

PRECITEC



## CONTROLLING LASER CLADDING LAYERS ON BRAKE DISCS

Precise monitoring and control of layer thickness via laser photothermal technology

Quickly, precisely and non-destructively measuring laser-cladded layers on brake disc tracks is still a challenging task for existing sensor technologies. Precitec now offers a breakthrough technology through Enovasense laser photothermal sensors.

The new Euro 7 vehicle emission standard that will apply in the automotive industry from 2025 onwards specifies tough maximum levels of small particle PM10 emissions. One of the main ways to comply with those limits is to add a harder layer to the brake disc track. A typical deposition process for this layer can be high-speed laser cladding followed by grinding. Controlling the thickness of this coating on the whole track is essential to ensure that there is enough of this hard

material. It also enables better monitoring of the stability and homogeneity of the coating and grinding processes. Due to the generally high similarity between this layer and the base cast-iron material, technologies relying on magnetic or conductive differences between the two materials cannot be used in the majority of cases. For the same reason, radiative techniques such as X-ray fluorescence cannot differentiate between the layer and the base substrate.



T060 ultra-compact sensor head



HKL 2 control station

## PRECITEC ENOVASENSE TECHNOLOGY

Laser photothermal technology from Precitec Enovasense brings a unique new offering to the fields of laser-cladded or, more generally, thermally sprayed applications. This technology enables non-contact, non-destructive, non-intrusive, non-radiative, fast, repeatable and easy-to-integrate measurements. It also opens up access to easy and cost-effective in-line and at-line measurement.

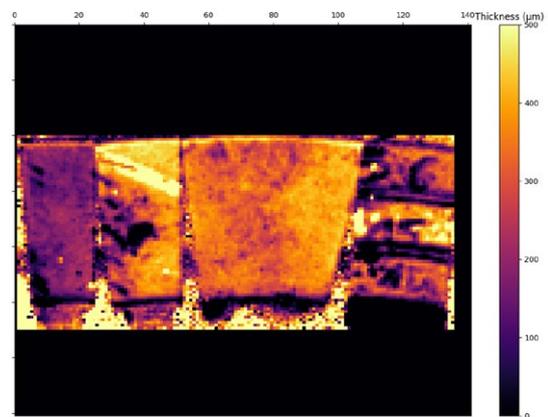
### IN-LINE OR AT-LINE MEASUREMENT

Precitec Enovasense sensor technology can measure the entire track surface with an outstanding level of precision. RMS repeatability levels down to 1  $\mu\text{m}$  can be obtained on a typical 350  $\mu\text{m}$  thick layer. In a study performed in collaboration with Laserline, one of the leaders in laser-cladding technology, Precitec was able to perform a full thickness mapping of four brake disc sections with various thickness levels of 316L stainless steel with titanium carbides on the cast-iron substrate. The sensor head can easily be integrated into a production process thanks to its ultra-compact dimensions, low weight (as little as 150 g), and independence of part curvature, vibrations, or temperature. The measurement data are automatically stored and archived, with the data streamed live to the line controller.

#### HOW YOU BENEFIT

- ▶ Improved quality process thank to great repeatability
- ▶ Compact and lightweight – easy-to-measure coating thickness in-line
- ▶ Expertise for your parts with fast and high-resolution coating thickness scanning

The sensor can also be embedded in the fully automated 3-axis control station HKL2 for at-line measurement. In this control station, pre-programmed cycles allow many measuring points on a given brake disc to be covered in just a few seconds.



Mapping of four brake disc sections from Laserline with HKL 2 control station

### PARTNERING WITH YOU

Enovasense is an innovative French company and a member of the Precitec Optronik Group, a German manufacturer of highly innovative sensors and optical probes. The Enovasense® product line sets the standard in contact-free layer thickness measurements. Enovasense and Precitec products deliver in-process, in-line and offline measurements of the highest precision on all materials and measurement ranges from nano- to millimeters.