Dentro LRX

Rugged On-line Scanner

On-line Visualization of Embedded Defects and Material Properties

3 Key Features

1. Contactless Monitoring of the Entire Material
2. Water, Dust and Temperature Resistant
3. Operates with Non-ionizing Microwave Transmission

3 Key Benefits

1. Improve your Production Process
2. Peak Performance in Harsh Environment
3. Easy & Safe to Operate

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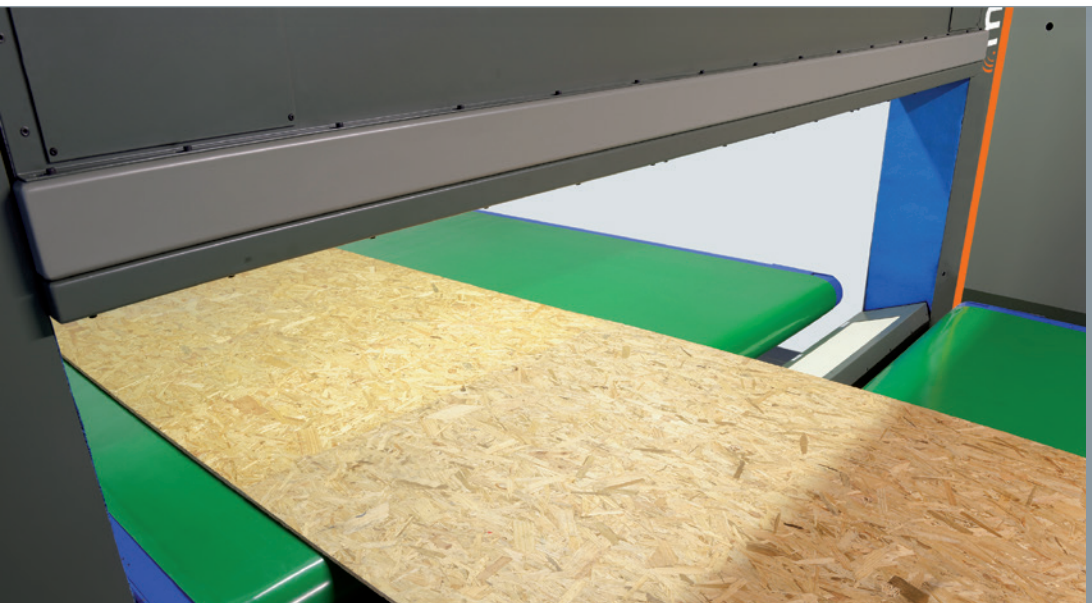
Microwave Vision Group

Control and Optimize your Production Process

Dentro LRX is a scanner that provides a full cross-sectional analysis of material on a continuous production line. It uses electromagnetic waves to reveal physical parameters (physical composition, moisture content, density, ...) or material defects (inclusions, wet pockets, knots in wood, leather hide defects, ...). The electromagnetic waves are transmitted through the entire thickness of the inspected material.

Dentro LRX does not require contact between the sensors and the material in motion. It offers an excellent resolution (centimeter) and eliminates safety hazards associated with scanners using ionizing radiation (like X or gamma rays).

This version is rugged, taking into account industrial constraints. Dentro LRX is waterproof, dustproof, vibration proof and is capable of sustaining high temperature variations. Dentro LRX completes the non destructive set of testing tools available to the industry. In addition to cameras (optical, thermal) and scanners (X or gamma rays), manufacturers can now rely on this innovative scanner to detect discrepancies, monitor material properties and improve their production process.



