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PRESS RELEASE

Brake disc coating: HICLAD maximizes protection against corrosion and wear

(Dresden, March 22, 2021) Brake discs are moving into focus as part of the current green-energy discussion. Fraunhofer IWS scientists have developed the HICLAD process to maximize protection against corrosion and wear by tailored surface functionalization. A further focus includes the reduction of particulate emissions. An additional advantage of this technology is the cost-effective series production.

Due to its coating properties and the diverse material spectrum, laser powder cladding is one of the well-established industrial coating processes for protecting high-quality components against corrosion and wear. However, for mass production in large quantities, such as brake discs, conventional laser cladding so far only partially meets industrial cost targets. As a result, Fraunhofer IWS has now developed high performance and high-speed laser cladding HICLAD. This new process uses customized powder nozzles and optics configurations to design a stable and reproducible high power coating method with up to 20 kilowatts of laser power. Efficiency and coating performance increase accordingly, both indispensable for series production.

Optimum friction pairing in terms of braking properties and minimum particulate emissions

The brake discs are coated in two steps with two layers: Firstly, an approximately 125-micrometer-thick stainless steel anti-corrosion coating is deposited. The HICLAD process is set up in such a way that a defect-free coating is generated on the difficult-to-weld cast iron with lamellar graphite of the brake disc blanks, with minimum values for dilution, stresses and distortion. Secondly, the coating with the tailored tribological functions is applied on top. It receives its wear resistance from hard metals such as tungsten carbide, titanium carbide or chromium carbide, which are embedded in an iron-based alloy. The coating system and the mixing ratios are adjusted in such a way that, when combined with the brake pads, an optimum friction pairing in terms of braking properties and minimum particulate emissions can be achieved. Thanks to process control and melt pool monitoring, the process is extremely robust, so that, for example, low-cost powders with a broader particle size distribution can also be used. As a result, the overall material costs are significantly reduced. The quality of the coating system can be monitored non-destructively using LAwave® technology. Finally,

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the coating solution significantly reduces particulate emissions during braking and avoids corrosion damage usually caused by sporadic use – such as in electric vehicles. The service life of HICLAD-coated brake discs is significantly extended.

Visit us on this topic at the digital Hannover Messe 2021, from April 12 to 16, 2021.

HICLAD enables high-quality corrosion coatings in an efficient process.
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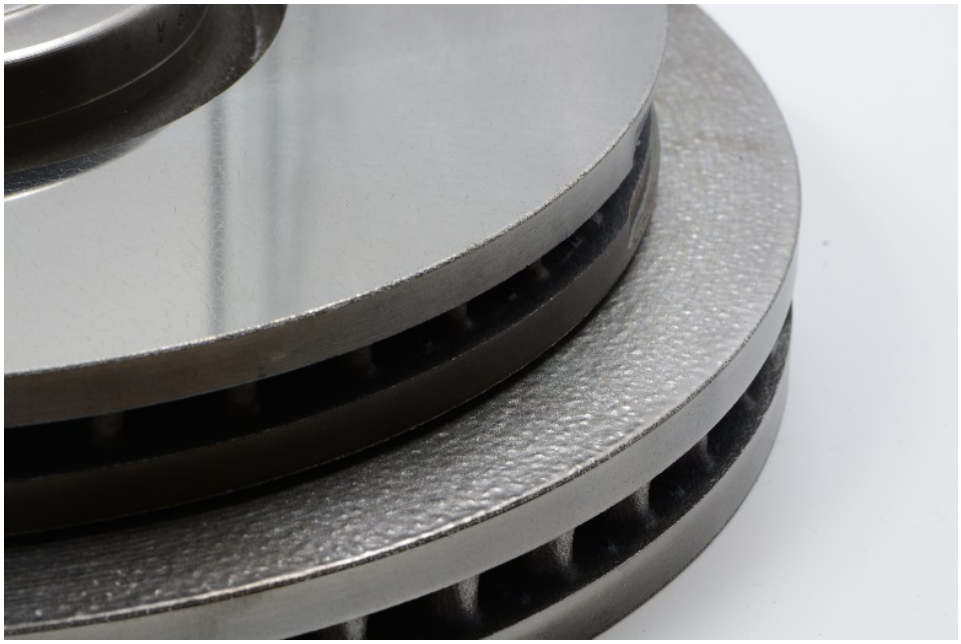

HICLAD is a cost-effective coating solution for the tailoring of brake disc's corrosion resistance, friction behavior and reduced particulate emissions (bottom: as-clad condition; top: finish grinded condition).
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