

Eisenmann plans, designs and installs pretreatment and cathodic dip coating systems for Bavarian automotive manufacturer

Specialized in international plant engineering for sustainable paint shops, Eisenmann GmbH with headquarter in Böblingen, Germany, has the world's largest portfolio of conveyor systems for pretreatment and cathodic dip coating processes (PT/ED) in the automotive industry. Thanks to numerous successfully completed complex projects, Eisenmann has extensive experience in optimally utilizing limited floor space in existing plant environments for the benefit of its customers. Against this background, the BMW Group commissioned the plant manufacturer to modernize the PT/ED system for axle carrier production at its Dingolfing site.

The new axle carrier production facility at the BMW Group plant in Dingolfing is designed as a two-stage process, with all process steps fully automated and digitally interconnected. After the front axle carriers are assembled from individual sheet metal parts using welding systems and robots, the chassis components are coated with cathodic dip coating in the second production stage to ensure long-term corrosion protection.

Pretreatment and cathodic dip coating form the foundation of the complex automotive painting process. Even at this early stage, minor details are decisive for a smooth production flow and high coating quality.

Within an existing production hall, Eisenmann implemented a pretreatment and cathodic dip coating system measuring 55 × 25 meters with a height of 9 meters. The electric exhaust air purification system (a three-chamber E-RTO unit with a capacity of 1,500 Nm³/h) as well as the cooling unit for the cathodic dip coating bath /ED-bath and supply air were installed on the hall roof.

Approximately 5.5 km of piping and more than 50 km of cables were installed to connect the various system components. The plant comprises 25 process tanks with a total volume of around 236 m³, eight of which are heated and one cooled.

In the approximately 50-meter-long process tunnel, the front axle carriers are cleaned, rinsed, pickled, zinc-phosphated, and finally primed in the ED section in a synchronized cycle process. For this purpose, workpiece carriers loaded with eight axle carriers each are transported in sequence into the respective process and treatment tanks by seven fully automated hoist systems, remaining in the immersion baths for between 60 and 300 seconds depending on the process step. Tilting devices in the ED tanks and activation zones ensure the necessary freedom of movement for the components.

To prevent the escape of vapors into the hall atmosphere, the heated process tanks are covered with folding closures. Additional edge extraction systems and a dust

protection tunnel installed over the entire PT/ED area provide further protection against contamination.

The 25 PT/KTL system tanks as well as 20 storage and counterflow tanks are located at the 0-meter level. The tanks for intermediate wastewater buffering have a total volume of 160 m³ and are divided into oil-containing and acidic media. This level also houses the fully automated replenishment stations for the activation baths as well as the pumps and filters required for bath maintenance. The entire system was installed in a recessed containment basin with a retention volume of 198 m³.

Ventilation of the process tunnel is provided by a supply and exhaust air system, whose crossflow heat exchanger is also used for energy recovery.

To improve the CO₂ footprint, an electrically heated KTL curing oven with nine cycles and a heating capacity of 650 kW was integrated. After curing, the coated components are cooled in two cooling zones.

Outside the process tunnel, material transport is handled by the Eisenmann Power & Free conveyor system, designed for loads of up to 500 kg. The workpiece carriers, measuring 2.6 m in length and 1.4 m in width, are transported to an empty carrier storage area located beneath the hall roof. Transfer between the loading units and the Power & Free system is fully automated.

As a general contractor, Eisenmann delivered the complete solution from a single source. As part of the two-stage high-tech production line, the modern PT/ED system makes a significant contribution to increased efficiency and flexibility in response to changing production requirements.

Watch the [Video!](#)

Eisenmann GmbH
Jörg Robbin / Head of R&D
Tübinger Straße 81
71032 Böblingen
www.eisenmann.com