Material Discrepancy Detection

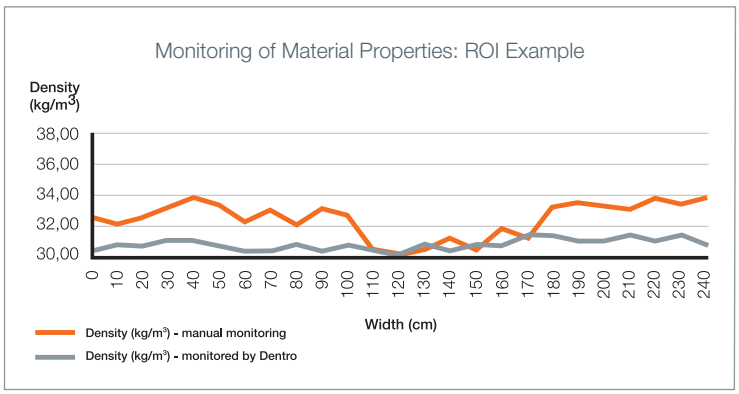
Defective materials automatically scrapped: connected to a marking/ejection system, products that do not meet quality requirements can be scrapped automatically.

- ↘ Decrease damage on production line
- ↘ Decrease customer complaints

Material Properties Monitoring

Material properties continuously monitored on the production line: refine the average value necessary to ensure production parameters, such as moisture content or density.

- ↗ Optimize use of raw material
- ↗ Save energy needed to produce the material
- ↗ Mitigate distribution of the material



Process Tracking

Dentro LRX provides several advanced statistical tracking tools. Learning when and where process problems occur, it is, in many cases, possible to prevent defects. This improves the overall product quality while minimizing scrap.

- ↗ Improve overall productivity

Peak Performance in Harsh Environments

Dentro gets rugged with water, dust and temperature resistance

This new rugged version can adapt to highly demanding industrial environments: At every design stage, special attention has been given to dust, water, vibrations and temperature constraints. Each and every component has been developed, tested and integrated with industrial environments in mind.

All instrumentation is protected by an uninterruptible power supply system. The instrumentation cabinet contains the signal generating and receiving systems, as well as a computer for data acquisition, processing and visualization. The instrumentation cabinet is IP 55 and the scanner is IP 65. Both the instrumentation cabinet and the sensors benefit from a powerful air conditioning system allowing Dentro to operate at temperatures up to 60°C (140°F).

Results are tangible: The Electromagnetic reference phase is stable at +/-1° – even under harsh temperature variations.

These results guarantee a high measurement repeatability rate.

Technical characteristics

Maximum number of modules	8
Distance between the emitting and receiving unit	Max. 80 cm/31 in
Weight of 1 module	35 kg/77 lb
Dimensions of 1 module	H45 x L27 x W90 cm H18 x L11 x W35 in
Number of sensors in the reception unit	64
Space between the sensors of the reception unit	10 mm/0.4 in
Ingress Protection of the module	IP 65
Ingress Protection of the cabinet	IP 55
Working temperature	up to 60°C/140°F
Dimensions of the instrumentation cabinet	H190 x W61 x D90 cm H75 x W24 x D35 in
Power supply	100 - 240 VAC
Typical power consumption	1100 W

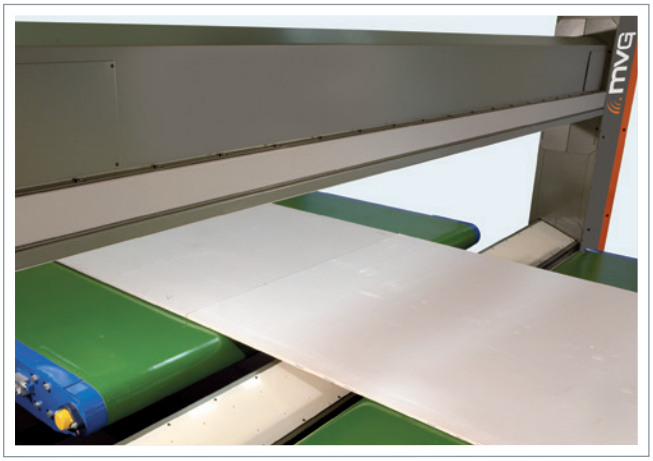
Dentro LRX is accurate: it continuously measures the entire substance

The receiving scanner is an array of sensor antennas with 10 mm (0.4 in) spacing. This sensor array is scanned electronically so that the collected measurement data can be gathered and processed instantaneously.

