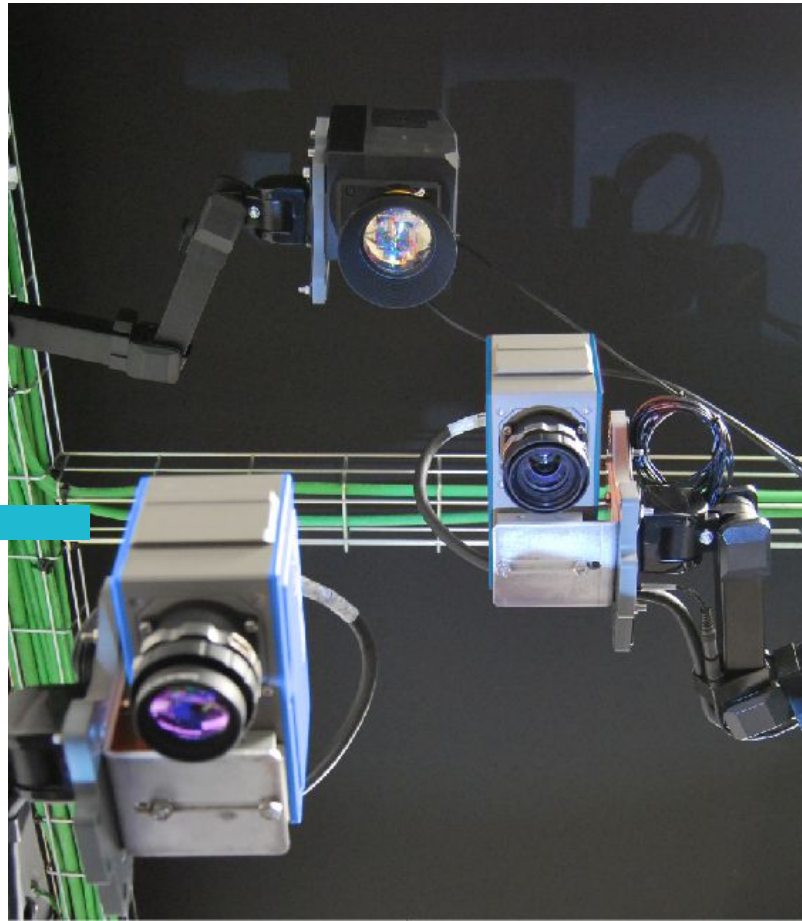




WOOD, PLASTICS & RECYCLING:
REAL-TIME QUALITY CONTROL
AND PROCESSES.



Who We Are

IRIS Technology Solutions is an engineering manufacturer of real-time process and quality control solutions with spectroscopy and artificial vision for the food, pharmaceutical, chemical, plastics, wood and other process industries.

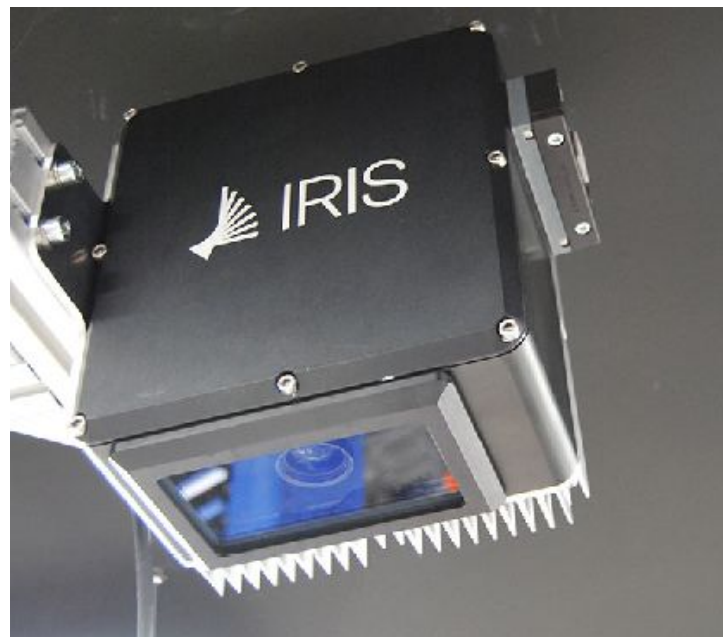
We are a deep-tech engineering company that contributes to Industrial Digital Transformation with 4.0 solutions.

