# VEREVEAL

## Hyperspectral Vision Module

## FAST, COMPREHENSIVE, AND NON-DESTRUCTIVE

VEreveal features the VEpioneer® core for inline Hyperspectral Vision inspection, tailored to your needs with the AI-equipped software VEsolve® Pro.

- VEreveal captures **surface properties, contaminations and deviations** in production **continuously and fast** (measurement frequence10 - 200 Hz).

- VEreveal boosts the information content by orders of magnitude compared to random sampling and single-point laboratory measurements like FT-IR, GD-OES, TEM/SEM, LIBS, X-ray, Contact-angle or AFM measurements with just **one comprehensive measurement** (100% of the production).

- VEreveal is a unique **combination of optical spectroscopy and imaging** to objectively assess the entire sample surface **non-destructively**.
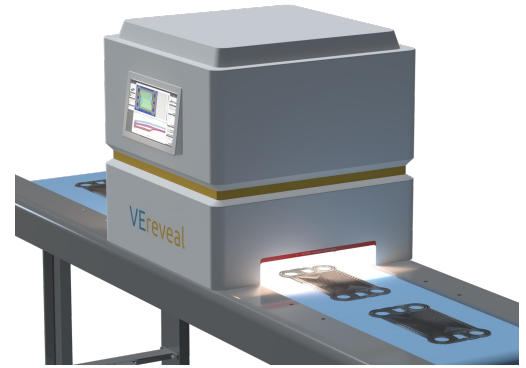
## INSPECTED MATERIALS

The system is designed for simple and fast area measurement of **surfaces and thin layers,** e.g.:

- Substrates: Metals, polymers, ceramics, glass, etc.
- Layers: Oxides, nitrides, carbides, polymers etc.

## INSIGHTS FROM INSPECTION

Extend your sample knowledge by spatially resolved optical recognition of:

- Layer thicknesses (1 nm -  500 µm, depending on layer material)
- Roughness of surfaces and interfaces
- Defects and contaminations of surfaces and layers
- Chemical, electrical and optical properties of surfaces and layers
- Quality criteria of surface and layers (i. e. processing status)

# VEsolve® Pro
## Hyperspectral Vision Software

## Targeted, Process-oriented, and AI-driven

VEsolve® Pro is the powerful all-in-one software suite designed for DIVE technology, comprising acquisition, screening and exploration of Hyperspectral Vision data ("hypercubes"). Easy handling of sophisticated math utilizing commonly known concepts empower users to commence productive work immediately.
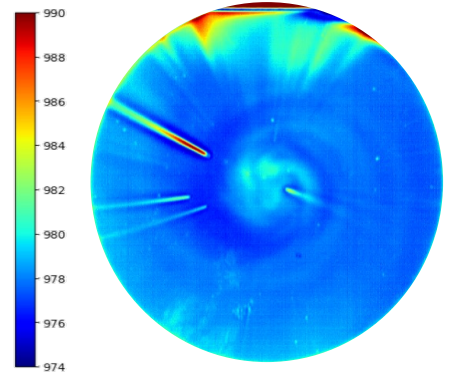


Layer thickness in nm as provided by VEsolve® Pro

- VEsolve® Pro controls VEreveal data capturing – providing optimised presets per sample and ensuring highest data quality through live correction of all non-sample influences.

- VEsolve® Pro processes inline acquired high-dimensional hypercubes close to real-time (milliseconds) and directly visualises the insights from inspection.

- The operator mode in VEsolve® Pro provides easy access to the pre-defined machine learning and AI algorithms by a one-click solution.

## Software Features

| Data acquisition | Live frame, white and dark reference, pixel-binning, exposure time, averaging (and more), widely assisted |
|---|---|
| Data screening and data pre-treatment | Hypercube editing (resampling, crop, stitching), Spectral processing (and more) |
| Data exploration | Machine learning algorithms |
| Unsupervised | PCA, k-means |
| Classification | LDA, random forest |
| Regression | PCR, PLS |
| Data import | ENVI (bsq, bil, bip), .jpg.hsi, .csv, .hdf |
| Data export | ENVI, .tiff, .jpg, .png, .csv, .xml |

