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Opening photo: Profiles coated with the phase dense system at the SARO facility in Vittoria (Álava, Spain).



FOCUS ON TECHNOLOGY

SPECIAL ALUMINIUM & DESIGN



Dense Phase Technology to Powder Coat Aluminium Profiles

Alessia Venturi **ipcm**®

The dense phase pumps of powder coating systems are specifically designed for users consuming high quantities of paint and requiring long-term process consistency and repeatability. This is why one of the industrial coating sectors in which this technology is more widespread is that of aluminium profiles. On both ipcm® and ipcm®_Ibérica/LatinoAmérica, we have already dealt with several success stories of European companies performing powder coating operations on aluminium profiles and other workpieces that have benefited from the replacement of traditional Venturi injectors with dense phase pumps. Saro Recubrimientos Orgánicos is based in Vittoria, Spain, and it is one of them. The firm has recently updated one of its vertical powder coating booths with Gema's OptiSpray technology (**ref. Opening photo**). OptiSpray APo1 pumps use the Smart Inline Technology (SIT) to ensure a consistent and delicate powder flow and thus ensure the maintenance of the qualitative characteristics of the coating over time, even when using particularly critical products.

Specialising in the powder coating of steel and aluminium since 1980

SARO was established in 1980. Since then, it has never stopped developing and expanding its position in the powder coating market. Currently, it has a covered area of 6000 m², with two 3000 m² buildings located in the best industrial polygon of Vittoria, in the Basque Country. Its strategic position in one of the most densely industrialised regions of Spain and its proximity to France have turned SARO into a competitive firm not only in its own country but also in the neighbouring one. Established as a coating contractor specialising in aluminium parts and structures, SARO soon expanded into the aluminium field by installing a vertical coating line for profiles and a wood-effect finishing line with the sublimation technology. Now, it is a highly versatile and flexible company serving a wide variety of markets in the industry and architecture sectors. "We are pure contractors: the material treated is provided by our customers, which mainly operate in the fields of architecture,

construction, aerospace and general industry. For them, we coat profiles, sheets, accessories, moulds and workpieces in many different sizes,” says Jesús Antonio Resano Cía, the General Manager of SARO (**Fig. 1**). “Operating both in the aluminium and the steel sectors, we have the Qualicoat Seaside and the C5M class Qualisteelcoat certifications. Since we export over 60% of our products in France, we are currently obtaining the Qualimarine label of ADAL, the French branch of Qualicoat, which is essential to work in this country in the field of metal architecture. Compared to the Seaside certification, which enables to perform an acid-only or a combined acid and alkaline attack with a minimum removal of 2 gr/m², the Qualimarine label requires the use of a combined acid and alkaline attack ensuring an overall minimum removal of 2 gr/m², but also a removal of 0.5 gr/m² per stage.”

Diversified and versatile equipment

SARO’s versatility is ensured by its diversified equipment, which enables it to offer numerous types of treatments on both aluminium and steel. The company has three coating lines.



Figure 1: From left to right: José Luis Alamo, the Production Manager of SARO, Jesús Antonio Resano Cía, the General Manager of SARO, and Alessia Venturi, ipcm®.

“We powder coat aluminium profiles for architecture on a vertical line that can treat up to 7 m long workpieces with thicknesses between 1 and 5 mm (**Fig. 2**),” states Resano Cía. “Our customers are extruders, frame manufacturers, wholesalers, and carpenters. For this vertical plant, we have paid great attention to the pre-treatment phase, which ensures that the Seaside quality level is reached on all products, irrespective of the customer’s specifications. We use a chrome-free system with the Proquimia no-rinse passivation process. We have

completely automated the plant with the installation of dosing pumps; moreover, the high computerisation level of the system allows us to constantly monitor the quality of baths on both PCs and mobile devices. The department devoted to architectural steel also features a sublimation line for wood-effect finishes, which can handle both profiles and flat sheets. “The department devoted to steel, on the other hand, is equipped with a highly flexible horizontal plant. Thanks to a multi-metal pre-treatment process developed by the

