

Direct torch extraction ensures clean hall air

The VacuFil high-vacuum torch extraction system from KEMPER is in use at Aebi Schmidt Nederland, helping to protect welders and ensure that the air in all areas of the manufacturing hall remains clean.

The quality of the air in the manufacturing hall of the Dutch manufacturer, Aebi Schmidt Nederland, was already at an acceptable level, but as a rule, it tended to be very close to the maximum legal limits. This was clearly not good enough with regard to the health of its employees.

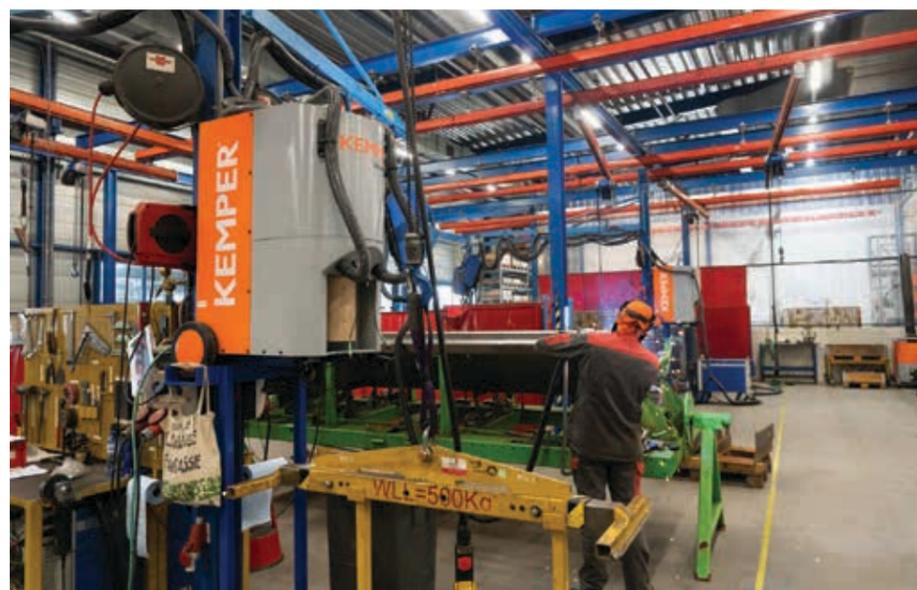
By international comparison, the Netherlands already has one of the lowest workplace exposure limits for production plants. However, the company wanted to improve the air quality in order to push the concentration of hazardous substances even further below the prescribed limit of 1.0 mg/m³, particularly in the welding shop.

“One focus at Aebi Schmidt is on improving working conditions,” says facility manager Steven Koenderink. “Air quality was a central issue here.” The company wanted to ban, completely, hazardous substances with lung-damaging, toxic or even carci-

nogenic effects, such as those associated with the MIG/MAG welding process used to manufacture heavy steel components.

Increased demand in recent years had generated more welding work. The company's development into the world's leading supplier of systems for cleaning and clearing traffic areas as well as maintaining green spaces also brought with it higher protective welding equipment requirements. Aebi Schmidt wanted to continue this legacy with a healthy and satisfied workforce, particularly since employee health is playing an increasingly important role in the competition for the brightest minds.

In the search for a supplier of extraction technology, KEMPER GmbH from neighbouring Germany came up trumps, “Mainly because of the positive test experiences and the comprehensive advice we received in the course of our decision-making process,” recalls Koenderink.



To protect automatic welding equipment and operators, KEMPER installed a push/pull general ventilation system in the welding robot gantry, which captures rising welding fume at a height of around 4.0 m above the equipment.

Mobile high-vacuum extraction units for flexible production

The requirements for the system specified the cleanest possible hall air compatible with production needs, that is, the extraction systems for hazardous substances generated during welding were required to perform effectively while maintaining flexibility in production, within a fixed budget.