The real time scanning capability of the Dentro system enables measurement of the inspected material throughout its width and thickness at full production speed. Unlike mechanically traversing sensors, Dentro measures 100% of the material.

Throughout the production line, the scanning resolution is constant at 10 mm (0.4 in) along the scanner. In the direction of movement on the production line, the scanning resolution depends on the line speed and the required scan width.

- **6 modules (3.84 m/12.6 ft scan width) and a conveyor speed of 80 m/min (262 ft/min) provides a full scan for every 5 cm (2 in).**
- **1 module (64 cm/25 in scan width) and a conveyor speed of 40 m/min (131 ft/min) provides a full scan for every 1 cm (0.4 in).**



Easy & Safe to Operate

Dentro LRX is easy to install on any existing production line

It's non-intrusive

Dentro LRX can be mounted directly on the production line. It can easily be positioned between two conveyors. As there is no contact between the measurement system and the produced material, the system does not interfere with the production process.

It's modular

Dentro LRX is built in 64 cm (25 in) modules. Up to eight modules can be added (up to 5.12 m/16.8 ft) in order to fit the width of the production line.

Dentro LRX is simple to operate

The system is equipped with the Dentro Analysis software. This software performs the following tasks:

❶ Display measurement data in real time

The main window displays a continuously moving top-view image of the most recently measured data. Defects with a scan response higher than the specified pass/fail threshold level are highlighted with target indicators.

❷ Define measurement parameters

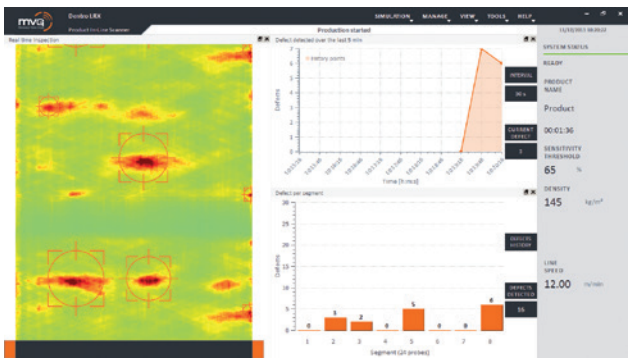
The user can configure the pass/fail sensitivity threshold for the marking of defects. The software also provides a second threshold for statistical analysis of defect occurrence, for process improvement purposes. Measurement settings and calibration coefficients are stored in a product database and will be automatically recalled when a given product is being produced.

❸ Control alarms and scrapping systems

The Dentro software can control most alarm types: visual, sound, control room display, etc. Marker guns and ejection systems can also be connected to the Dentro system.

