

## PRESS RELEASE

By Sylke Becker  
Tel. +49 (0) 69 756081 33  
E-mail s.becker@vdw.de

### Low-emission brake disk: Best practice in data-driven production

**Frankfurt am Main, 20. May 25 –** In order to significantly reduce particulate matter pollution in the Eurozone's transport sector, new car models are to be equipped with low-emission braking systems from next year. For the manufacturing industry, this represents a technological leap that could only be achieved thanks to innovative materials and processes, new types of tools and machines and digital networking in production. This may ultimately benefit everyone, not just environmental and health protection through fewer fine dust particles in the atmosphere. The hard-coated brake disk favored by European manufacturers is also more effective, corrosion-resistant and lasts the life of the car. This is why it was previously reserved for the luxury car segment.

The first production lines for the new brake disks are currently being set up in the automotive industry. In the case of hard-coated brake disks, this means that turned cast brake disks are processed by laser deposition welding or gas dynamic cold spray and subsequent double-sided surface grinding. While the first part of the process chain can still build on tried-and-tested methods, laser deposition welding with the subsequent grinding process differs significantly from previous methods.

#### Almost as hard as diamond

Modern carbides embedded in a metal matrix, which almost reach the hardness of diamonds, are decisive for this. The Fraunhofer Institute for Ceramic

**Innovate Manufacturing.**

[www.emo-hannover.de](http://www.emo-hannover.de)

Technologies and Systems (IKTS) in Dresden explains how they are processed. Accordingly, the carbide metal powder is mixed using a customized powder nozzle system and applied to the rotating brake disk using a laser. Decisive cost advantages result from the process, the powder materials used and the low layer thicknesses that can be achieved, explains René Bischoff, Head of Development at IKTS's technology partner C4 Laser Technology, which is also based in Dresden. In other words, a very thin layer can be applied by laser, which is extremely hard. This saves material and is considered extremely resource-efficient. However, the final grinding process is a major challenge.

### **High demands on tools and machines**

The challenge became clear at the latest when the first newly coated brake disks were received by the grinding machine manufacturers for test trials: During the first tests, the grinding disks literally "tore apart" in the machine, it is said. This is because the previously completely unknown material mix of the top layer proved to be quite unimpressed by contact with the abrasive. The good news: The brake disk did what it was supposed to do. It developed a high braking effect without emitting fine dust particles.

"There's nothing worse than not knowing exactly what needs to be ground," emphasizes Mario Preis, Head of Technology & Corporate Development at DVS Technology Group, Dietzenbach (Hesse). As the various subsidiaries of the DVS Group, which specializes in surface processing, have specialists and suitable machine tools for each process step, this was followed by an intensive, cross-technology exchange. The aim was to develop a common understanding of the process and to find out which combination of coating, grinding wheel and motor spindle power would work best to achieve the desired geometry and surface properties of the brake disks.

### **Documentation for a safety-critical component**

The development and careful coordination along the process chain was not made any easier by the fact that there are also different variants and manufacturers of the new coating. In addition: "Even in the early stages of development, our customers wanted everything documented," reports Mario Preis. After all, the brake disk is a safety-critical component for occupant and personal protection, which is subject to high quality standards. What's more, every vehicle manufacturer follows its own philosophy and has clear ideas about how the brake disk should look and how the vehicle should feel when braking. Preis is convinced that without digitalized process chains, it will hardly be possible to implement individual product specifications and changes as well as the constantly increasing documentation requirements economically. This is

particularly true with regard to the EU CSRD (Corporate Sustainability Reporting Directive) on comprehensive sustainability reporting.

### **More flexibility thanks to digital networking**

"Machine manufacturers are ahead of the game when it comes to digitalization," says Irina Eisele, Lead IoT Product Development at the Emag Group, a machine tool manufacturer based in Salach (Baden-Württemberg). Many machine tools are already equipped with extensive sensor and monitoring systems ex works. At the most recent grinding conference in Stuttgart-Fellbach, Eisele spoke about digital networking along the process chain using the example of hard-coated brake disks. The IoT (Internet of Things) specialist presented a holistic approach to workpiece-related recording and archiving of process data from various production steps and technologies. Whether production parameters such as laser power and powder feed rate, sensor data such as layer thicknesses and component geometry or process data such as grinding machine wear per workpiece - "Data forms the basis for being able to optimize tools and process parameters in a targeted manner," says Eisele.

Machine manufacturers support customers with hardware and software for data transfer and documentation. With the help of an industrial PC, machine controls and sensors are connected to the company network via suitable interfaces. The software collects the data, assigns it and analyzes it. Workpiece-specific data can be recorded or visualized for documentation purposes, for example to compare good and bad parts. "The clear added value for the user results from transparency," emphasizes Irina Eisele. The system view facilitates quality assurance and traceability. This is an invaluable advantage, especially for safety-critical components such as brake disks, where the processing history must be meticulously documented.

### **AI and Digitalization Area at EMO Hanover**

The immense advantages of digital process chains inspire machine manufacturers and scientific institutes alike. This will also be reflected at EMO Hanover, the world's leading trade fair for production technology, which the VDW (German Machine Tool Builders' Association) is organizing in the capital of Lower Saxony from 22 to 26 September. Companies will present best practice examples in a separate AI + Digitalization Area. The spectrum ranges from smart production, Industry 4.0 and machine learning to the Internet of Things (IoT) and AI applications.

"We should rely more on data," demands Irina Eisele. Digitization simply makes it easier to understand which adjusting screws work and how. Users could react more quickly to product changes and new market requirements. In

the case of the hard-coated brake disk, this should also prove particularly useful in the future. It is not only at Emag that brake disks for trucks and rail vehicles are next on the agenda. After all, nobody wants to stand in a fog of brake particles in train stations.

((7,746 characters incl. spaces))

*Author: Cornelia Gewiehs, freelance journalist, Rotenburg (Wümme)*

The direct link to the press release: <https://vdw.de/presse-oeffentlichkeit/pressemitteilungen/>

## **Contacts**

VDW (German Machine Tool Builders' Association)  
Gerda Kneifel  
Communication  
Lyoner Strasse 18  
60528 Frankfurt am Main  
Germany  
[g.kneifel@vdw.de](mailto:g.kneifel@vdw.de)  
Tel. +49 (0) 69 756081 32  
[www.vdw.de/en](http://www.vdw.de/en)

DVS Technology AG  
Mario Preis  
Head of Technology & Corporate Development  
Johannes-Gutenberg-Str. 1  
63128 Dietzenbach  
Germany  
[mario.preis@dvs-technology.com](mailto:mario.preis@dvs-technology.com)  
Tel. +49 (0) 6074 3040613  
[www.dvs-technology.com](http://www.dvs-technology.com)

Emag GmbH & Co. KG  
Oliver Hagenlocher  
Head of Marketing  
Austrasse 24  
73084 Salach  
Germany

[ohagenlocher@emag.com](mailto:ohagenlocher@emag.com)

Tel. +49 (0) 7162 17-4267

[www.emag.com](http://www.emag.com)