State-of-the-art processes for top coats cannot entirely eliminate paint loss and the need for cleaning agents – but can significantly reduce them. Eisenmann offers end-to-end solutions for a primerless process, meeting automotive manufacturers’ exacting requirements in terms of first-run rate, efficiency, flexibility and automation.

New technologies are at the heart of Eisenmann’s primerless process. These allow direct charging of challenging water-based base coats – via the VarioCharger v.2 paint metering and potential isolation system integrated onto the robot arm, and the compact, easy-to-clean VarioBell v.2 rotary atomizer. Additionally, Eisenmann’s Vario IP Cleaner is a highly effective atomizer-cleaning device that operates without moving parts, and is specially designed for stubborn integrated-process (IP, i.e. primerless) paints. What is more, for the first time paint shops can now deploy the VarioMCC color changer with a built-in drain functionality.

The advantages of a primerless process

Fully automated paint application gives the vehicle chassis a brilliant finish and essential protection against external influences. At the same time, this is one of the most complex vehicle production processes. Increasingly, OEMs are painting car bodies using the primerless process for the top coats. An Eisenmann paint shop precisely tailored to this scenario has been successfully implemented in Brazil, and projects in Hungary, South Africa and Russia are underway. Eliminating the primer improves sustainability and lowers operating costs. For example, the manufacturer save out one of the drying processes.

A particular challenge with primerless paint is its strong adhesive and thixotropic characteristics, making it difficult to handle and use. Eisenmann’s paint metering system and high-speed rotary atomizer were specially developed for and aligned with these requirements. The extended, enhanced range of technologies can deliver better results and significant cost savings. For conventional and IP processes, the application solutions are the core components of the spray booths – and have enormous potential in terms of production costs, quality and sustainability. Critical success factors for cost-effective, sustainably paint shops include high paint transfer efficiency, rapid color changeover, minimum paint loss, and maximum finish quality – in combination with outstanding process reliability.
VarioBell: all-round excellence with direct charging
The VarioBell range of high-speed rotary atomizers is designed for the state-of-the-art application of one- and two-component water-based or solvent-based paints. The VarioBell v.3 incorporates in comparison with the VarioBell v.2 an additional hardener channel and an effective mixer for 2C paints. As a result, the paints can be mixed directly in the atomizer and applied with reliable quality. This two- or three-channel design accelerates color changeover, since the next color can be pushed forward to the main needle during the previous cycle. Charging paint takes place directly in the atomizer. In conjunction with the VarioCharger v.2 metering and potential isolation system, Eisenmann’s solution ensures highly effective paint transfer and especially low paint loss. Additionally, its compact construction enables potential isolation directly on the robot arm.

Direct charging with v.2 and v.3
Direct charging of 1-component and 2-component water-based or solvent-based paints markedly reduces the amount of overspray. Moreover, it improves paint finish quality. VarioBell v.2, exceptionally slender and weighing less than 5 kg, is one of the most compact systems on the market. This versatile high-speed rotary atomizer can be leveraged in a variety of ways. Depending on its configuration, VarioBell v.2 can be employed for painting large surfaces, as well as complex cavities and undercuts in chassis interiors. Furthermore, using a single type of atomizer in all spray booths simplifies maintenance and repairs, training, and spare parts management.
An advanced dual shaping air system enables a broad range of spray patterns; the diameter of the jet spray at SB50 can be flexibly adjusted from 50 to 350 mm. Moreover, the atomized spray can be precisely tailored to the shape and size of the target component. As a result, consistently high paint finish quality can be achieved for both small, complex forms and for large surfaces.

**Vario IP Cleaner for pure results**
VarioBell’s simple geometric shapes facilitate automated cleaning during production. Specifically, the Vario IP Cleaner ensures atomizers remain clean at all times. This solution, too, was specially developed with the adhesive nature of the primerless paint in mind. Any paint that has adhered to the atomizers is reliably removed using an intelligent configuration of nozzles. Vario IP Cleaner’s straightforward design, without moving parts, makes the unit exceptionally robust and long-lasting, with little maintenance. The atomizers are treated at regular intervals in synchronization with the production cycle. The pulsed solvent-air mixture guarantees minimal solvent consumption. Two contactless nozzle rings seal the cleaning process, and promote rapid atomizer drying. The VarioBells are immediately clean and ready for use, fully automatically, and in synch with the production cycle.

**VarioCharger v.2 paint metering and potential isolation system**
The new VarioCharger v.2 paint metering and potential isolation system is specifically tailored to the electrostatic application of water-based paints by means of direct charging. Employing an “A-B configuration”, i.e. alternating between two cylinders, one side of the VarioCharger v.2 supplies the VarioBell for painting with paint, while the other side can be rinsed and filled. To ensure reliable potential isolation, a movable chamber containing an insulating agent separates paint supply and metering. The smart design avoids paint loss when the same color is used in sequence.

VarioCharger v.2 opens up new possibilities in terms of accelerated filling and minimized paint and rinsing agent loss. Despite including additional mechanical parts, it is highly compact just like its previous version. Additionally, it is simple and maintenance-friendly. Its space-efficient design also means that the system can be integrated onto the robot arm directly upstream of Eisenmann’s atomizer.

**VarioMCC: seamless color changeover**
Eisenmann’s new VarioMCC (MultiColor Changer) solution is the ideal connection between paint supply and robot. A smart valve configuration allows it to manage 18 paint colors. VarioMCC is made of three layers, each comprising a monobloc. Constructed this way Eisenmann avoids unnecessary shear stresses of the paint in the main channel. Its comparatively seamless construction means paint in the main channel is not subject to. The VarioMCC is extremely compact, and can be mounted on the robot carriage. The system also features a built-in train function for residual paint after extended periods of inactivity. In all, VarioMCC supports rapid color change and very low paint loss.
A strong combination of technologies

Together, Eisenmann’s VarioBell, VarioCharger v.2, VarioMCC and Vario IP Cleaner are a strong combination – creating an end-to-end solution for cost-effective, high-quality and primerless paint application for vehicle bodies. The solution can be tailored to all common makes and models of painting robots. A process data analysis (PDA) system monitors and stores all application parameters. In sense with the Industry 4.0 vision, data from sensors and control units, plus quality and material data, are captured and used for quality monitoring. Defined thresholds and key performance indicators can be employed to optimize paint shop operation. And when quality parameters change, process data are immediately available to locate the root cause.

Eisenmann has experience and expertise from many successfully installed, automated paint shops for OEMs and their suppliers across the globe. These include, for instance, facilities for alloy wheels and bumpers. Users benefit from customer-centric solutions with excellent first-run rates, cost-efficiency and eco-friendliness. Eisenmann also provides application solutions for surface cleaning, material supply, sealing, damping, adhesive bonding, plus corresponding tailor-made control units. All these elements can be combined to create a one-stop, end-to-end smart paint shop – in conjunction with Eisenmann’s VarioLoc skidless conveyors, Smart Oven, complete pretreatment and electrocoating lines with E-Shuttle conveyors, and E-Cube for intelligent overspray removal. This is the paint shop of the future.

Eisenmann offers better performance in primerless painting.