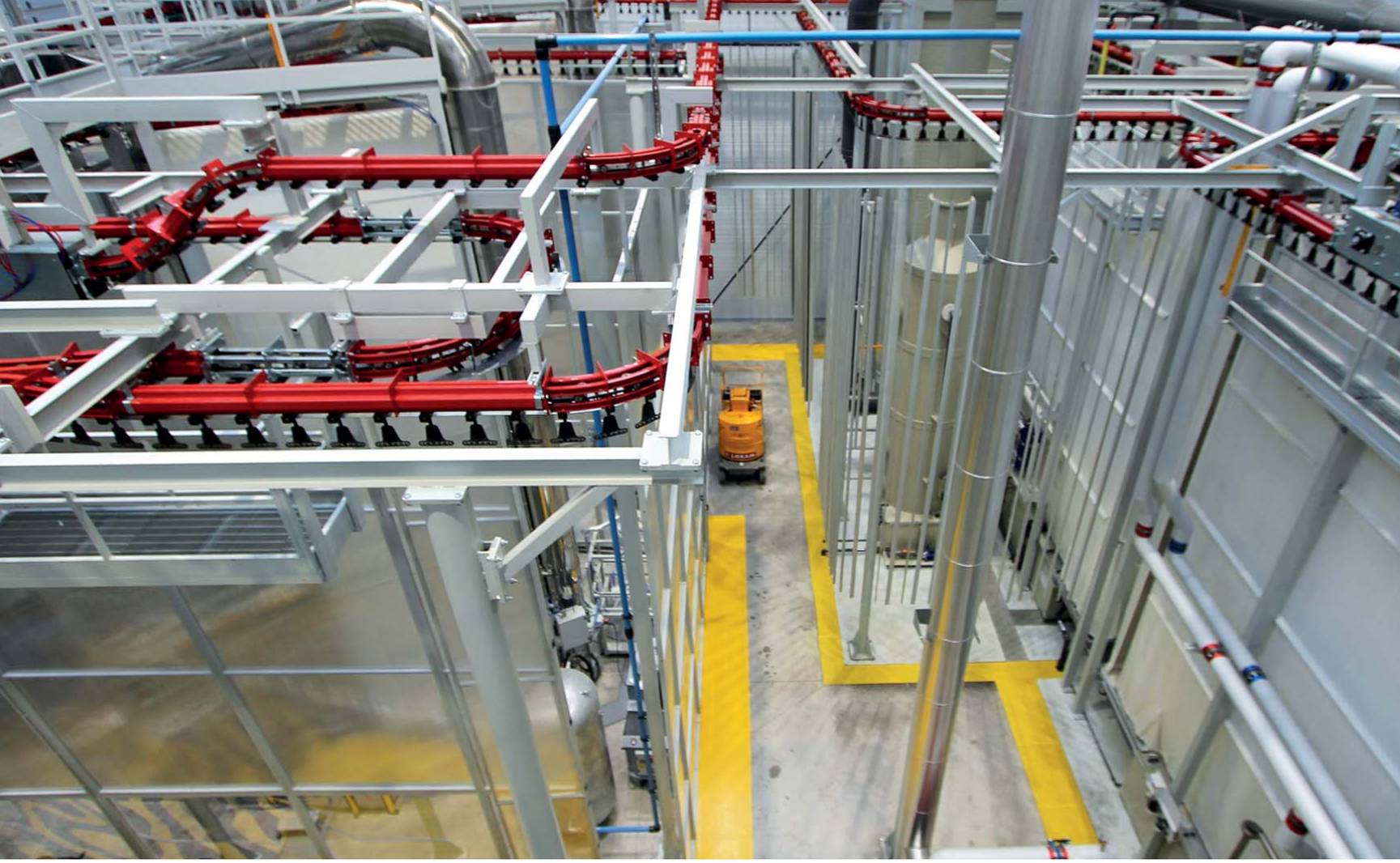

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Aerial view of the plant.

SLA Industrie: A Last Generation Vertical System to Increase the Productivity of a Service Company in the Aluminium Profile Sector

Alessia Venturi ipcm®

SLA Industrie, a service company for the procurement, processing, finishing and assembly of aluminium profiles for the French ATRYA Group, has invested in a vertical coating plant for profiles with a maximum length of 7 meters, designed and installed by SAT (Verona, Italy), to replace the previous saturated horizontal plant. The new line presents two highly productive V-shaped coating booths featuring dense phase application devices and numerous technical characteristics aimed at improving sustainability and product quality.

