

QUALITY ASSURANCE SYSTEM FOR BRAKE DISC HS-LMD* COATING PROCESS

*High Speed Laser Metal Deposition

In real time provides, in line, quality assesment (OK, NOK) of a brake disc coating process respect a previously reference process defined by the manufacturer.

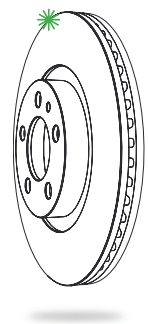
Assessments are based in the analysis of MWIR images captured by a HS infrared camera and the information extracted.

Analysis is based in the mathematical treatment of the temporal evolution of different features.



HIGH SPEED REAL TIME IN-LINE MONITORING SYSTEM

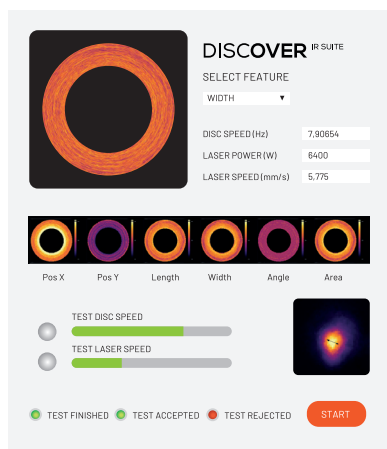
Continuous monitoring and
process quality assesment.



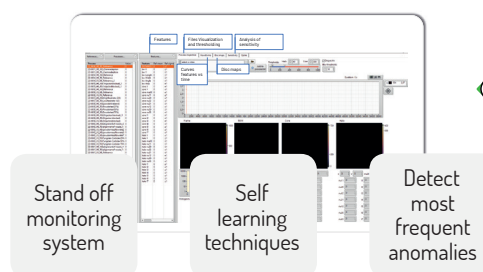
SOLUTION FOR BRAKE DISC HS-LMD PROCESS

- ✓ HIGH SPEED INFRARED IMAGING CAMERA
- ✓ DEDICATED SOFTWARE
- ✓ REAL TIME QUALITY CONTROL MONITORING

DEDICATED SOFTWARE



* Fictitious recreation of the software dedicated to process monitoring. The images and the interface can/will be modified in the final product.



 DISCOVER IR SUITE

Infrared imaging captured by CLAMIR: Background and NUC
Video 1kfps
Logging capabilities
Automatic background with buffered frames
Image segmentation
Image features -core, halo... @ 1kHz: Visualization on 2D disk map
Distance against reference @ 1kHz: Visualization on 2D disk map
Final score for classification -distance average-

MAIN BENEFITS.

ADVANTAGE OF USING



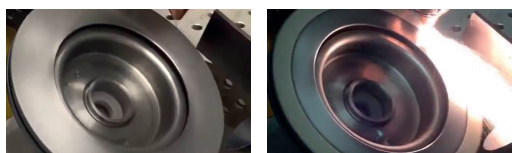
A unique system that guarantees quality assurance in HS-LMD brake discs coatings.

Real time detection of:

- Dirty & defect surface identification.
- Powder flow rate.
- Powder line bended.
- Injectors blocked.
- Linear speed variations (feed rate).
- Nozzle misalignment.
- Powder leak. Able to quantify the leak size.
- Powder mass flow rate. Able to find a linear regression to quantify mass flow rate variations.
- Tungsten Carbide. Able to find a linear regression to quantify tungsten carbide proportions.

COATING BRAKE DISC USING HS-LMD TECHNIQUE

Coatings produced by HS-LMD provide longer and more effective protection emitting much less number of fine particles.



HS-LMD technology is one of the most promising technologies in brake disc coating for reducing the particle emission problems.

HS-LMD is able to provide brake discs made of gray cast iron with an effective coating firmly bonded with the base material.

HS-LMD provides the required corrosion and wear resistance over such a thickness of 150-300 µm as a single-layer solution.

APPLICATIONS



Applications for automotive industry.



Compatible with most of laser optics and powders

Easy mechanical integration and quick configuration, allows retrofit

Consistent operation, no need of reconfiguration during the process

