

We clean the air



TECHNOTES

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Better Filtration, Less Money

By Tim Pennington
Editor

Keller Filters says its product reduces energy costs by 85%.

Those who paint know the systems can be an energy hog. Some estimate that industrial painting processes often require up to 50% of a facility's energy use, a rate even higher in the automotive industry where some reports say that about 70% of energy in those facilities is consumed by painting processes.

With paint filter systems accounting for a large majority of energy and operating costs, Keller set out to develop a sustainable process that incorporates a dry separation system for wet paint overspray. The result is a system the company says reduces overall costs up to 85% by using a regenerative filtration system that eliminates disposable filter media or water-based wet scrubber costs, as well as minimizing related energy consumption.

Keller USA, a subsidiary of Keller Lufttechnik GmbH of Germany, says its system captures the paint overspray mist, conveys it to the filter housing, where it is then separated using a high-efficiency rigid body membrane SINBRAN filter elements, a limestone pre-coating and continuous back-pulse online cleaning to provide regenerative automatic self cleaning of the filter elements

The company says the system also provides up to 80% significant air recycling. Keller says retrofitting an existing paint system that has an intake volume of 10,000 cfm and runs 4,000 hours a year with exhaust air and storage filters could save about \$40,000 a year in heating and electric costs.

"This approach offers extremely long filtration life cycles of 20,000+ hours, as well as significantly reduced energy and disposal

costs," says Jeffrey Zullo, Keller's vice president and general manager. "The system provides upwards of 85% operational cost reduction in comparison with traditional equipment."

Keller began applying these systems in Europe more than eight years ago in a number of aerospace, automotive and industrial painting applications in a large variety of sizes ranging from 5,000–450,000 cfm. The company currently has two painting applications with this system in the U.S. on autobody and auto component painting lines.

The filter media uses SINBRAN, a combination of sintered, porous polyethylene with a Gore membrane laminated onto it, combining both a membrane filtration and rigid body filtration. Keller says the solid rigid body with a large filter area in a minimum of space ensures high mechanical stability and a long service life.

The system uses a special pre-coating process that acts



as an auxiliary layer on the surface of the filter elements, which then protects the actual filter surface from adhesive substances, while at the same time absorbing a large portion of hydrocarbons. The company says the system can also be used for the separation of adhesive substances or particles.

The filter elements are continuously cleaned, thereby ensuring a constant air flow, Zullo says. The paint loaded limestone powder is collected in receptacles, and the recycled cleaned air is returned to the paint booth with HEPA efficiency rating of H12 to achieve a cost-effective, auto-thermal process.

"The smooth uniformity of the membrane results in a surface filtration with extremely high efficiency," says Nick Herfurth, Keller USA's director of sales. "The dust particulate is almost completely retained at the filter surface and cannot clog the sintered body because it is unable to penetrate it."

The result is a low and constant pressure loss compared with conventional technologies, Herfurth says. The filter cleaning is done by short pulses of compressed air during the filtration process, and as the additive in the filter unit is simultaneously diffused and extracted, an additional protective layer is continuously created. This procedure is repeated during the entire painting process.

"We can also ensure a constant airflow volume for a 24-hour operation," Herfurth says. "It is possible to adjust each parameter to the respective operating conditions, if necessary, with an integrated electrical control system."

Components of the system include capturing elements, non-stick coatings, ductwork filtration units, dosing systems, a disposal method, pneumatic, safety and monitoring equipment, and an electrical control system.

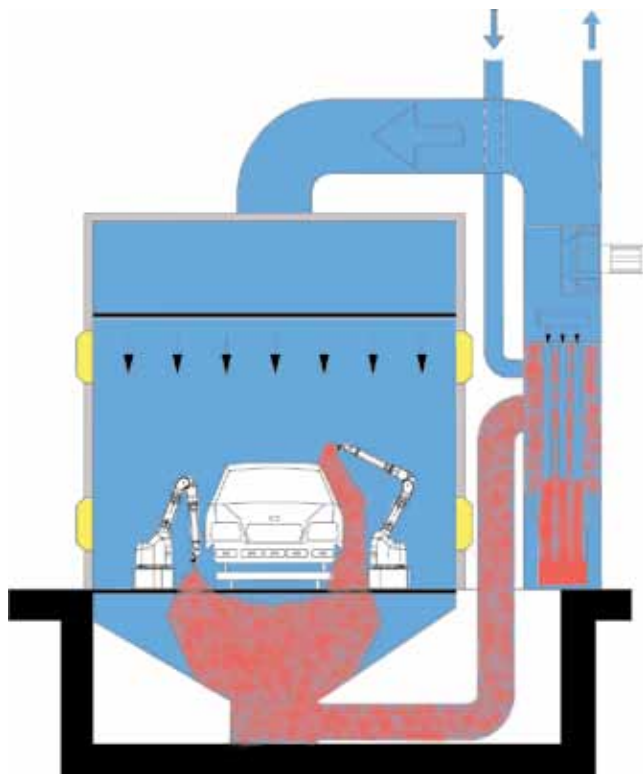
As future energy costs rise, Herfurth says the Keller dry filtration system with recirculated air reduces the energy consumption of paint booths by 80%. He estimates the original purchase price of the system can be recovered in 1.5–3 years, adding that after initial investment costs, the ongoing operating cost of the system is for limestone powder supply and disposal, as well as energy costs for the

power and compressed air for the system.

There also are reduced costs in waste disposal, Herfurth says, as there are no additional chemical and water removal costs, no toxic waste, and higher life cycle filter elements with 20,000-hour minimum use. Also, the system eliminates the cost of coagulants or chemical additives for water treatment, and does not require sludge removal or a humidifier.

Keller says it has been successful in applying these systems with a significant number of customers, ranging from large truck producers, wind energy blades and steel towers to a piano maker, large aircraft manufacturers and Tier 1 and 2 automotive suppliers. ■

To learn more about Keller USA, please call 203-729-0145, or visit kellerusa.com.



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