Sectional view of the profiles assembled with the thermal bridge.

The mission of a service company is to provide its customers with finished products, or semi-finished products that have reached the required process stage, as quickly as possible. In order to do so, it is essential to have systems and machines that enable a lean production flow and can compensate for any production peaks or structural increases in demand – including the demand for small batches - without the need to rely on contractors.
This was also the issue faced in 2018 by SLA Industrie (Fougerolles-Saint-Valbert, France), specialising in the processing and coating of aluminium profiles for door and window frames. The boom occurred over the previous ten years in the aluminium frame market had completely saturated the horizontal coating line of the company.
In order to make up for its lack of production capacity, SLA Industrie chose to make a major investment in a vertical coating plant for profiles with a maximum length of 7 metres. SAT (Verona, Italy) designed and installed it, supplying a last generation, high productivity line with two V-shaped coating booths featuring dense phase application devices and numerous technical characteristics aimed at improving sustainability and product quality.

Company history

SLA Industrie operates as the procurement, processing, finishing, and assembly service provider of the ATRYA group, a French plant engineering business in the sector of architectural profiles. Johannes Tryba, a carpenter of German origin, established it in 1980 in the French region of Alsace by launching the production of PVC windows with fifteen employees and a production capacity of twenty windows per day, sold in the French market. Indeed, the ATRYA group's history is the story of a passion that became a job and of a job that proved a very successful endeavour.
In 1984, TRYBA designed its first range of profiles.

Detail of the vertical coating installations

Pascal Fischer, SLA Industrie general manager.

Its success was such that in 1988 it completely automated its production process. TRYBA managed to consolidate its presence in all market segments, thanks to both targeted acquisitions and the establishment of various production units in France, Switzerland, and Germany, thus laying the foundations for the creation of a European-level group. PVC door and window frames were joined by wood and, above all, aluminium ones. Indeed, since the 2000s aluminium has become more and more appreciated thanks to its characteristics of sustainability, lightness, and recyclability even when painted.

The ATRYA group was officially created in 2004 by including various brands, operating in both the BtoB and BtoC markets and in the public building sector. Since 2004, the ATRYA group has continued to expand in France, Germany, Switzerland, and Belgium by incorporating new sectors, such as that of profiles for verandas, pergolas, and garage doors. It thus became a benchmark company in the market of high quality architectural structures. Its strong focus on the protection of our planet has led it to adopt a responsible development philosophy, based on continuous innovation that is also respectful of humankind and the

The loading.

The warehouse with the pre-load zone.

Internal view of the pre-treatment tunnel.

environment: this approach is well summarised by its motto, "ATRYA, Making the best of WE (World's Energy)". The ATRYA group is now among the major European door and window manufacturers, with 1450 employees, 15 production sites in Europe, an annual turnover of 265 million Euros, and a commitment to always invest in the excellence of its product.

The transition from the horizontal to the vertical system

Established in 2008, SLA Industrie is the ATRYA's group service company. It deals with all the operations needed to transform a profile into a window or door, from machining, thermal bridge assembly, and accessory and small part integration to coating, wood-effect sublimation (carried out in-house), and anodising (currently outsourced). In addition to these services, SLA Industrie also manages the procurement of the aluminium extrusions used by all the companies of the group to produce their aluminium, wood/aluminium, and PVC/aluminium doors and windows.

"The demand for aluminium has grown exponentially in the last few years, thanks to the sustainability characteristics of this material, whose properties perfectly meet the requirements of recyclability, low environmental impact, and lightness of structures. Aluminium frames have gained more and more ground within our group, to the point of pushing us to invest in a new coating plant to adapt our productivity to the boom in market demands. In 2018, our production volume had reached 400,000 coated square metres per year: despite working on three shifts, our horizontal line had reached full capacity. We therefore chose a vertical system supplied by Italian company SAT. We definitely broke with the past, since our already-existing plant was a horizontal machine," says SLA Industrie general manager Pascal Fischer. "At the end of 2019, the vertical line was ready for the ramp-up phase and we started gradually reducing the use of the previous plant – a phase that is still underway. The vertical line is also supported by a small horizontal line, which we installed in 2015 to coat the accessories and sheets necessary to complete our profiles."

