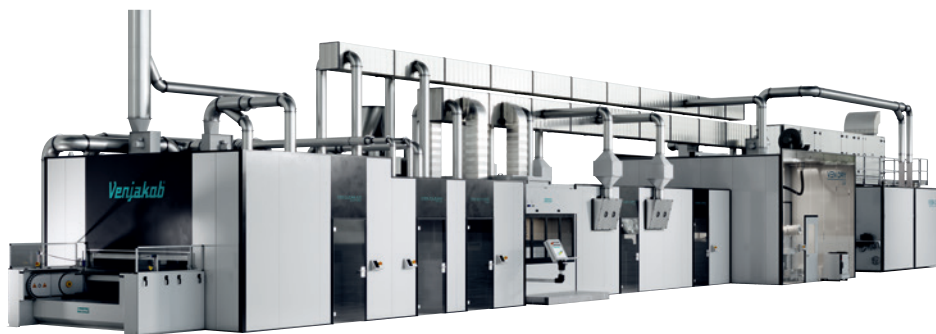


THE RIGHT COATING SOLUTION FOR ANY REQUIREMENT

Requirements for coating processes differ based on the coating material system and workpiece geometry. This success story presents three of currently five Venjakob finishing lines that have supported the successful growth of a contract coating company.



CUSTOMER PROFILE



Techniplas NRW GmbH & Co. KG in Lüdenscheid

Since 2020 the **contract coater Nanogate**, formerly Vogler GmbH based in the German town of Lüdenscheid, has been part of the American company Techniplas, a full service provider of decorative, multi-functional equipment solutions, **primarily for the automotive industry**. The products being coated **range from visually appealing decorative and control elements from well-known automotive manufacturers to switches, push buttons and other accessories from well-known home automation brands**. When it was still Vogler GmbH, the company relied on Venjakob finishing lines from the very start. By now, the company, now under the ownership of Techniplas, has become a major player in the field of complex black high gloss surfaces thanks to tailor-made finishing solutions by Venjakob.

THE REQUIREMENTS

System A: UV coating for flat components

Company founder Ingo Vogler recognized the trend of high-gloss looks for interiors and exteriors early on and wanted to adapt to it in terms of technology. He was looking for a surface coating system that could handle UV coating of flat components such as plastic buttons, e.g. for garage doors or hand-held transmitters, which were intended to be coated in large volumes in a continuous flow.

System B: Coating of complex 3D components

The next surface coating system from Venjakob was also supposed to be able to coat 3D parts, e.g. curved center consoles or storage trays in passenger cars, with solvent- or water-based coating materials. There was also a special requirement: The layer was supposed to be equally thick at all points. To achieve this, a special solution in the coating booth was necessary.

System C: Coating of complex workpieces with high-gloss coating materials

The final system installed was intended to use both UV- and solvent- or water-based coating materials. The aim was to allow flat workpieces and complex 2.5D workpieces made of plastic to be coated and dried in a continuous flow. The coating material systems used are: Piano Black and Nano coating.

TECHNIPLAS | *SUCCESS STORY*

THE IMPLEMENTATION



VEN CLEAN ICE: The solution to your cleaning problems:
CO₂ snow and dry ice blasting equipment. Suitable for large-area cleaning before the coating or bonding process.



VEN CLEAN: Dust removal and ionization systems permit the removal of electrostatic charges, which promote the adhesion of dust on component surfaces.



VEN SPRAY: A view of the spray coating booth with a special Multiflex rail system, which allows the four linear axes, each with two spray guns, to also move vertically during the horizontal stroke, i.e. in an arc shape adapted to the shape of the workpiece.

System A: UV coating materials require special arrangements

When developing the space-saving surface coating system of 23 meters (75.5 ft) in length for UV coating materials, material processing was a particular focus. As the uncured coating material sticks to everything and can only be cured by UV light, a variety of measures were taken. A divided transport system of self-cleaning steel belts is used inside the coating booth so that the coating material is not spread by the workpiece carriers.

Venjakob considered it extremely important for cleaning of the spray booth to be as simple and thorough as possible. The few screw connections were attached so that everything is easily accessible for cleaning.

In the UV drying section, a UV lamp was installed underneath the chain conveyor to cure potential overspray residue on the workpiece carrier.