KEMPER adhered to these specifications from the outset and put together a customised protective welding equipment concept for Aebi Schmidt. To allow for possible adjustments to the welding shop layout, the manufacturer decided on mobile extraction units. The German company recommended a welding fume extraction solution using high-vacuum systems with connected extraction torches. Benefits of this solution include the immediate capture of welding fumes directly at the point of origin; and fume source tracking because the extraction point moves with the welder's torch.

As these systems continue to evolve, they are becoming more popular – but their reputation for being difficult to use still persists. Despite initial scepticism, Aebi Schmidt agreed to a comprehensive test. In just a few days during which the VacuFil 250 system had extracted the welding fumes exceptionally effectively, the manufacturer was convinced of its effectiveness, with the result that Aebi Schmidt ordered several units for deployment.

13 VacuFil-250 units for 26 workplaces

KEMPER delivered a total of 13 VacuFil 250 high-vacuum systems to the Dutch company. Because they can each be coupled to two extraction torches, Aebi Schmidt employees are able to weld safely at 26 workstations at the same time. The systems are matched to each other in terms of extraction capacity, so that the welding fumes are optimally captured without destroying the protective shielding gas envelope.

Unlike other extraction systems, such as extraction hoods on adjustable arms, extraction is integrated into the torch and

is therefore moved by the welder. This allows for reliable extraction of the hazardous substances at the point of origin via a nozzle integrated into the torch.

This means Aebi Schmidt achieves high production capacity as well as clean hall air for its employees. Even at high welding intensity, the VacuFil-250 units extract high levels of smoke and dust in continuous operation with a maximum output of 250 m³/h – without any loss of quality, even when two employees are welding at the same time.

Thanks to the particularly high filter quality provided by the special KemTex® ePTFE filter cartridges with surface filtration, the systems permanently filter out more than 99.9% of captured smoke particles. Even particles smaller than 0.1 µm cannot escape back into the environment after extraction.

In addition, automatic filter cleaning avoids welders having to interrupt their work to deal with saturated filters. Instead, the hazardous substances enter a special disposable container incorporated into the systems, which isolates the extracted dust, enabling contamination-free disposal and container replacement.

Additional general ventilation system for the welding robots

When it comes to protecting welding equipment, Aebi Schmidt, in cooperation with KEMPER, identified a general ventilation system to capture welding fumes during automated welding processes, while also provide protection for operators and employees. KEMPER installed a push/pull general ventilation system in the welding robot gantry, which captures rising welding

fumes at a height of around 4.0 m above the equipment.

On one side, special extraction openings capture the hazardous substances. A customised ducting system then transports them to the central WeldFil filter system installed outside the hall.

After separating the particles that are hazardous to health, the system returns the purified air to the outlets. Because the outlets are positioned a few metres away and in-line with the extraction ducts, a constant horizontal air flow is created, which channels the welding fumes rising towards extraction ducts. In addition, displacement outlets on the floor support the natural buoyancy of the welding fumes.

Recirculation of the cleaned and already heated air also makes this principle energy efficient. To further improve air quality, a two-way distributor allows some of the air to be discharged to the outside while fresh air from outside is being introduced.

Thanks to the comprehensive protective welding equipment measures, the air quality in the manufacturing hall at Aebi Schmidt has improved significantly: “The air pollution control technology at our workplaces and in the robot gantry exceeds our expectations,” says Koenderink.

“Our welders are very happy with the improved air quality. We are always amazed at how many harmful hazardous substances the systems actually capture when we change the dust collection containers.” As a result, he says, welder awareness of their own health has increased immensely. And after an initial changeover to the new systems, even the handling of the extraction torches is now very easy for the welders.

