

Surface finishing: Clean air during thermal spraying

Thermal spraying for coating components, such as during automobile production, generates fine respirable dusts. An efficient extraction system to filter out the hazardous particulate from the air is, therefore, of paramount importance. Proficiency is required when designing the workplace, because the slightest modification in materials or process parameters can bear considerable influence on the volume and types of emissions.

Thermal spraying is a term that is used by industry experts to describe various processes used in applying a 0.1 to 0.5 millimetre thin coating onto surfaces to achieve a very durable and high-quality finish. Manufacturers in the automotive industry, aerospace, mechanical engineering, electrical engineering and medical technologies all employ thermal spraying to enhance their products and components. The process makes the end products more wear and corrosion resistant, alters their electrical conductivity, or enhances their surface appearance, as well as their frictional behavior and sliding characteristics. Manufacturers apply the desired coating material by using one of many different spraying processes, such as arc or plasma spraying. These are often metallic, metal alloys or carbides in a metal matrix, usually in powder or molten wire form.

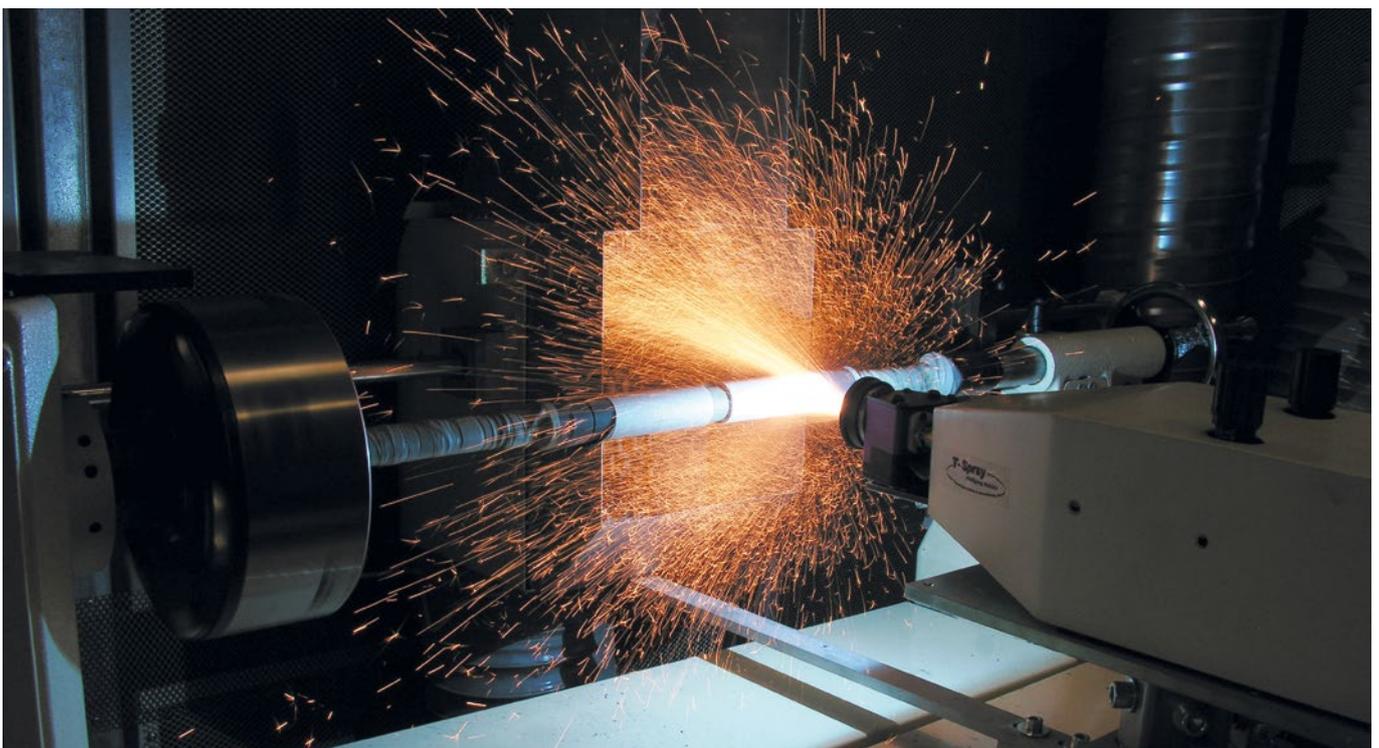
The overspray produced during thermal spraying can migrate throughout the workplace. A system with efficient collection removes the spray mist, thereby keeping the air clean and ensuring high quality coating results. (Photo: T-Spray GmbH)

Hazardous emissions

Whenever possible, the process takes place automatically in an enclosure. "There are two reasons for this," explains Carsten Brockmann, who is responsible for thermal spraying at Keller Lufttechnik. "The process is very noisy and, above all, it produces hazardous emissions. The particles are often less than 2.5 microns in size and so fine that they can be easily inhaled, which is particularly critical." Thorough collection and extraction of the particulate is therefore essential, regardless of any physical barriers that may separate the spraying process from the rest of the production plant.

Materials and processes influence resulting emissions

To configure and correctly design a reliable extraction system for such applications poses a special challenge, explains the expert. The resulting particulate will vary depending on the coating material and the spraying process, as well as other basic parameters such as gas velocity, material feed rate, etc. There is, therefore, no conventional solution. >



Practical knowledge required

Drawing on his many years of experience, the Keller specialist, a member of the GTS (Association of Thermal Spraying) and a lecturer at various seminars, will determine the correct extraction solution for every spraying process. An analysis of the resulting dust and a review of the situation on-site provide him with the required information. Normally, a dry separator, equipped with the KLR-bran surface filter, is recommended for thermal spraying processes.

KLR means Keller Long Run

This latest filter innovation from Keller Lufttechnik is characterized by its high durability. KLR filters withstand 120,000 compressed air pulses, or 20,000 operating hours without revealing any wear. "Long filter life is financially beneficial for our customers," says Carsten Brockmann. "If a system is shut down for a filter change, this creates an expensive interruption of production." Inexpensive cartridge filters, which are widely sold, generally become useless after only six months of use. A KLR filter, on the other hand, provides years of service. "In the end, investment in our higher quality filters pays off," declares Carsten Brockmann.

Clean air recirculation possible? Fire and explosion prevention necessary?

"The term 'bran' in the filter name denotes a membrane coating of the pleated textile filter material. It ensures a low residual dust content of 0.1 milligrams per cubic meter and in many cases enables clean air to be returned to the workplace," explains Carsten Brockmann. Whether additional components are required for fire and explosion prevention will depend on each individual situation and the dust characteristics.

Dust dosing improves filtration

If the dust proves to be particularly fine, our specialist opts for a self-dosing system. To prevent clogging of the filter, the system operates by adding an additional filter layer. After automatic cleaning of the filter, which usually occurs during operation, the system blows a portion of the cleaned material back onto the filter surface to form a new, dry auxiliary layer. This allows the filter element to be cleaned more easily and quickly, with significantly lower compressed air consumption.

Are you interested?

Companies that employ thermal spraying and have yet to settle on a workable solution for their emissions problem can rely on Carsten Brockmann's expertise. <

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