Clearing the air - applies to systems A, B, C

At the same time, Venjakob installed a thermal oxidizing system (Venjakob Umwelt-technik) to treat the solvent-containing exhaust air so that it complies with strict international regulations. The thermal oxidizing system is now being used for all coating lines installed at the company. In addition, each line is equipped with a fully conditioned air supply system that ensures that the same climate conditions apply in the spray coating booth year-round.

System B: Multiflex rail system for 3D geometries

The solution for surface coating of plastic 3D components consists of a specially developed Multiflex rail system. It allows the four linear axes, each equipped with two spray guns, to also move vertically during the horizontal stroke, i.e. in an arc shape adapted to the shape of the workpiece. This makes it possible to achieve an identical layer thickness in all workpiece areas.

Flame treatment to ensure adhesion

To ensure excellent adhesion, Venjakob positioned a flame treatment system between the dust removal system and the coating booth. Flame treatment increases the surface tension and therefore also increases adhesion of the solvent- and water-based coating materials on the plastic workpieces. These are then dried with circulating air in a 6-level dryer. To simplify cleaning of the dryer, the side walls are designed to be mobile.

System C: The 40 meter (130 foot) universal talent for interior high-gloss coating and scratch-proof systems

The technology of the most recent finishing line allows the contract coater to both use UV coating materials and coat 2.5D workpieces in a continuous flow. The system is designed for solvent-based, water-based and UV coating materials. As in the systems described above, a pallet conveyor system is used for coating in a continuous flow.

Coating of 2.5D workpieces adjustable via spray jet parameters

To achieve an even layer thickness on 2.5D workpieces, an intelligent control system was used for this line.

The spray jet parameters of the spray guns are adapted to the workpiece geometry and stored in the control system.

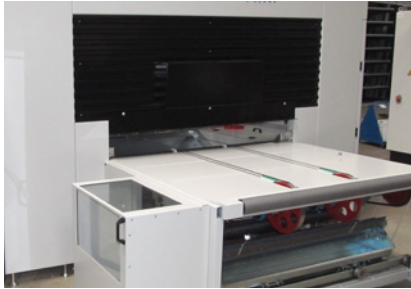
At the machine infeed, a sensor measures the workpiece geometry and automatically generates the spray jet parameters.

RobRobot with UV lamp for even drying of the 2.5D workpieces

The highlight of this line is a robot with a UV lamp. It deals with the "curves" of the complex 2.5D workpieces and ensures even curing or drying. When solvent-based or water-based materials are used, the robot is not activated and the workpieces simply pass through. This line is used for numerous series orders from German automotive manufacturers such as Audi and BMW. Thanks to the quality achieved here, the contract coater plays a leading role in the field of complex black high-gloss surfaces.

TECHNIPLAS | *SUCCESS STORY*

THE PROCESS

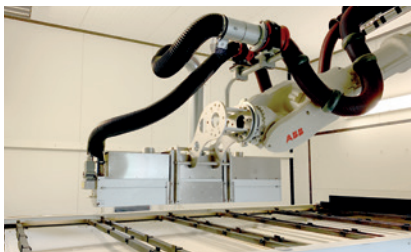


Separated transport system with self-cleaning steel belts prevents uncured UV coating material from being spread by the workpiece carriers.

System A: UV coating

On the UV surface coating system, the flat workpieces made of plastic are transported through a variety of processes on workpiece carriers. An infeed roller conveyor first transports the workpieces into the CO₂ cleaning system, then they continue to the dust removal system with ionization. Both units are equipped with extraction flap systems to remove dusty air. After the preliminary treatment, the workpieces continue into the spray coating system. Here, self-cleaning steel belts are used for transport. The subsequent drying process begins with an evaporation zone, from which the workpieces are transported by the chain conveyor into the infrared channel.

The final step is UV curing. The adjustable parameters for the UV lamp are: Lamp power, distance from the workpiece and speed underneath the lamp. The cured workpieces are discharged from the system via the outfeed roller conveyor at the other end.



VEN DRY UV_Robot: In this UV dryer model, the lamps are guided by a robot for curing the UV-curing coating material within seconds. They are often used for complex 2.5D parts, or when edges need to be hardened all around.