"We deliberately chose a vertical plant that was oversized with respect to our current production needs because we knew we had to take an important step for the development of our company," states Pascal Fischer. SLA Industrie also coats parts for some firms outside the ATRYA group, which it provides with an integral profile

The pre-treatment tunnel.

management service based on their production schedules, so that they can directly manufacture the window frames with the profiles of each batch.

Features of the vertical line: energy efficiency, safety, and excellent coating quality

SLA Industrie stores its profiles, mostly coming from European extruding firms, in an advanced automatic warehouse with 2,200 slots. These are then picked up according to production orders, aimed at optimising

The vacuum evaporator of the water treatment plant.

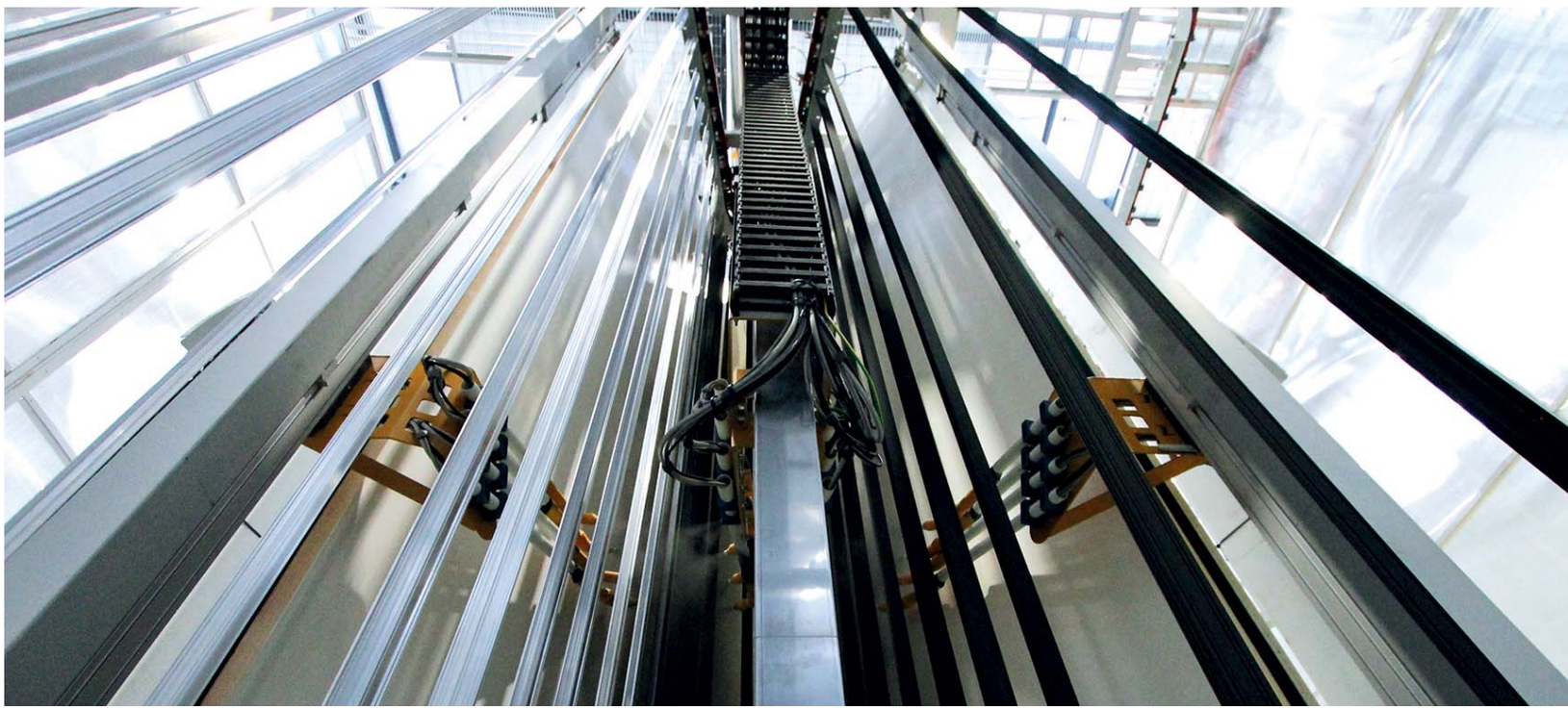
production according to both colours and delivery deadlines, and dropped off in a few storage buffers in front of the vertical system's loading station: each buffer corresponds to a different customer or colour batch. SAT's plant includes a pre-treatment station with a Qualimarine-level cycle with alkaline attack, acid attack, conversion, and rinsing phases. "We chose to obtain the Qualimarine certification: it is the quality mark of French association Adal and it differs from the Qualicoat Seaside one because it has lower tolerances in terms of raw material quality and especially of copper content in alloys, as it is a corrosion factor," explains Pascal Fischer. "Pre-treatment waste water is handled with a zero-discharge purification system with a vacuum evaporator."