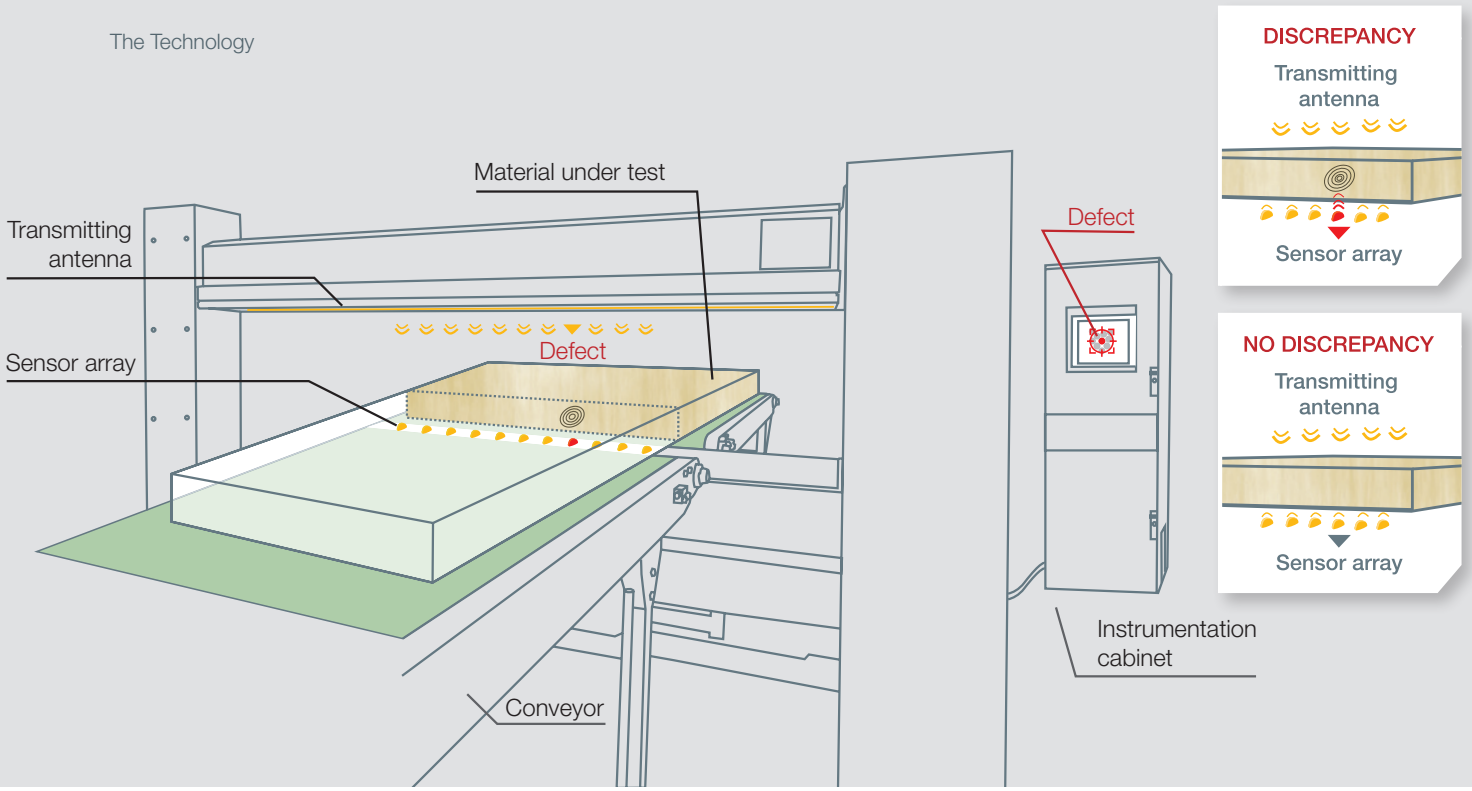
❹ Display statistical information and issue statistical reports

- Latest production review: displays the number of defects detected in the last 24 to 72 hours.
- Activity report: displays a list of the latest events registered in the system, such as identified defects, changes of production line parameters, etc.
- Histograms: contains frames that can be configured to show a wide range of measured and statistical parameters. Typical displays are the distribution of density across the width of the product and the defect occurrence frequency at different positions throughout the production line.



