250 mm
Protection type IP 54
Supply voltage: 230 V ± 10 % 50 Hz
110 V ± 10 % 60 Hz
Mains type: phase/neutral conductor/protective conductor

including:

- Power supply
- GreCon I/O computer with display
- Digital input cards
- Digital output cards
- Analogue input cards
- Counting cards
- Contact outputs, e.g. if the tolerances are exceeded ±
- Ethernet interface to transfer data to the visualisation computer
- Traversing control for the measuring head movement, forward and backward run Offset of the working width by the variable of the computer
- Manual control unit for the optional forward and backward run via touch panel (in manual position). Stop in every requested position.
- Calibration setting to move outside the working width.
- 2 signal lamps to signalise “ATTENTION RADIOGRAPHY”, mounted to the front sides of the O-frame

Control console cooling
in case of ambient temperatures of 40 °C to 60 °C to cool the switch cabinet.

Vortex cabinet cooler
Additional device to cool the unit at ambient temperatures of more than 40 °C to max. 65 °C. A clean air connection without humidity and oil is necessary.
Air performance: < 100 psi and < 190 l/min, depending on the ambient temperature

ATEX design
Design of the weigh per unit measuring gauge BWQ 5000 for Ex zone 22.

Conductor labelling
On request, we label all conductors in the control centre according to the circuit diagram provided.

Measuring data computer
incl. all necessary interfaces and input devices, adapted to the measuring system, Windows operating system.
Installation of all necessary programmes and drivers, incl. licenses and manuals,
incl. 24"-TFT flat screen

OPC communication interface
- Ethernet interface card for the connection to the control
- GreCon OPC client for the connection to the OPC server
- OPC server for all important types of control, as for example Siemens (S5 and S7), Allen Bradley and others
- Communication according to the GreCon data table for the recipe change and the measuring data transfer
- Sequential product change of the system parameters and the measuring parameters in case of a change of the product data. In case of a product change, the necessary data are read into the memory of the measuring system and taken over into the system by activation of a digital input in a timely manner.

Visualisation software
The ergonomically designed software based on the Windows operating system facilitates an easy handling of the system by the operator. The recorded measured values are processed and shown in a clearly structured way.

A. Control

The control software takes on all tasks which are necessary for a proper operation of the system:

- Measuring sensor check by means of a reference sample with tolerance monitoring
- 3 operating modes: stationary operation / step operation / cross operation

B. Configuration
The system can be adapted optimally by a system setup according to different requirements. Furthermore, there is a graphic setup by which the entire screen design of the graphic presentation can be compiled according to the own requirements.

C. Calibration
All parameters necessary can be set in a separate menu:
- Calibrating tolerance
- Calibration according to "n" traversing

D. Logging
A printout of the current graphic shown on the screen is possible by a keystroke. Furthermore, a numerical report can be printed out when the production type or the shift changes.

E. Operation
The operation is very easy and menu-driven. The operator must only
(1) enter the production type,
(2) possibly select the operating mode,
(3) start the automatic operation.

F. Miscellaneous
Error messages are displayed on the error message screen. Additionally a clearly visible message is shown in the head field if the tolerances are exceeded / not achieved.

The last 20 errors occurred are displayed with date and time on a long-term error page.

Storage of selected data (via a history administration) is optionally possible on the hard disk or a network (optionally). Furthermore, the data can be exported from the history administration in the standard file format CSV.

Different conditions can be switched potential-free via digital outputs:
- Tolerance exceeded
- Tolerance not achieved
- Alarm error message
- Alarm E-stop
- Signalising “ATTENTION RADIOGRAPHY” - no X-rays”

SERVICES

Project planning and construction

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Spare and Wearing Parts

Priority 1 / Wear parts:
These parts will be replaced by the GreCon technician during maintenance and should generally be stocked for any maintanance. The wearing parts include spare parts which are subject to mechanical or electrical wear.

Priority 2 / Customer Spare Parts:
These spare parts should be stocked to increase your system availability. Priority 2 spare parts can be replaced by your technician in the event of a fault or under the guidance of the GreCon Support.

Priority 3 / Stock Replacement Parts:
These replacement parts have a long life expectancy and thus a low probability of failure, but can be stocked to further increase the system availability. The spare parts of Priority 3 are characterized in that they are replaced by the GreCon specialist.

Special notes

The system works according to the principle of the radiometric penetration. An X-ray tube is used as radiation source. For this reason the equipment is subject to country-specific laws and regulations for the X-ray technology. *Any possible protective equipment at the place of measurement, e.g. barriers, etc., has to be provided locally by customer.*

X-ray tubes

The X-ray tube is a wear part and is therefore subject to the aging and consumption process. The operating time and the switching frequency have an important influence on the life of the X-ray.

Verifications and approvals

The necessary local regulations have to be observed and the possibly resulting approvals must be obtained. We help you with pleasure and make available the necessary documentation with the necessary technical details.

The costs or fees which accrue in connection with the operation of the system as well as any possible technical inspections by the local authorities are not included in the quotation price.

The customer is responsible for the acceptance necessary to use the system on site.