Pascal Fischer from SLA Industrie, on the left, with Stéphane Sénéchal from SAT.

The booth 1.

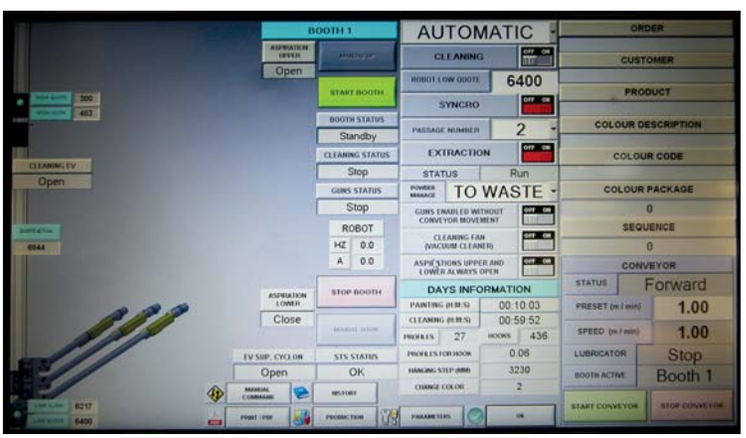
temperature rises. In this area of France, it can be very hot in summer: the coolers prevent the baths from accumulating too much heat. Finally, the pre-treatment station features a scrubber system to purify the tanks' vapours before air is released."

The powder application area consists of two V-shaped booths, each equipped with 16 spray guns fed through GEMA dense phase pumps. "In the V-shaped booths, the suction ducts are located behind the guns and, therefore, overspray suction also contributes to paint the profiles," says Pascal Fischer from SLA Industrie. "Thanks to their rotating walls, the booths are constantly cleaned during

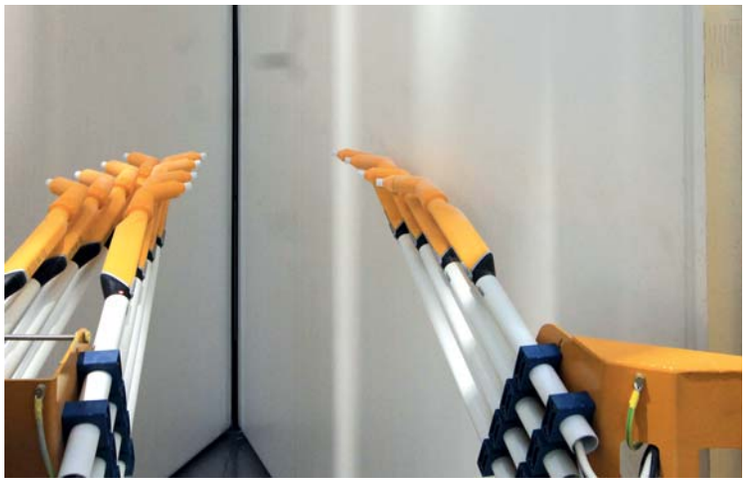


The booth 2.

"The drying oven following the pre-treatment station was separated from the curing oven already during the design stage, at the specific request of SLA Industrie," says Stéphane Sénéchal, project manager at SAT, "because they required a process enabling to fine-tune operating temperatures. This is why we installed two independent ovens, each with its own burner. With the aim of better managing energy efficiency, we have also equipped the pre-treatment tunnel with two cooling unis in correspondence with the conversion tank, which keep the baths' temperature constant when the environment's



Touch screen for booth and guns setting up.



The V Shape configuration with opposing guns.

spraying, so that the colour change operations are very quick. The two booths work simultaneously, not based on the typical distinction between light and dark colours, but rather on production batches. Of course, we try to optimise production orders by tint, but our main goal is to meet our customers' deadlines and only rarely is it possible to devote one booth to dark colours and the

The fans are positioned at floor level of the oven.

