PRESS RELEASE

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New brake disks produce significantly less fine dust

Innovative coating makes the brake disks fit for strict Euro 7 standard

Frankfurt am Main, 5 August 2025 – Jannik Röttger can still remember the first attempt at grinding a hard-coated brake disk: "The grinding disk broke in the machine", he adds. The new, extremely hard material was considered revolutionary in the industry. Röttger is now Head of Grinding Technology at the machine tool manufacturer Emag in Salach, Baden-Württemberg. And the brake disks, which were tested at that time in the machine tool laboratory of RWTH Aachen, are close to a major breakthrough. They meet the strict requirements of the Euro7 standard and from 2026 should ensure that the hazardous fine dust pollution in traffic areas is reduced considerably. Approximately 100 million brake disks are produced in Europe every year.

Up to 90 percent less fine dust when braking

The development of the brake disk, with which the arising particle quantities during braking can be reduced by up to 90 percent, was a major accomplishment for the industry. A hard coating was preferred early on because it was considered particularly efficient, corrosion-resistant, and durable. One flaw: its price. Fans of sports cars and SUVs in the luxury class might be prepared to

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pay up to five-figures for a particularly efficient brake system. But this does not hold true for the majority of motorists. An affordable variant had to be found.

The Fraunhofer IKTS (Institute for Ceramic Technologies and Systems) in Dresden, among others, focused on the development. As stated, for the new coating a powder of carbide, a mixture of carbon and a metal, is mixed using a special nozzle system and applied to the rotating brake disk with a laser. This method and the powder materials used allow very thin layer thicknesses to be achieved. It is essential that the expensive material carbide is used very sparingly. The subsequent grinding process is about achieving the required surface properties.

Digital networking is a must
Suitable machine and tool technology is now available, corresponding production lines are entering the halls of the automotive industry. Comprehensive test runs, during which thousands of brake disks were machined, led to the desired results. But that alone was not enough. For economic production, optimization potential across all technologies was sought in the entire manufacturing process from the casting of the blank, to turning, laser coating and grinding through to the resulting function properties in the vehicle. Attention was also paid to how the manufacturing process can be modified in a targeted manner and customized depending on the raw material and individual requirements. What's more: "Already in the early phase of the development our customers wanted to have everything documented", reports Mario Preis, Head of Technology & Corporate Development at DVS Technology Group, Dietzenbach, who specializes in surface treatment. The brake disk is always a safety-critical component subject to high quality requirements. The companies are also required to document everything with regard to the EU CSRD (Corporate Sustainability Reporting Directive) on comprehensive sustainability reporting. For Mario Preis, there is no alternative to digital networking of the process chain. Only digital networking enables the system view to repeatedly adapt manufacturing processes to new requirements and to comply with documentation duties reliably and at the same time economically.

Service as a new business model
In order to facilitate entry into data-driven production, many machine tools are already equipped with extensive sensor and monitoring systems ex works. The machine builders also provide suitable infrastructure and software components so that data can be captured, analyzed, and visualized across the entire process chain using different technologies. The VDW (Verein Deutscher Werkzeugmaschinenfabriken) in Frankfurt/Main wants to show how this works at its trade fair EMO Hanover, which takes place from 22 - 26 September.

There the interest groups of machine tool manufacturers will bring together companies from almost all continents and present worldwide innovations in the area of production. And it is no longer just about innovative machines.

Emag, for example, will also present their solutions in North Germany. Because Jannik Röttger is convinced that competency in complex production contexts will be increasingly decisive for industry. "The process chain will become the business model", he says, as is reflected using the example of the hard-coated brake disk. However, he still believes real tests cannot be completely eliminated in the digital world. At Emag at least they will be included once again for hard-coated brake disks – this time for commercial and rail vehicles.

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