



Opening photo: The booth 4.0 designed and installed by Zeus Electrostatic Systems.



FOCUS ON TECHNOLOGY

Cutting-edge Coating Technology for Medium and Large-sized Carpentry Components. Industry 4.0 Principles for Increased Plant Versatility and Performance.

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The coating industry is complex and requires robust, reliable and efficient equipment. In this increasingly competitive and difficult market, however, many companies performing coating tasks also seek a partner that can help them reduce costs, stay competitive, and improve quality. For a firm dealing with carpentry components of different shapes and sizes, from the smallest dimensions to several meters in length, it is important to rely on production systems that can cope with the needs of different customers while ensuring adequate quality and durability levels for all types of products.

Arcobaleno Verniciatura was established following the acquisition of Verniciatura F.lli Piccoli by Marzio Patuzzo, now managing the company with his sons Paolo and Valerio. Precisely aiming at continuous technological and qualitative improvement, it has made some important investments on its coating plant in collaboration with Zeus Electrostatic Systems (Argenta, FE, Italy), a company specialising in the production of powder coating plants and equipment (Fig. 1). This upgrade project has enabled Arcobaleno Verniciatura to be among the Northern Italian leaders in the surface treatment of large-sized components for different sectors, including furniture, design and industry.

“In 1997, when Arcobaleno Verniciatura was established, the original business had already switched from liquid to powder coatings and it was equipped with two in-line systems and a static plant. After dismantling one of the two in-line systems, the first investment we made in 2007 involved the static

machine,” says Paolo Patuzzo. “Looking at how the market and its demands were evolving, we believed that this plant would have ensured a competitive advantage by enabling us to process medium and large-sized components as well as applying increasingly more



Figure 1: From left to right Matteo Giordano Cuman, Guerra Srl's Commercial Division, Marzio Patuzzo, his sons Paolo and Valerio, and Massimo Ricci from Zeus.

colours.” “The manual sliding static plant is 7 m long. It has lowered our costs, increased our flexibility and enabled us to acquire new clients who

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are still among our main customers,” adds Valerio Patuzzo (Fig. 2). Thanks to this first upgrade phase, Arcobaleno Verniciatura was able

to lay the groundwork for the next step: “Once the static plant was in full operation, we focussed on the replacement of our in-line system. We kept only its pre-treatment tunnel, which performs a three-stage multi-metal process (phosphodegreasing, rinsing with mains water, and rinsing with semi-demineralised water); it uses Dollmar products and it features a small nebulisation plant for the nanotechnology conversion product, entirely designed and built by our family,” states Paolo Patuzzo.

Arcobaleno Verniciatura 2.0: the new coating plant

“We started a project called Arcobaleno Verniciatura 2.0 for the

upgrade of the old plant, which, albeit applying powders, had been designed for liquid coatings,” says Valerio Patuzzo. “That is why, a few years ago, we conducted a market research with the intention of changing our drying and polymerisation ovens, spray paint booth, and overhead conveyor.” “The first booth we installed on the advice of the plant’s designer immediately gave us problems: there were several critical issues in the powder application process due to the over-sized suction system, which compromised our quality standards,” says Paolo Patuzzo. The Patuzzo family turned to Zeus Electrostatic Systems in order to find a solution. “We already knew Zeus and its distributor in Lombardy, Guerra Srl (Zelo Buon Persico, LO, Italy), because we had already purchased from them the



Figure 2: Besides the in-line system, the factory is equipped with a static plant to treat large-sized components.

powder management unit and the cyclone linked to the new booth. In order to optimise our resources, at the same time, we devoted the old booth to the application of only one colour,” explains Patuzzo.