The powder centre.

other to light ones. We currently perform five to twenty colour change operations per shift. We carry out powder recovery operations or not depending on each batch size. The speed of the chain is 1 metre/minute and during loading we leave 5 metres between one batch and another: if the batch to be processed is smaller than 5 metres of chain, we do not recover the powder used."
"The latest type of GEMA dense phase powder management unit is equipped with a gap control system, which automatically detects the lack of profiles on the

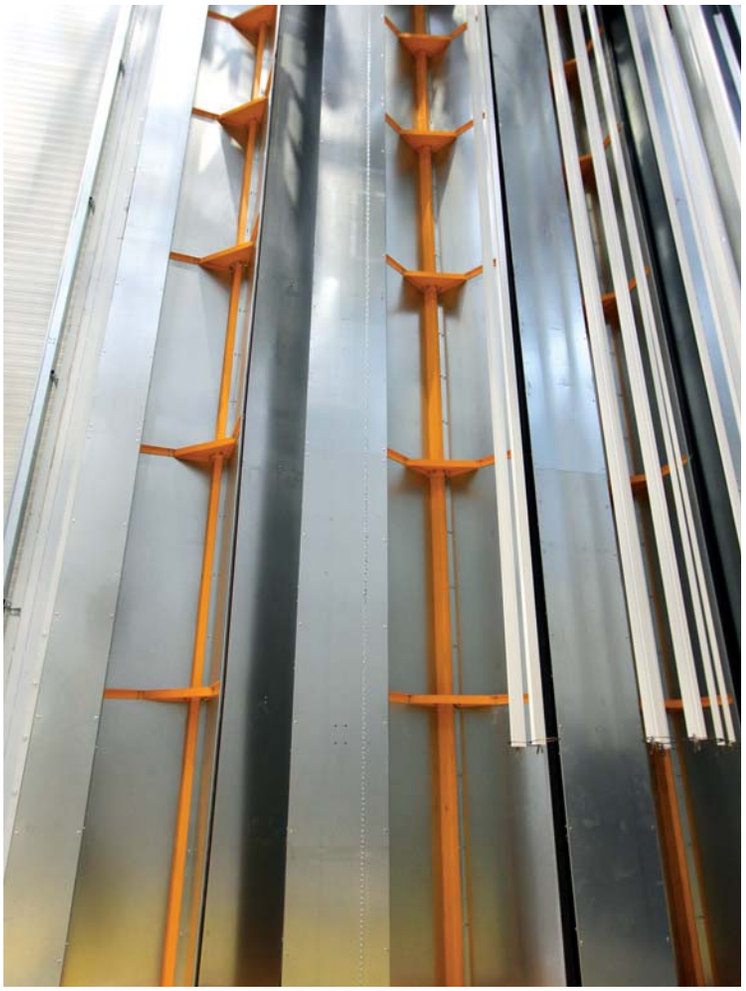
chain and allows simultaneously turning off all guns, which are normally managed by individual control modules," says Stéphane Sénéchal from SAT. "This enables the operator to save time and prepare for the subsequent coating program while the system performs the booth and gun cleaning operations."

"Another peculiar characteristic of this plant is its curing oven. It has excellent insulation and softer, more fluid, and uniform air distribution, since this comes out from numerous bottom holes with the same speed. In this way, air comes out fragmented and with a constant flow: this avoids any collisions between the profiles and the dispersion of impurities, which may cause inclusions on the profiles' finished surfaces," indicates Sénéchal. "Moreover, gas consumption is limited and fans are positioned at floor level to facilitate maintenance. Finally, its most important construction characteristic, which has become the trademark of SAT plants' curing ovens, are revolving doors. These are an excellent solution, because they give the profiles time to gel, with very positive effects on coating quality, the reduction of any inclusions, and energy savings."

Coating efficiency with reduced powder consumption and improved quality

"Last year, we decided to standardise the use of Qualicoat Class 2 powders in order to guarantee excellent quality and position ourselves in the high-end market. This led to a natural selection of our paint suppliers. We have now three main ones: Tiger Coatings, Axalta, and IGP," explains Pascal Fischer from SLA Industrie. "With the installation of the new plant and, above all, thanks to GEMA dense phase technology, we have already found that we consume much less powder than we did on the horizontal line. We already had some experience in the use of dense phase pumps on our horizontal line for coating some accessories, and we chose to also install them on our vertical line because the application quality degree is higher."