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Extraction torches and torch parameters

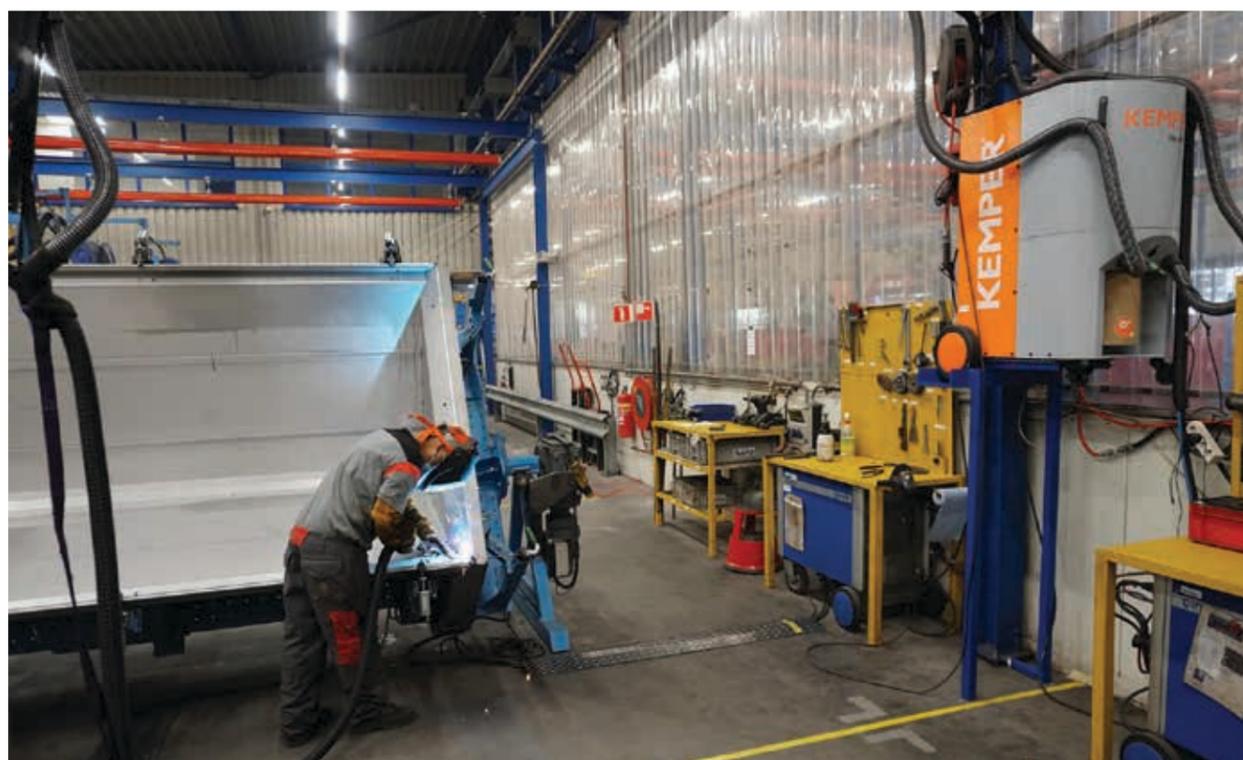
The closer to the point of origin the better: This is the unanimous advice of protective welding equipment experts for effective welding fume extraction. This is because if fume is extracted directly at the point of origin, it cannot enter the welder's breathing zone or escape further into the hall.

For this reason, extraction torches are superior to other systems because the collection elements are closest to the point of origin. But there's a catch! The extraction capacity must be individually designed for each torch so as not to interfere with the welding process. This depends on the various parameters of different torches.

With this in mind and in order to create more transparency for the parameters relevant for torch extraction, the German Welding Society (DVS) has recently launched an appeal for torch manufacturers to make their data freely available on a platform created specifically for this purpose.

With regard to this data, KEMPER had already done preliminary work in recent years. On its own measuring stand, the manufacturer has measured more than 100 torch types from different manufacturers, thus establishing a unique database. This is an integral part of the VacuFil-i high-vacuum product series from KEMPER. At the push of a button, these units provide the correct extraction capacity for the torch in use and automatically adjust this capacity continuously during operation.

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High-vacuum systems with connected extraction torches capture welding fumes directly at the point of origin while tracking of the source of fume as the welder moves the welding torch.