



CONTROLLING THE THICKNESS OF THERMALLY SPRAYED COATINGS

Precise monitoring of thermally sprayed coatings thickness via laser photothermal technology

Quickly, precisely and non-destructively measuring thermally sprayed coatings is still a challenging task for existing sensor technologies. Precitec now offers a breakthrough technology through Enovasense laser photothermal sensors.

In industries such as aerospace, medical implants, automotive or energy, thermally sprayed coatings are key for achieving thermal barrier protection, performance enhancement, implant biocompatibility as well as resistance to corrosion, oxidation, erosion and wear. Controlling the thickness of those coatings allows to ensure a proper performance as well as guaranteeing the

mechanical tolerance of the part. Due to the shape, roughness and specificity of those coatings, usual non-destructive techniques are generally not available. Applicators have then no other non-destructive option than an imprecise height comparison before and after coating that is long and difficult to implement as well as imprecise.



T060 ultra-compact sensor head



HKL 2 control station

PRECITEC ENOVASENSE TECHNOLOGY

The Laser Photothermal technology proposed by Precitec Enovasense brings a unique new offer in the fields of thermally sprayed applications. This technology allows measurements that are non contact, non destructive, one-sided, non radiative, fast, repeatable and easy to integrate. Opening this way access to an easy measurement integration with a cost-effective positioning.

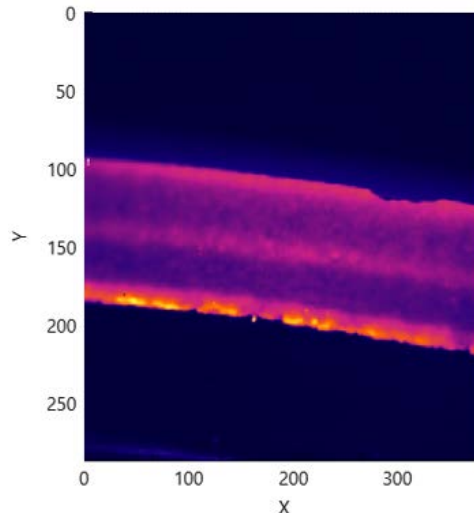
THERMAL SPRAY APPLICATIONS

The Enovasense sensor technology can measure the thickness of all kinds of thermally sprayed coatings (metallic, ceramic or polymer) with an outstanding level of precision. Whether they are deposited through plasma spray, HVOF, twin wire-arc spray, cold spray or laser cladding, any submillimetric coatings are measurable. Validated aerospace applications go from thermal barrier coatings like yttria-stabilized zirconia (YSZ) to other coatings such as chromium carbide–nickel, tungsten carbide–cobalt (WC–Co) or MCrAlY for aircraft engines turbine and compressor blades. Biomedical applications like plasma sprayed hydroxyapatite (HA) or Titanium layers on hip, knee and dental implants are also uniquely measurable through this technology. The sensor head can easily be integrated close to the thermal spray process due to its ultra-compact dimensions and low weight (down to 150g), its high tolerance on the distance and its independence on part vibrations or temperature. With a single-sided sensor and no need for reference measurement before coating, the whole system is highly simplified.

HOW YOU BENEFIT

- ▶ Improve the quality of your process thanks to high precision
- ▶ Avoid destructive and comparative measurements
- ▶ Compact, simple, safe – Easy to integrate coating thickness close to the process

Additionally, the new Enovasense Field sensor allows to realize quick mappings of the coating thickness with high spatial resolution, even on parts that show fine geometric patterns such as turbine blade tip segments.



Coating thickness mapping on a turbine blade tip segment

The measurement data are automatically stored and archived; data are streamed in live communication to the line controller. A comprehensive human-machine interface is offered with live analysis, alarm when pre-set tolerance is crossed and history of measurements on months of passed fabrication orders.

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.