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PLYWOOD AND
PARTICLEBOARD
MANUFACTURING

RECYCLING AND
CIRCULAR ECONOMY





PLASTIC INDUSTRY

REAL-TIME PROCESS AND QUALITY CONTROL IN THE PLASTICS INDUSTRY

The VISUM® family of multiparameter analyzers allows the monitoring of different processes and quality control in real time. It integrates optics, spectroscopy and artificial intelligence.

BENEFITS OF INCORPORATING VISUM®

- Non-destructive, non-invasive and intensive sampling. Its use does not require specialized personnel.
- Accurate and objective results in real time and at any point of the production line.
- Ad hoc adjustments for the production line.
- Real-time connection with the plant PLCs for immediate process correction.
- Calibrations for all products, with set values and uncertainty range.
- Early anomaly detection (EAD).
- Reduction of cycle time, losses and claims.
- Quality assurance according to GMP standards.

GENERAL APPLICATIONS

- Identification, classification and separation of polymers.
- Real time control of the polymerization process.
- Water content monitoring.
- Recycling.



In-line polymerization process control

The polymerization process or production of plastics can be monitored in-line inside the reactor in order to continuously analyze the different chemical reactions that form the polymer, detect anomalies for process correction, as well as to determine the end point of the process.

Currently there is no practical way to take samples during the process, as the temperature is usually high (100-200 °C) and the material very viscous. The end point is when all the reagents have been converted into the desired polymer, i.e. the reaction has been completed without any residues other than those that are unavoidable.

Monitoring consists of introducing an integrated probe to the NIR or In-Line Raman analyzer. The usefulness is to know what is happening inside the reactor to adjust the parameters - reagent addition, temperature adjustment - in order to achieve, in the shortest possible time, the optimal end point, with the consequent reduction of lead time and energy consumption.

¿Raman or NIR technology?

The use of NIR or Raman In-Line Visum spectroscopy is determined according to the parameters to be determined and the matrix, depending on the fluorescence and the nature of the different compounds that make them more or less visible with one or the other technology.



VISUM Raman In-Line Raman analyzer designed to be integrated into process machinery to monitor with high precision parameters with minimum concentrations and very complex matrices.



VISUM NIR In-Line Multiparametric NIR analyzer suitable for integration into conveyor belts, tanks or pipelines for continuous analysis.



VISUM PALM

Polymer identification and classification

Because NIR spectroscopy requires no sample preparation and is non-destructive, it is an excellent in-line or at-line analytical control tool for the identification and separation of plastics to obtain quantitative and qualitative parameters.

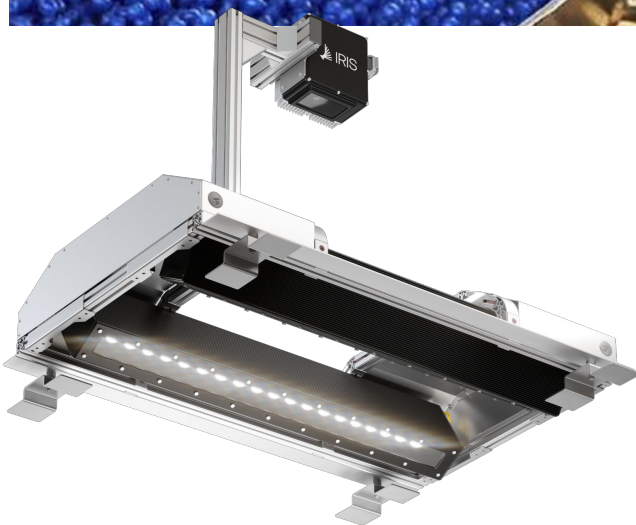
This control can be performed at-line with a Visum Palm (portable NIR) analyzer that includes models to characterize a large number of polymers, including PET, HDPE, LDPE, PP, PS, PVC, PC, ABS, to name a few.