Spanish firm Proquimia, it coats both steel and aluminium, specifically out-of-range sheets and bars, since it can handle workpieces up to 8.5 m in length (**Fig. 3**). Operating for the automotive, electrical appliance and structural engineering sectors, this horizontal line is equipped with a newly installed spray paint booth implementing the latest technical innovations, such as automatic mixing of virgin and recovered powder and automatic recognition of the parts’ size (**Fig. 4**). For this plant, we chose to invest in a multi-metal nanotechnology

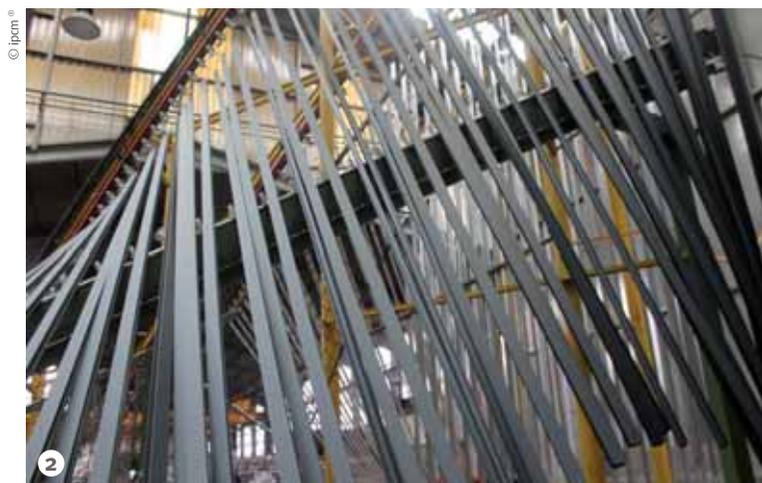


Figure 2: The unloading area of the vertical system.



Figure 3: Thanks to its multi-metal pre-treatment process, the highly versatile horizontal plant can coat both steel and aluminium and treat up to 8.5 m long workpieces.



pre-treatment process that is completely devoid of any toxic substances and ensures that the same quality is achieved on both steel and aluminium. Also on this plant, we can work with our Qualicoat license, choosing to replace the multi-metal bath stage with a special one. In this way, as well as all steel components, including small parts and accessories, the horizontal line can also paint aluminium sheets and bars that are more than 7 m long.”

“The vertical line, on the other hand, is much less versatile but it has a high production capacity, about 1000 m²/day. The quality control and packaging stages are performed next to the coating system to optimise our response time. Given the strategic importance of this plant, SARO has recently invested in a major technology upgrade of the powder feeding and application system on one of the two quick-colour change booths,” says Resano Cía.

Replacing Venturi injectors with new-generation pumps

System Pulver S.L., Gema’s official distributor for Spain based in Sant Just Desvern, installed its new-generation powder application



Figure 4: The newly installed automatic booth implements several technical innovations such as automatic mixing of virgin and recovered powder and automatic recognition of the parts’ size.

devices on one of the two vertical booths present at the SARO premises. These include the powder management system OptiCenter OC03 (Fig. 5), the



Figure 5: Gema’s OptiCenter OC03 powder management unit.

fully integrated pump OptiSpray AP01, the control module OptiStar GC12-P, and the 20 automatic guns OptiGun GA03-P.

“Our vertical line was supplied by SAT from Verona, Italy” explains the Production Manager José Luis Alamo. “The V-shaped booth is still the original one, whereas the second one has been recently replaced with a new-generation U-shaped booth with a quick colour change system (Fig. 6). The new technology with powder pumps keeps the application parameters constant for longer than our previous Venturi-type devices did. We chose this new plant not only for the dense phase conveying system (Fig. 7), which translates into better application results and a better profile look, but also for the possibility to control each gun individually (Fig. 8).

“With Gema’s individual gun control modules, it is possible to optimise the electrostatic charge parameters and the amount of powder dispensed by each gun,” says José Antonio Azpeitia, System Pulver’s representative for the Basque Country. “The booth on which we intervened features 20 guns, divided into two groups of 10 guns each: each block has 5 guns with SuperCorona parameters and 5 guns with different parameters (Fig. 9)”.