Non destructive control system

The Technology

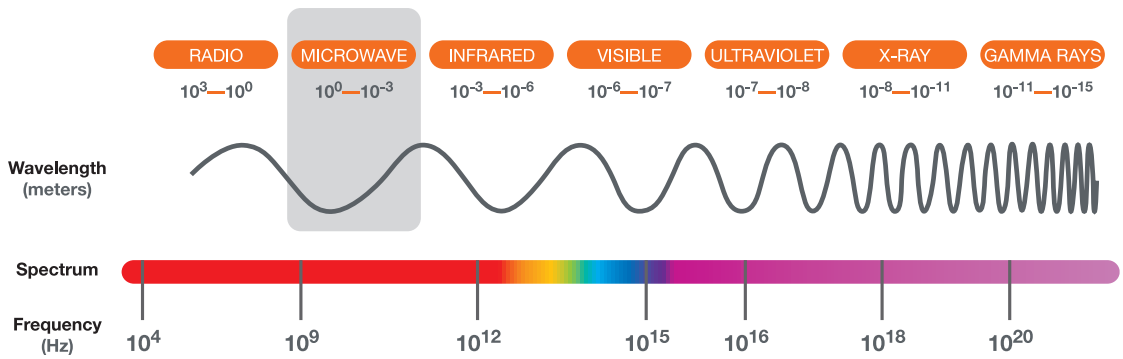


Dentro LRX is safe: it operates with non-ionizing microwave transmission

The system uses an electromagnetic field in the microwave frequency range. The level of emission is very low - no safety zone or special precautions are required.

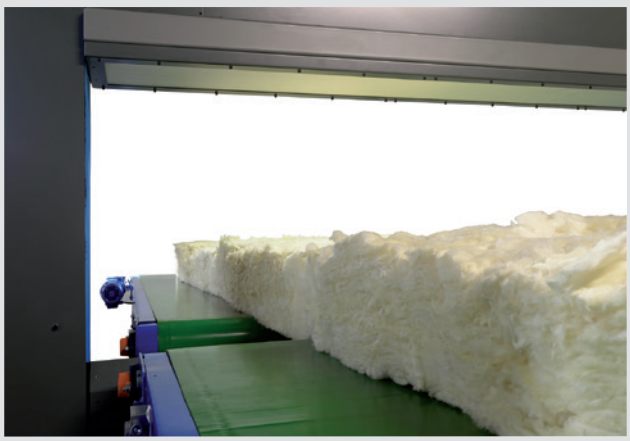
Dentro LRX's electromagnetic field emission level complies with the reference exposure level for workers - stipulated by the International Commission on Non-Ionizing Radiation Protection (ICNIRP).

The electromagnetic spectrum



How it works

The electromagnetic field is projected through the material from the transmitting antenna located above the production line. The sensor array, located underneath the material, measures the resulting electromagnetic field phase distribution. Sharp and isolated deviations in the measured field indicate local defects in the material, such as pockets of moisture. Material properties are continuously calculated from the difference between the measured field and a previously performed calibration measurement with no material present in the system.



Applications

Discrepancies that can be detected

- Inhomogeneous areas in homogeneous materials
- Moisture pockets
- Solid objects
- Metal objects
- Bubbles and cavities
- Leather hides

Dentro LRX effectively detects embedded defects in stone wool, glass wool and insulation material. MVG also accepts non-metallic materials without thickness variation to our R&D for analysis.

Material property measurement

- Density
- Moisture

2 conditions that ensure optimal use of the system:

1. The material must be sufficiently non-conductive to enable the electromagnetic field to propagate through the material.
2. There must be a detectable contrast between the defect and the surrounding material, i.e. difference of density or moisture content.

Measured materials

- Insulation material
- Stone wool
- Glass wool

- Wooden products
- Wood
- Plywood

- Building construction material
- Plasterboard

- Composite material
- Fiberglass

- Paper products
- Paper

- Leather hides

Watch the video

About Microwave Vision Group (MVG)

MVG is an innovative high-tech company, specialized in the design and production of real-time scanner systems for electromagnetic fields. For over 20 years, MVG has developed measurement systems based on its patented multi-probe technology (networks of electronically-scanned sensors).

MVG's customer satisfaction program

Our DENTRO LRX team is a group of highly-qualified engineers, dedicated to customer satisfaction.
They have thorough knowledge of the technology and are trained to understand the specifics of each application. They are MVG's best asset to ensure client satisfaction throughout the project(s):

- An on-site visit can be organized to perform a needs analysis
- Installation continues until final acceptance from the client
- All our systems are guaranteed one year
- Additional extended guarantees are available.

MVG is ISO 9001:2008 certified.

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