The NIR is a useful tool for the identification of polymeric waste for recycling as it allows the characterization and valorization of waste plastic material as raw material in other processes and industries.



VISUM PALM Portable (handheld) NIR analyzer for at-line control or at different points of the process, from raw material to final quality control.

VISUM NIR In-Line & VISUM HSI



VISUM HSI: Hyperspectral NIR analyzer for on-line monitoring of physical-chemical parameters on a unit-by-unit and spatially distributed product basis.

Determination of the water content in the pellet at the exit of the polymerization process.

Practically all plastic used for composite molding is manufactured in pellet form. An undesirable by-product of the reaction is the water formed in the process.

The Visum HSI and Visum NIR In-Line analyzers are two ideal control tools for monitoring and determining the water content down to minute amounts as the product passes through a conveyor belt, alerting the manufacturer if excess water is detected to prevent the production of defective batches or future returns.



PLYWOOD AND PARTICLEBOARD MANUFACTURING

REAL-TIME HYPERSPECTRAL IMAGE ANALYZER

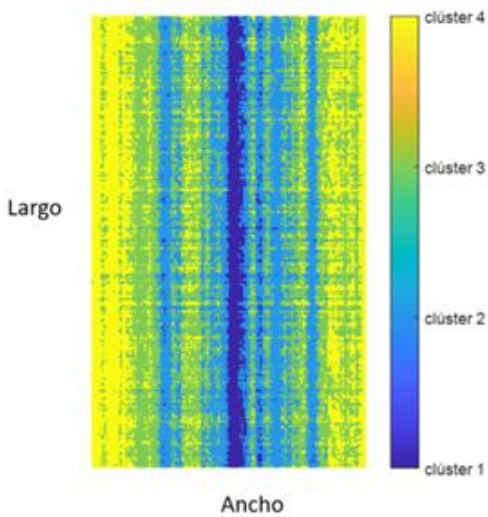
The **VISUM®** family of multi-parameter analyzers allows real-time process monitoring and quality control at different critical points along the entire production line. They integrate photonic (NIR) and/or hyperspectral imaging technologies and ICT (machine learning and specific software).

BENEFITS OF INCORPORATING VISUM

- Non-destructive, non-invasive and intensive sampling. Its use does not require specialized personnel.
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- Ad hoc adjustments for the production line.
- Real-time connection with the plant PLCs for immediate process correction.
- Calibration for all products, with set values and uncertainty range.
- Early anomaly detection (EAD).
- Reduction of cycle time, losses and claims.
- Quality assurance according to GMP standards.

GENERAL APPLICATIONS

- Supervision of various processes in the production of chipboard, e.g. inspection of the quality of the board coating process.
- Control and classification of the chipboard curing factor.
- In-line control of product distribution to ensure homogeneity and desired quantity of components in each product unit.
- Detection of defects imperceptible to the human eye and/or traditional machine vision cameras.
- Detection of foreign bodies -metals, rubber, among others- based on their morphology or composition.
- In-line characterization of raw material (chips) for process control.

