

IN-SITU QUALITY CONTROL SYSTEM

FOR BRAKE DISC LASER COATING PROCESS



Tested and validated by
VOLKSWAGEN R&D GROUP



SOLUTION FOR BRAKE DISC HS-LMD* PROCESS

DISCOVER IR SUITE is compatible with OPC-UA and integrable on PROFINET networks.

<p>Assessment of quality in real time</p>	<p>Easy installation and setup</p>	<p>Advanced software</p>
<p>Adapted high-speed infrared imaging camera</p>	<p>Suitable for AI and self-learning strategies</p>	<p>Enhanced productivity and decreased CO₂ emissions</p>



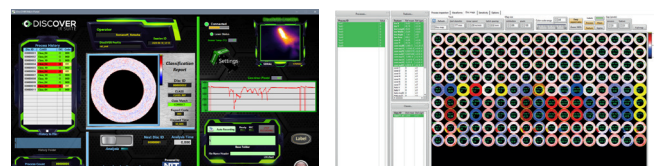
DISCOVER IR SUITE provides, in-process, quality assessment (Ok, NOK)** of a brake disc coating process.

A specially designed system captures, analyses and delivers key information from the process in-line.

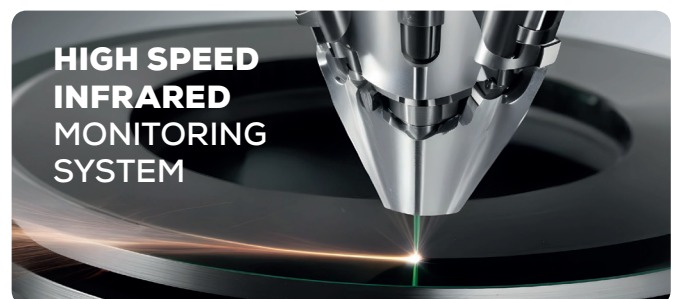
Mathematical treatment of the extracted information allows for the identification and classification of the most common process deviations and instabilities in real-time.

ADVANCED SOFTWARE

Powerful AI-based analysis tool that detects and classifies the most common anomalies.



- Infrared imaging captured by sensor.
- Automatic background and NUC with buffered frames.
- Frame rate 1000 fps.
- Logging capabilities.
- Image segmentation.
- Image features at 1000 Hz: Visualization on a 2D disk map.
- Final score for classification (average distance).



*Product image and software interface could be modified in the final product.
* High Speed Laser Metal Deposition. ** DISCOVER IR SUITE provides real-time process deviations and instabilities based on the reference setup by the manufacturer.*

MAIN BENEFITS

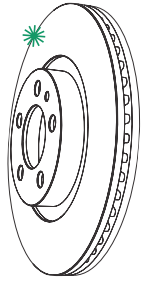
ADVANTAGE OF USING DISCOVER IR SUITE

A unique system that ensures quality assurance in HS-LMD brake disc coatings.



Real-time classification of process deviations and instabilities:

- Identification of dirty and defective surfaces.
- Powder flow rate.
- Bent powder line.
- Blocked injectors.
- Variations in linear speed (feed rate).
- Nozzle misalignment.
- Powder mass flow rate.
- Tungsten Carbide content.
- Powder leaks, with the ability to quantify leak size.



MAIN SPECIFICATIONS

COMPONENTS	Sensor head with embedded real-time processing electronics and connectors. Imaging lens. Software for system configuration and analysis. Infrared emitter for initial focus and optical calibration.
PROCESS COMPATIBILITY	High speed LMD (Laser Metal Deposition) process.
OPTICS REQUIREMENTS	Optical path transparent to infrared radiation (above 1.1 μm) from the process area to the optical port is required.*
DIMENSIONS / WEIGHT	84 mm x 60 mm x 42.5 mm / 0.5 kg (without connection box)
POWER SUPPLY	24 VDC, 6W
IMAGING LENS	According to client's specifications and needs. Several optical configurations available - Manual focus.
MECHANICAL ENCLOSURE	IP65 housing with embedded waterblock for air/watercooling temperature stabilization.
MECHANICAL INTERFACE	Multiple Adapters
INFRARED CAMERA	VPD PbSe camera, 64x64 pixels (pixel size: 50 μm) Sensitive in the MWIR (1-5 μm) Fully Digital and snapshot type ROIC.
COMMUNICATION INTERFACE	Gigabit Ethernet (Shielded M12 Connector to RJ-45)
SOFTWARE	Includes both analysis software and production software.
MINIMUM REQUIREMENTS	PC with processor i5, RAM memory: 8 GB Hard disk available: 1 GB, O.S.: Windows 10 or later (32/64 bits).
OTHER FEATURES	2x digital input, 2x digital output (multiple functionalities). Process data logging.

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*The performance of the system may be limited if additional optical components are installed in the optical path.