Figure 6: The second last-generation booth supplied by SAT Spa (Verona, Italy) is U-shaped and has a quick colour change system.



Figure 7: OptiSpeeder is an innovative reservoir that prevents any loss due to the fluidification of powders. The closed-loop system is fully automatic, ensuring extremely low powder consumption and excellent coating results.

Important benefits

“This investment dates back to December 2016: the new system has been operating for six months. Already in this short period, and considering the time we took to learn how to handle the new technology properly, we have found many benefits. First of all, we have achieved greater penetration capacity even in complex-shaped profiles thanks to the optimisation of the operating parameters,” says Alamo. “Architectural profiles now have more and more complicated geometries and, since the installation of the Gema system,

we have been obtaining a more homogeneous look and a remarkable reduction in the orange peel-effect.” “Also the continuity of this quality improvement over time has positively impressed us,” states José Antonio Resano Cía. “Once the proper parameters for the application of powders on different profile families have been set, the quality level remains



Figure 8: The touch screen system controlling the application parameters of each gun.

The **REVOLUTION** in powder application



OptiSpray AP01 with SIT Smart Inline Technology (SIT)

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- **Consistent coating quality**
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unchanged. As for the actual saving of powder paint, we cannot quantify it at the moment, because we have not completely optimised the control of the colour change process, yet. However, I can safely say that the coating quality achieved with Gema's OptiSpray guns is considerably higher in terms of both thickness consistency and aesthetics. The market demanded this technological change because the quality requirements



Figure 9: The new booth's 20 guns are divided into two groups of 10 guns each: each block has 5 guns with SuperCorona parameters and 5 guns with different parameters.

are getting stricter and stricter and the powders used are becoming more and more particular. In Spain, we are among the first companies to adopt this technology, while in France several firms already did.”

“Another key factor is the fact that such high quality level is ensured even for small profile batches,” says Alamo. “This is crucial for a contractor like SARO, which also treats small lots with a wide variety of profiles and with up to 40 different colours per day. If we wanted, we could increase the speed of the line; however, first of all, we want to make sure that our customers are satisfied with the quality we are providing with this new system.”

“In 2016, we made two major investments on our coating plants. The first involved one of our two vertical booths, with the complete replacement of the powder feeding and spraying system. The second investment was made on the pre-treatment process of the horizontal line: in fact, we integrated a new multi-metal cycle using the Prospray system provided by Proquimia (Figs. 10 and 11) for the atomisation process of the last passivation stage,” states Resano Cía. “Given the benefits and the quality achieved with the new Gema equipment, our next investment will be definitely aimed at implementing the dense phase pump technology on the second vertical booth, too.”



Figure 10: Proquimia's Prospray atomisation system for the last passivation stage.

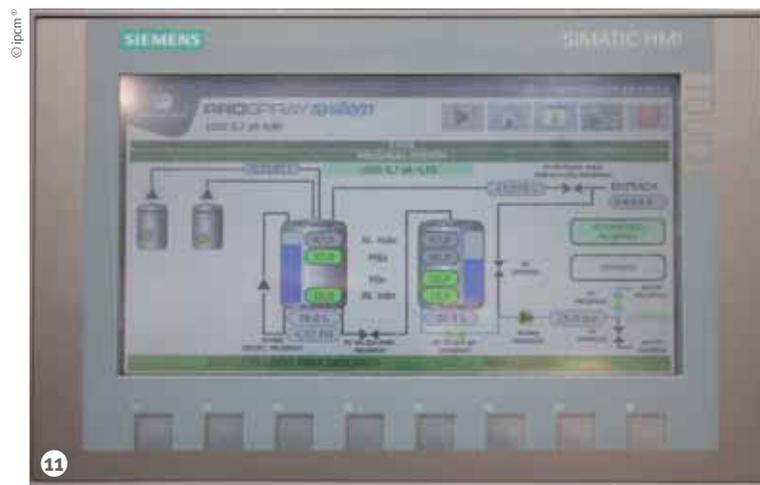


Figure 11: The touch screen system controlling the parameters of the Prospray system.