# **VE**REVEAL

## Hyperspectral Vision Module

## TECHNICAL SPECIFICATIONS

| | |
|---|---|
| Imaging technique | Pushbroom scanning mode |
| Measurement mode | Reflectance (fluorescence on request) |
| Measurement frequence | 10 - 200 Hz |
| Wavelength range | VNIR: 400 – 1000 nm<br>SWIR 1: 900 – 1700 nm optional<br>SWIR 2: 1000 – 2500 nm on request |
| Spectral bands | 448 (VNIR) \| 224 (SWIR 1) |
| Spectral resolution | 1.34 nm (VNIR) \| 3.5 nm (SWIR 1) |
| Field of view (FOV) | customized for the production line<br>typical: min. 1 µm (µ-optics), max. 1 m (macro inspection) |
| Spatial resolution | application and sensor based, typically < 1 mm |
| Lighting | VEluminise: tuneable halogen broadband source for homogeneous light field<br>(broadband LED with spectral range 400 – 900 nm or UV-LED excitation optional) |
| Sample size | Width: 1000 mm maximum; sample height max. 10 mm |
| Sample stage | Custom definition, i. e. conveyor belt |
| Reference | reference integration into process system, if feasible selection of reference materials according to custom process (usually PTFE, protected aluminium) |
| Operating conditions | +5 ... +45 °C (non-condensing) |
| Module certification | CE, RoHS, UKCA |
| Power requirements | Rated voltage: 115 / 230 VAC,<br>Rated frequency: 50 - 60 Hz<br>Rated power: 170 W |
| Connectivity | RJ45 (ethernet) |
| Compute unit | Embedded module control<br>User interface: Laptop or PC (customer specification)<br>with DIVE VEsolve® Pro software |

## DIMENSIONS
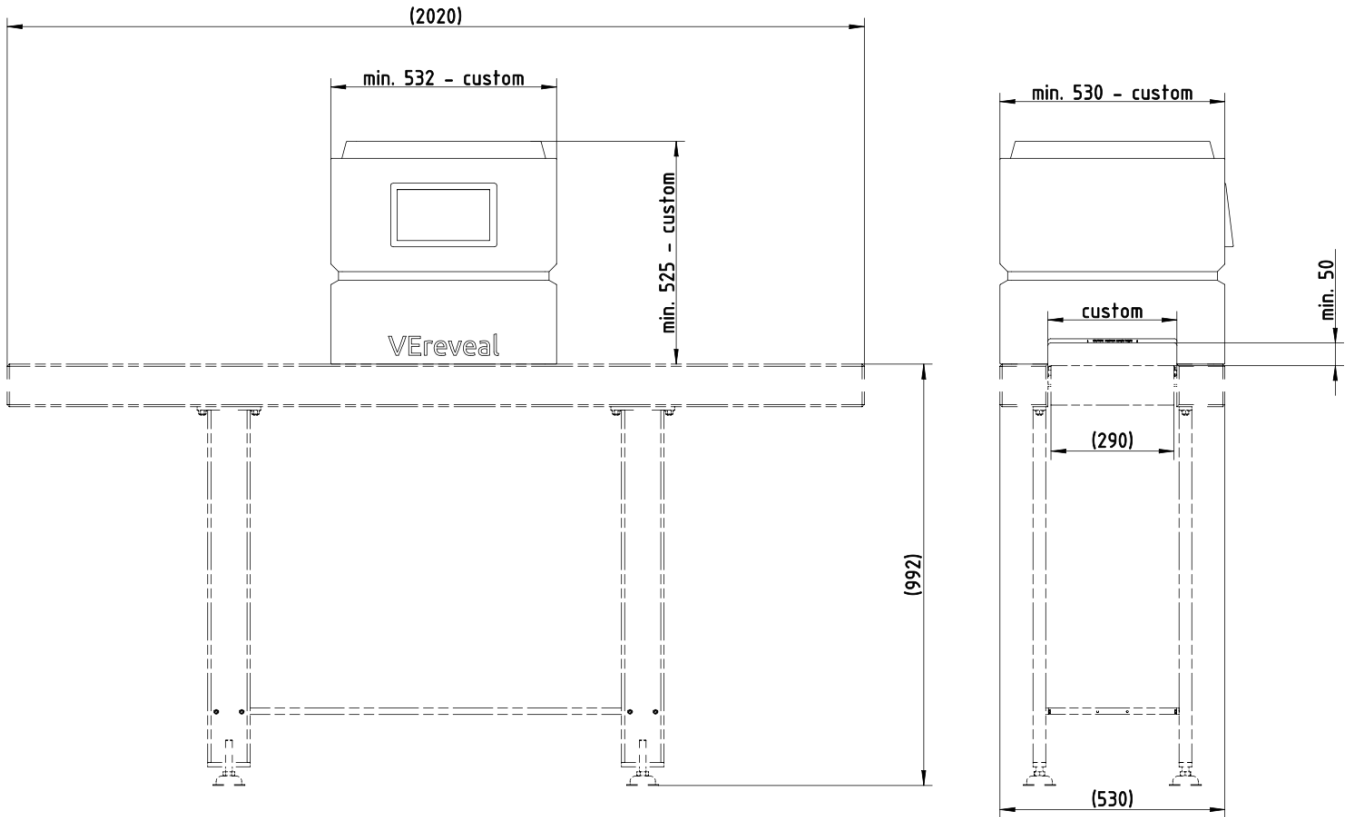


Dimensions are subject to sample sizes and the manufacturing process of the customer. The above dimensions provide an illustration of a specific use case with sample sizes of 120 mm x 220 mm.

## CONTACT

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