

SIMPLE, SUSTAINABLE, EFFICIENT

E-CUBE

**Dry separation system for highest quality
and optimum energy balance**





Advanced Technology for
Low-emission Applications
and Sustainability

EISENMANN

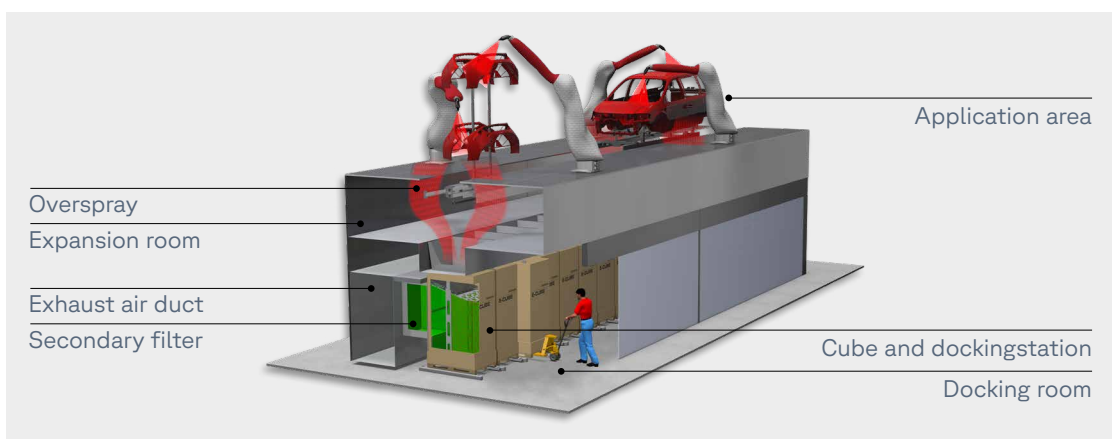
E-CUBE

Paint separation with vision

Simple ingenious: The E-Cube modular filter system extract overspray reliably, cleanly and around the clock.

During spray painting, paint material loss cannot be completely avoided. In order to reliably capture and dispose of this overspray, the use of efficient technology is necessary. As an alternative to traditional Venturi wet scrubbing, Eisenmann's E-Cube dry separation system has proven its worth. With the E-Cube system, automotive manufacturers, suppliers and other users benefit from striking advantages in terms of availability, resource conservation, operating costs and cleanliness.

Eisenmann has made a name for itself as a paint shop manufacturer with a complete portfolio of products and solutions for the surface treatment of car bodies, plastic parts and other workpieces through customized, low-emission, energy-efficient and wastewater-free processes. With the E-Cube mechanical dry separation system, the disadvantages of paint mist separation with Venturi wet scrubbing have been solved through system simplification. The success speaks for itself: E-Cube separates all types of wet paint overspray in a growing number of paint lines around the world.