“Given Arcobaleno Verniciatura’s needs, we offered them Zeus³, a booth 4.0 with a quick colour change system, two manual touch-up stations, and conventional Venturi pumps for feeding the paint (ref. **Opening photo**). It integrates the Industry 4.0 principles to offer functions such as workpiece recognition, production data transmission, and remote machine

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monitoring. This enables both the user and Zeus itself to intervene promptly in case of technical problems,” states Massimo Ricci, the CEO of Zeus. “The booth is

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made of dielectric material, fast to clean and efficient in terms of powder recovery. Compared to conventional metal booths, plastic does not allow the powder to accumulate on the walls, thus ensuring maximum efficiency of the recovery system and greatly facilitating the cleaning operations,” adds Ricci. “This booth was designed for companies performing several colour change operations per shift.

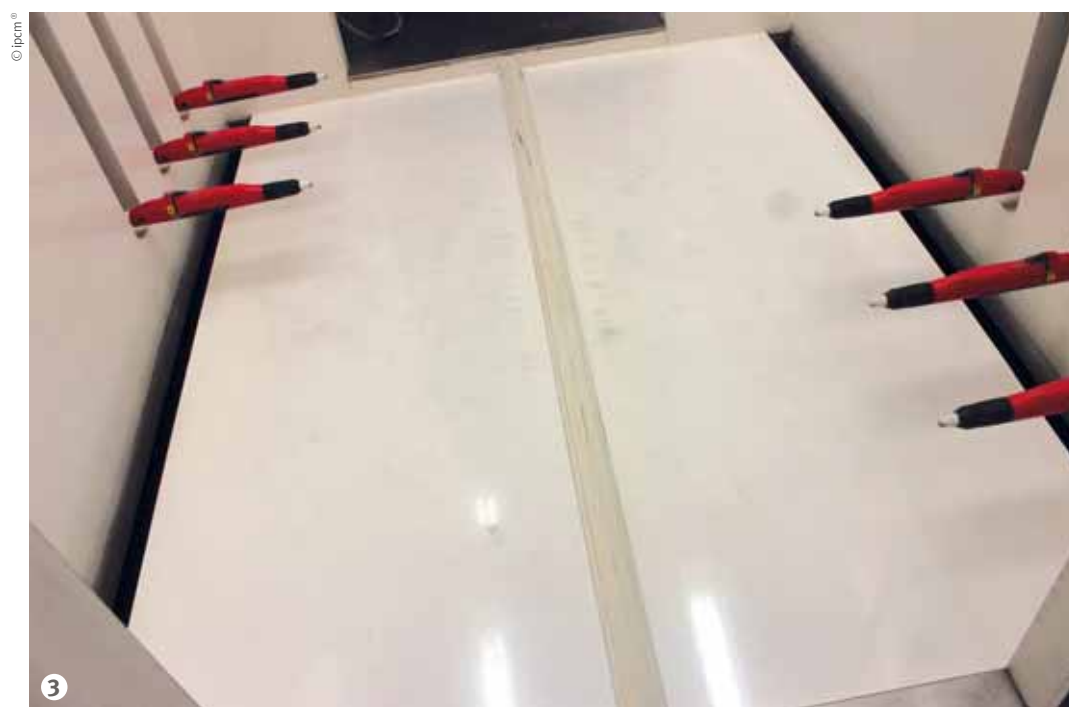


Figure 3: The Venturi-effect micro-hole cleaning system keeps the booth floor clean avoiding any accumulation of powder.