System B: Coating of 3D workpieces with Multiflex system

Preliminary workpiece cleaning is identical to that in the UV system. This line is equipped with a flame treatment system positioned between the dust removal system and the coating booth. The infeed and outfeed area of the coating booth is equipped with a water-sprinkled basin that helps bind dust particles. After sprinkling, the workpieces pass through an evaporation zone into the 6-level dryer to dry there in circulating air for approx. 40 minutes.

In this system, workpieces are loaded and removed at the same location. For this reason the plastic pieces being coated are transported by a continuous chain that returns underneath the system. In an approximately 39 m (128 ft) long zone, the workpieces are cooled down for immediate further processing or for a second coating process.



Loading and unloading station of the automatic plastic finishing line

System C: Coating of flat and complex workpieces with solvent-based/water-based and UV coating materials

This system is designed for solvent-based, water-based and UV coating materials. As this system is suitable for coating both flat workpieces and complex 2.5D components, it combines the possibilities of the previously separate individual systems. The technologies in use were adapted accordingly. The processing sequence is like that of system 2. When UV coating is used, the robot with the UV lamp positioned upstream of the 6-level dryer is activated for the curing process.

When other coating materials are used, the workpieces pass directly through to the multi-level dryer and the robot remains inactive.

FACTS AND FIGURES

System A:

Surface coating system with a coating booth for applying UV materials

System dimensions: 23000 mm (\approx 905.5 inch) length
Number of coating frames: Continuous flow system
Pre-treatment: CO₂ cleaning, ionization
Possible coating materials: UV coating
Possible maximum speed of transport: 5 m/min (16.5 ft/min)
Maximum working width: 1250 mm (\approx 49 inch)
Maximum working depth: Theoretically unlimited
Drying: UV drying

System B:

Surface coating system with a coating booth for coating concave or convex 3D workpieces with solvent-based and water-based materials

Number of coating frames: 98
Pre-treatment: CO₂ cleaning, ionization, and flame treatment
Possible coating materials: Solvent-/water-based coating materials
Possible maximum speed of transport: 2.5 m/min (\approx 8 ft/min)
Maximum working width: 2700 mm (\approx 106 inch)
Maximum working depth: 930 mm (\approx 36.5 inch)
Drying: Thermal drying

System C:

Surface coating system with a coating booth for coating complex 2.5D workpieces with solvent-based, water-based and UV coating materials

Number of coating frames: 127
Pre-treatment: CO₂ cleaning, ionization and flame treatment
Possible coating materials: Solvent-/water-based and UV coating materials
Possible maximum speed of transport: 2 m/min (\approx 6.5 ft/min)
Maximum working width: 2700 mm (\approx 106 inch)
Maximum working depth: 830 mm (\approx 32.5 inch)
Drying: Thermal and UV drying

SPECIAL FEATURES AT A GLANCE

SYSTEM A:

SURFACE COATING SYSTEM WITH A COATING BOOTH FOR APPLYING UV COATING MATERIALS

- Very small, space-saving system with length of 23 meters (75.5 ft)
- Throughfeed speed: approx. 1 m/min. (\approx 3.3 ft/min)
- Separate transport systems to avoid spreading UV coating material
- Self-cleaning steel belts
- Easy cleaning of coating booth
- Fully air-conditioned air supply system
- The UV dryer permits use of different UV lamps: Gallium, mercury, iron-doped

SYSTEM B:

SURFACE COATING SYSTEM WITH A COATING BOOTH FOR COATING CONCAVE OR CONVEX 3D WORKPIECES WITH SOLVENT- AND WATER-BASED COATING MATERIALS.

- Feeding and removal on the same side
- Continuous chain conveyor system
- Multiflex rail system for even layer thickness on 3D workpieces
- High throughfeed speed: 0.8 m/min (\approx 2.6 ft/min) for complex 3D workpieces
- Easy cleaning of dryer thanks to mobile partition walls
- Fully air-conditioned air supply system
- Space-saving system design

SYSTEM C:

SURFACE COATING SYSTEM WITH A COATING BOOTH FOR COATING COMPLEX 2.5D WORKPIECES WITH SOLVENT-BASED, WATER-BASED AND UV COATING MATERIALS

- Robot for UV curing
- Adaptable spray jet parameters for 2.5D workpieces
- Easy cleaning of dryer thanks to mobile partition walls
- Fully air-conditioned air supply system
- Space-saving system design