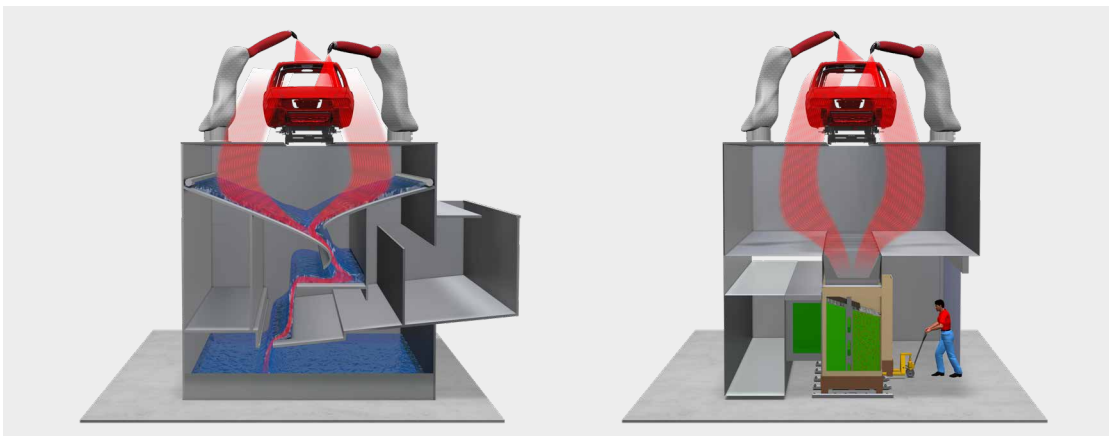
Eisenmann: E-Cube System

Venturi wet scrubbing a standard with flaws

While paint shops and application technologies continued to evolve in terms of throughput speed, flexibility, efficiency and ease of operation, the technology under the grating floor of the spray booths remained largely the same. Venturi wet scrubbing uses a water-coagulant mixture to capture the paint particles in the booth air. The booth air stream is drawn down and accelerated in the tapering venturi duct. This causes the particles to enter the catch basin at high velocity, where the material later settles as paint sludge and then has to be disposed of or treated. The cleaned booth air is then usually discharged to the outside. This principle has gained acceptance over the past decades. However, it demands a great deal from the user, the personnel and the environment.



The technical complexity of Venturi wet scrubbing is high, because basins, aggregates, pumps, piping and other equipment have to be accommodated and the technology takes up a lot of space and requires time-consuming and costly maintenance. It also requires a high input of resources - especially water and energy. The bacterial infestation in the basin that arises in the context of paint residues and water is combated with regular application of environmentally harmful biocides. The working conditions for the personnel are negatively affected by high noise levels and the smell of the decay processes. For this reason, additives such as biocides and defoamers are introduced, which usage is especially high during the warm seasons. The optimum selection and metering of coagulants can only be achieved with extensive know-how and chemistry adapted to the coating system. These weaknesses add up economically.



Comparison:
Venturi wet scrubbing
and E-Cube

E-Cube the clever filter without chemicals and water

Similar to Venturi wet scrubbing, the E-Cube system is located under the grating level of the spray booth. The mechanical system is simple in design and does not require any water or chemical additives. The booth air, which is enriched with paint particles, is sucked down and fed into the separation system. As it flows through the E-Cube filters, the paint particles are separated from the air. Behind this, a second separate filter stage ensures the high separation efficiency of over 99%. E-Cube filters and secondary filters can be exchanged during operation by automatically closing one filter module. Stable, cross-flow-free operation of the system is ensured by system monitoring and redundancy of the filter modules. The E-Cube system can be designed for both recirculation and supply/exhaust air operation.

The E-Cube cardboard filters are hybrid filters consisting of a combination of surface and depth filters. An optimized sequence of coarse, medium and fine separation ensures uniform filling of the filter. E-Cube filters have a very high paint absorption capacity. Depending on the operating model, they have a service life of several days to many weeks before an E-Cube needs to be replaced. The 0.8 m wide and 1.2 m deep (Euro pallet dimensions) E-Cube filters are 2.1 m high. With the use of a hand operated lift truck, the insertion and removal of the E-Cube is simplified. The quality of the paint particle filtration is first class.

Eisenmann E-Cube systems achieve exhaust air qualities of $<1\text{mg particles/m}^3$ air and are thus about three times cleaner than Venturi wet scrubbing systems. Thus, the E-Cube system is equipped to meet current and future international environmental requirements.

Energy savings of up to 42%

Painting processes are fundamentally very energy- and resource-intensive. For example, they require up to 70% of the energy needed for car production. Hence why coating companies are focusing on improving their energy and resource balance. E-Cube's waterless mode of operation allows air recirculation systems to reduce the need for air cooling or heating to the minimum. This allows energy savings of up to 42% compared to a Venturi wet scrubber operating in recirculation mode. A system with great economic potential without the usage of additives.