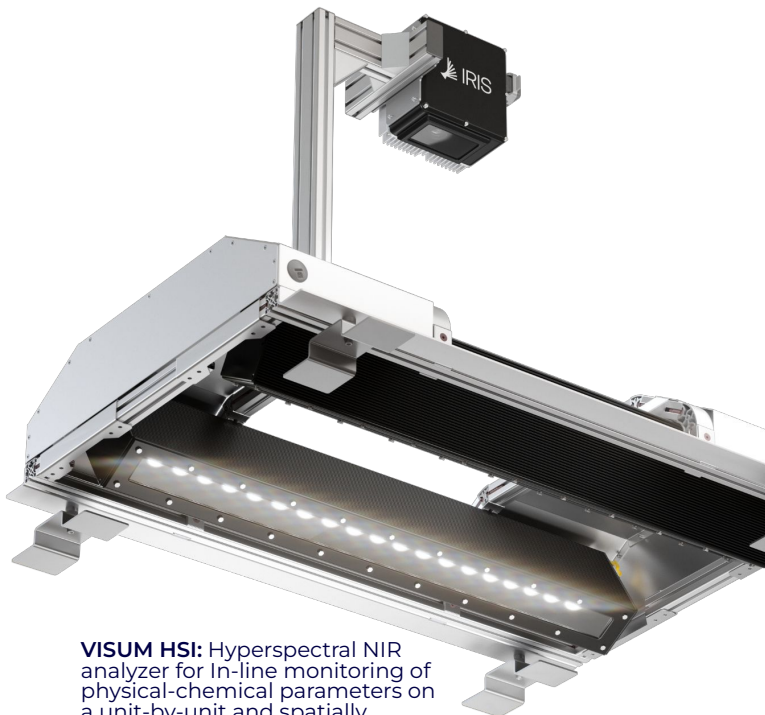


Curing defects

By implementing our **VISUM HSI** hyperspectral image analyzer, it is possible to inspect the entire board surface with machine learning tools capable of **classifying and determining the board cure factor**, unit by unit and pixel by pixel, non-destructively and in real time.

Its installation replaces quality control based on destructive techniques, consisting of chemical manipulations and visual inspection by an operator, limited to a few randomly selected samples.

The accuracy of the VISUM HSI system's determination of coating cure quality is more than 98% of the category. If defects are detected, the system generates an alarm that leads to rejection of the defective unit and inspection of the machinery in order to adjust the process parameters to correct the anomaly.



VISUM HSI: Hyperspectral NIR analyzer for In-line monitoring of physical-chemical parameters on a unit-by-unit and spatially distributed product basis.



VISUM HSI

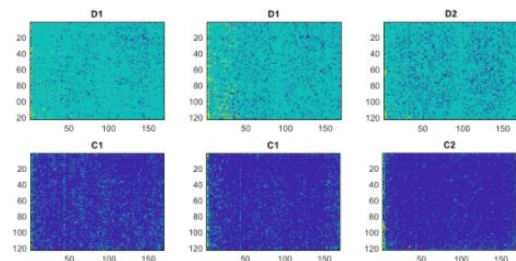
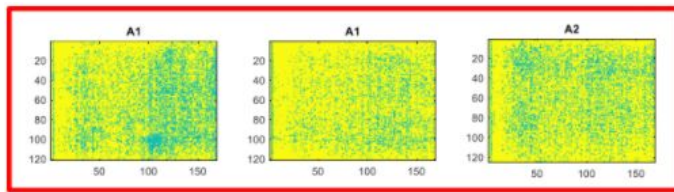


Moisture control in the impregnation line

The Visum HSI inspection system is able to monitor in two ranges (Vis-NIR and NIR) the **homogeneity and the amount of moisture** in the impregnated paper. Working in real time and connected to the PLC of the line, it identifies the paper reference (type/color) and performs a complete reading without the need for destructive or traditional quality controls.

The illumination system adapts to the line width and device calibration is minimal.

Overall, Visum HSI successfully predicts the level and distribution of moisture in the impregnated paper to detect anomalies in real time and avoid losses or claims.



VISUM HSI

Quantification of wood chips, moisture and detection of surface foreign bodies

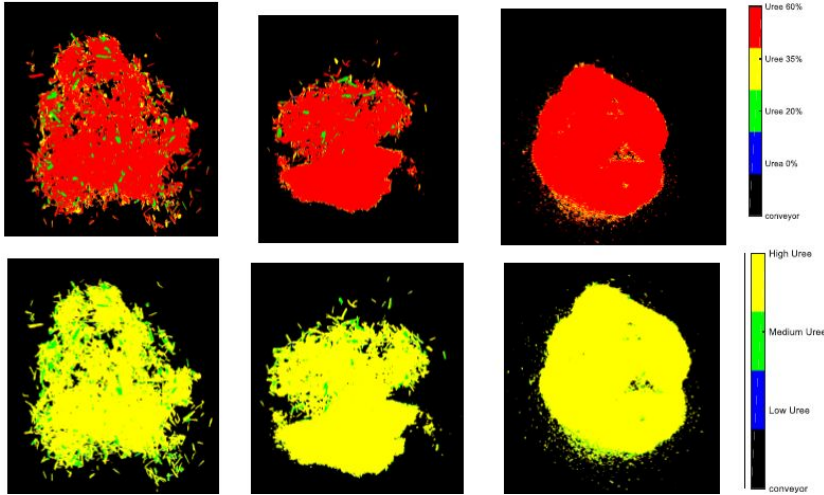
The Visum HSI inspection system operating in the SWIR range is capable of **monitoring and quantifying the amount of product** entering the board production (chips of pine, eucalyptus, poplar, among others, including subclasses) providing critical information to the subsequent processes of **defiberization and gluing**, prior to pressing, as these must be adapted to the wood species and the properties of the chips to ensure uniform quality.