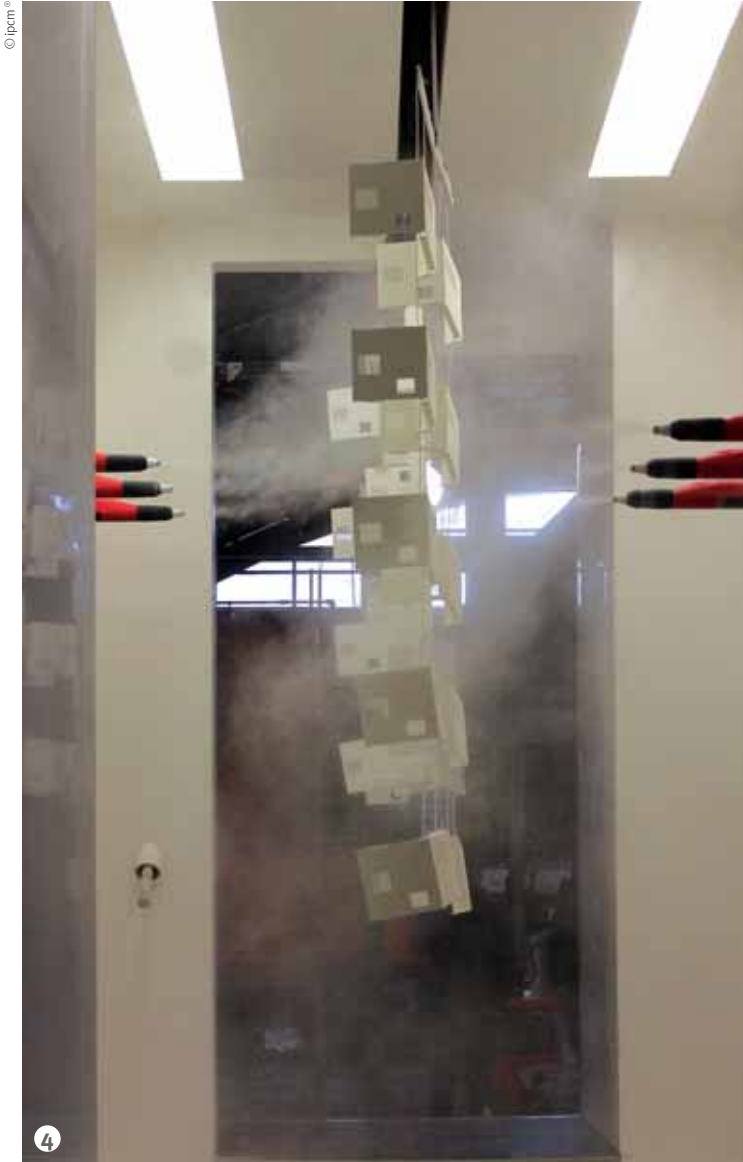


Figure 4: The powder application stage.

“ This booth was designed for companies performing several colour change operations per shift. Its Venturi-effect micro-hole cleaning system keeps the floor clean avoiding any accumulation of powder. Suction is intense but delicate on workpieces.”

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Figure 5: The control modules of the 6 automatic guns and of the manual one.

“Our new Zeus³ booth enables us to switch from black to white in 15 minutes. We no longer have any qualitative yield problem and we can control the reciprocators’ operation and the status of production orders in real time.”

Its Venturi-effect micro-hole cleaning system keeps the floor clean avoiding any accumulation of powder (Fig. 3). Suction is intense but delicate on workpieces: its intensity reduces powder leaks and ensures a healthy work environment. However, at the same time, the airflow analysis shows a well-distributed suction action, so as not to compromise the coating results (Fig. 4). Finally, this is a very versatile booth because it can have 1 to 4 slots for automatic guns as well as 1 or 2 manual touch-up stations with a variable size from 1000 to 2000 mm, depending on the requirements (Fig. 5).”

“We perform up to 15 colour change operations, working on one turn. Our new Zeus³ booth enables us to switch from black to white in 15 minutes. We no longer have any qualitative yield problem and we can control the reciprocators’ operation and the status of production orders in real time,” says Paolo Patuzzo.

Proven results

“After installing the new booth in August, we have lowered our consumption of raw materials by 30%, while applying the same thicknesses,” states Paolo Patuzzo. “By combining the expertise of another company with our own skills, we have obtained a versatile, highly performing and qualitatively impeccable system that has enabled us to acquire several important customers from which we received positive feedback.”

“In the future, we intend to also update our pre-treatment tunnel and to test the dense phase powder transport technology together with Zeus. Finally, we will carry on our project related to the application of wood-effect coatings with the powder-on-powder technique, for which we have developed an exclusive system that we may launch on the industrial market,” states Valerio Patuzzo. ○