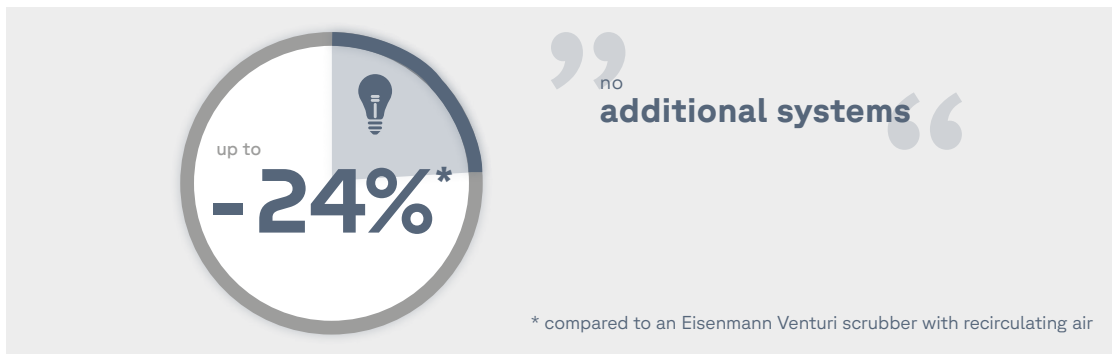
Simple and clean handling

The convenient disposal of the filtered-out solids is another plus of the E-Cube system. The system is extremely easy to handle, hence why the operating personnel do not need a special training or certification. The system is designed for simple replacement of the clever „boxes“ during ongoing production: New E-Cubes are assembled on Euro pallets which then are docked and undocked automatically into the modules. Using a hand operated lift truck, full E-Cubes are then taken away for disposal. Replacement during ongoing operation takes less than five minutes. The fill level of the E-Cube is monitored, displayed and controlled via the touch panel of the respective docking module. Clean and safe: The system operator does not come into contact with the overspray.



Low costs with maximum flexibility

In addition to the energy costs savings of up to 42%, coating lines can see up to 24% lower initial investment costs with the E-Cube system. The reason for this is simple: all aggregates and equipment connected to the wet Venturi scrubbing process are not required. The E-Cube system has no need for counter tank, flotation tank, pumps and dosing stations. The user's cash register is happy: less is more.



Dr. David Hoppmann, Product Manager E-Cube, Eisenmann GmbH

The modular design of the E-Cube system favors fast installation, even in the brownfield. The functional test before delivery of the docking modules also allows fast commissioning.



It is not only companies planning a paint shop „on a greenfield site“ that benefit from low costs and maximum flexibility. Due to the modular design, system replacement is also possible in very confined spaces. The length and width dimensions of the E-Cube system are flexible. The possibility of retrofitting existing painting lines in the brownfield has already been realized many times, thus significantly reducing costs in further operation. Eisenmann uses the E-Cube system to implement installation heights of between four and nine meters. The E-Cube system is simply installed below the grating level, adapted to the existing spray booth and enclosed. Because it consists of small installation segments, it can also be used in places where the openings for inserting material are extremely limited. E-Cube is the right system for every project.



Into the future with E-Cube

E-Cube is a simple and ingenious dry separation system that helps coating lines achieve initiatives to become environmentally friendly while having an efficient, flexible and sustainable solution. Since its market launch, the system has been successfully used many times for wet painting in various industries worldwide. E-Cube reliably separates overspray in paint shops from wheels to cars and trucks to combine harvesters. The E-Cube system offers maximum variability, is suitable for all plant sizes, can be easily expanded or replace other systems in existing plants. E-Cube –simple, sustainable, efficient.

Based on many years of experience with the Eisenmann E-Cube system and the experience of our cooperation partner NeuFilter, we have succeeded in developing a standard E-Cube filter. The standard filter is able to efficiently separate and store the overspray of almost all common wet paint systems. This means ONE type of filter for all wet paints, now and in the future. This is how simple storage, logistics and process planning works.

The E-Cube filters, which are delivered in assembled condition on a Euro pallet, can be installed and removed cleanly and quickly, and can be disposed of easily when filled. Round-the-clock operation is thus in line with occupational safety and resource efficiency. The quality of the filters is constantly monitored and checked during production, as small causes can have major consequences, especially in filtration. For this reason, it is also possible at any time to optimize and further develop the E-Cube filter architecture to suit individual aspects.

Upgrading to a regenerable filter system

With the E-Cube RE filter, Eisenmann is working on the reusable filter for the E-Cube system. The aim is to reduce the resources required for filtration while at the same time tapping the energy content of the filled filter. The reduction of consumables is in line with the maxim of a clean process. Pyrolysis as a method of regeneration of the E-Cube RE makes it possible to maintain all the advantages of the E-Cube system while achieving additional goals. Thus, a further reduction of operating costs is in sight, as well as an improvement of the CO₂ balance and an increase of the resilience of the painting process by reducing the outsourced processes.



More about E-Cube?

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