In this way, the manufacturer can adjust process parameters, resin usage and times with high-precision analytical information on a continuous basis.

The system is able to determine by area other useful parameters such as moisture and - provided there is product distribution - to detect plastics, gums and other foreign elements that often generate problems in the final product quality and visible defects on the surface of the board.



VISUM HSI



Classification or quantification of urea formaldehyde content

Numerous adhesives, binders or resins are applied in the gluing process, including urea formaldehyde, one of the most widely used because of its enormous advantages in particleboard production.

The mixing of the wood chips with the adhesives determines the consistency and quality of the board resulting from pressing.

The Visum HSI system makes it possible to monitor the amount of urea formaldehyde present in the mixture on the drag belt prior to pressing, without the need to use traditional sampling techniques, making it possible to optimize the process, the formulation and avoid defects.



VISUM
SOLUTIONS

RECYCLING AND CIRCULAR ECONOMY

REAL-TIME PROCESS AND QUALITY CONTROL FOR THE CIRCULAR ECONOMY

The VISUM® family of multi-parameter analyzers enables real-time process monitoring and quality control. It integrates optics, spectroscopy, and artificial intelligence in the development of solutions for the Circular Economy.

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- Calibrations for all products, with established values and uncertainty range.

GENERAL APPLICATIONS

- Monitoring and quantification of organic waste.
- Identification and separation of plastics.
- Recycling of fabrics: classification of textile fibers.

VISUM HSI



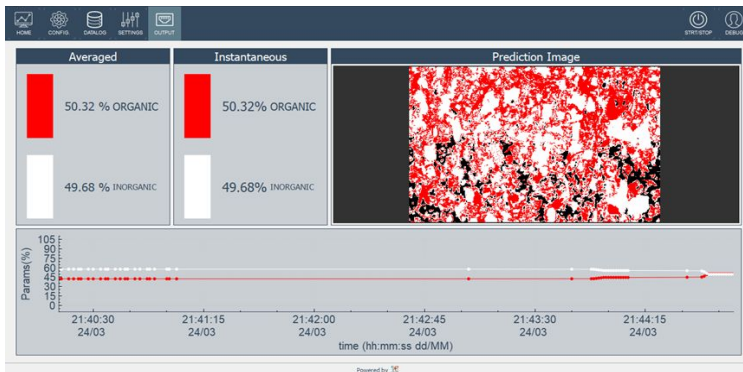
Organic waste monitoring

In organic waste recycling lines, not everything that passes through is necessarily organic matter. A fast and efficient way to know the distribution of waste passing over the belt is with hyperspectral NIR technology.

With the Visum HSI system, it is possible to monitor online the organic/inorganic content in the recycling plant to predict and adjust bioreactor parameters based on the ratio, optimizing its performance.



VISUM HSI: Hyperspectral NIR analyzer for in-line monitoring of physical-chemical parameters on a unit-by-unit basis and with spatial distribution.



VISUM HSI



Textile recycling

Textile products have individual spectral characteristics that can be used for classification. Textiles are based on three types of fibers: natural, man-made and synthetic.

Due to the differences in the chemical composition of each fiber type and how they are expressed in the NIR (Near-Infrared) viewing range, the Visum HSI hyperspectral imaging system can identify each of them and classify them automatically. Visum HSI in turn allows to obtain detailed information about the proportions of each category (% w/w), for the commercialization and valorization of the textile material for other industries or processes.

VISUM PALM



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