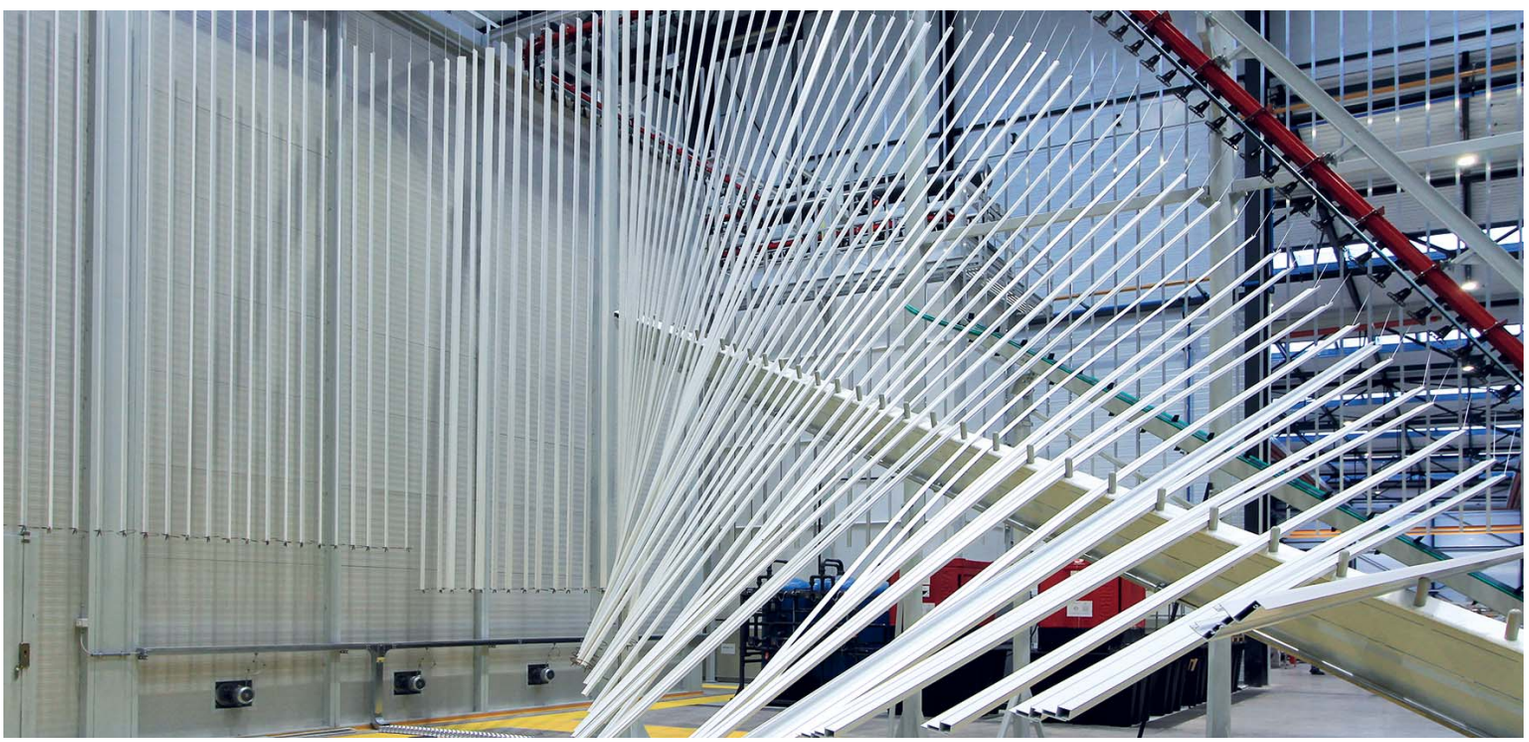
"While designing this plant, we focused on the environmental issues related to energy efficiency, which is a very important aspect for those who choose such a sustainable material as aluminium," states Fischer. "We opted for SAT as our plant supplier because its offer best suited our technical needs. I especially appreciated the oven's revolving doors, which reduce consumption while



The oven's revolving doors.

AP01 dense phase pumps.

eliminating the inclusion problem on profiles, which is due to the contamination that normally occurs at the entrance of curing ovens. The V-shaped booth concept is also very interesting: we are obtaining excellent finishing results even on very complex profiles: although we still need to optimise a few parameters, the difference with the coating results of the horizontal line is already clearly visible. Therefore, I can say I am pleased with our switch to a vertical plant concept. Obviously, this phase is not easy to manage because our operators must get used to a completely different coating process, but for now things are going very well, exactly as we expected."



The unloading.