In just 160 m², a powder coating line with an IR RHT tunnel for sheet metal 3D products

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Over the last decade, metal's role in interior design has solidified: the sophisticated finishes (glossy, brushed, satin, and coated) that can be applied to it make it perfect for styles ranging from modern to industrial. Cassetto Srl (Lugnacco, Turin, Italy), with its Chy Metal Valley brand, has transformed this potential into applied art through an advanced production process. At the beginning of 2025, it installed a second compact coating line from LEM Impianti, featuring an IR tunnel with RHT panels from Infragas, to optimise performance, cycle times, and consumption, even in a space of just 160 m².

METAL ART by Chy Metal Valley reproduces original paintings onto metal with a powerful 3D effect.

The timelessness and adaptability of metal, along with its aesthetic, functional, and sustainable advantages, have made it a standout in interior design over the last decade. Metal is a versatile element that can be used in endless different ways, adding a touch of modernity, elegance, or an industrial feel, depending on the chosen style of décor. In addition to being durable and sustainable due to its high recyclability rate, its aesthetic versatility makes it the ideal choice for a wide range of styles, even when combined with other materials such as fabrics, wood, and natural stone. Metal can be polished, brushed, satin-finished, or painted to achieve different results. And its reflective surfaces can play with light, giving rise to various effects and reflections.

For all these reasons, a generation of metal decorative products for interiors is emerging in addition to classic furnishing accessories. This includes not only traditional mirrors and vases but also paintings and works of art that can be placed in various environments, enabling the creation of unique and trendy spaces. As with industrial parts, it is the finish that elevates these commercial and furnishing products, making them unique, customisable, and giving them a decisive detail that ensures their success on the market. At the same time, it is through knowledge of finishing processes and their potential that new product ideas are

The very compact powder coating line supplied by LEM Impianti.

A tray of the product line DESIGN, which includes everyday objects.

born, capable of capturing the attention of distracted or overstimulated consumers.

The idea of reproducing portraits, photographs, and works of art by engraving, superimposing, and coating metal sheets to create contemporary paintings came to Gianfranco Calabrese, Plant Director at Cassetto Srl (Lugnacco, Turin), a company that started out as a small workshop producing frames for galvanising plants and then became a specialist in metalworking and sheet metal processing for the ACE sector. "By launching the Chy Metal Valley brand – its name recalls the territorial roots of our firm, which is located in Val di Chy, a municipality that brings together three villages in the Chiusella Valley – I wanted to give new life to metal and its processing operations," says Calabrese. "We have already participated in several photography exhibitions with our products, and we are establishing partnerships with well-known sports personalities to promote our sheet metal portraits and 3D reproductions. It goes without saying that adding the production of these decorative items to our already demanding metalworking business, which serves some of the world's leading brands in the ACE sector, has increased our coating requirements. That is why, at the beginning of 2025, we started up a new line as part of a broader programme to revamp and upgrade our entire department."

Faithful to the two-coat powder system it has chosen to ensure the best performance in terms of resistance and aesthetics for its products, Cassetto once again turned to Infragas (Mappano, Turin) to install a powder gelling tunnel between the new line's primer and top coat application booths, so that the components only need to be subjected to final curing, with significant savings in energy, costs, and cycle times.

Unlike the previous investment, already documented by ipcm® in 2021[1], Cassetto opted for high-temperature radiators instead of catalytic technology. The design challenge for this second coating plant, however, was space-related: the area available for installation was only 160 m^2, including a 4-m loading and unloading bay. The task was taken on by LEM Impianti (Carate Brianza, Monza e Brianza, Italy), which supplied an ultra-compact system, manufacturing most of the components to measure and collaborating with Infragas to create a powerful, efficient, and fast IR tunnel."

From the Chiusella Valley to homes worldwide

No longer solely focused on industrial components, Chy Metal Valley is reinventing metal through three key factors: design, creativity, and customisation. Using cutting-edge materials and advanced transformation and finishing processes, Cassetto has created collections of furnishing accessories that reproduce works of art or photographs on sheet metal with millimetric precision.

It already has three product lines conceived to be part of consumers' everyday lives: DESIGN, which includes everyday objects such as trays, fruit bowls, and bottle holders; METAL ART, which reproduces original paintings; and CUSTOM PORTRAIT / YOURPET, for transferring photographs of people or pets onto metal with a powerful 3D effect that gives the portraits depth and realism.

[1] A. Venturi, "How to Eliminate a Bottleneck in the Two-Coat Powder Finishing of Heavy Machine Parts: Cassetto's Experience", in ipcm® International Paint&Coating Magazine no. 72 (November/December 2021), pp. 52-56.

"The production process for our decorative objects starts with graphic design, which is essential for the digital modelling of metal sheets," explains Andrea Spinelli, Purchasing Manager at Cassetto Srl. "This is followed by laser cutting to engrave every detail with extreme precision, ensuring flawless reproduction of the image. The products then undergo coating to give the sheet metal a durable and elegant finish. Finally, we perform the composition phase, superimposing and assembling the different levels of the image to achieve a 3D effect."

The company's technological evolution and the doubling of coating lines

"In 2021, we upgraded Cassetto's core production process, namely sheet metal working," says Spinelli, "by installing another fibre laser cutting line with an automatic feeding tower, which brought the number of fibre laser systems in our metalworking department to two (a 3,000-watt one and a 6,000-watt one); both are connected to a feeding tower that allows them to work unattended for 48 to 72 hours, depending on the processed material. Between the end of 2023 and the beginning of 2024, our coating division also underwent a major transformation to cope with the increase in production volumes in the post-pandemic period. Over the last four years, this division has consistently worked in three shifts, including Saturday mornings and public holidays. Production volumes have now returned to normal, but demand for coated material remains extremely high – partly due to the launch of our Chy Metal Valley brand. Therefore, to avoid having to rely on contractors in urgent cases, Cassetto's owners decided to invest in a second coating line," Spinelli explains.

Pieces entering the 3-stages pre-treatment tunnel.

The oven has a single chamber divided into two zones, curing in the first section and drying in the second

"The existing powder coating plant, which was the subject of the previous article, was renovated by replacing the conveyor track and the electrical control cabinet. At the same time, we installed a second plant, which also applies two-coat powder systems with an intermediate gelling phase using infrared technology. Building on the experience gained with the previous plant – where Infragas, in collaboration with LEM Impianti, had designed an infrared catalytic tunnel with Infracat panels – we turned to them again for the design of the new gelling tunnel, this time incorporating radiant heat technology (RHT) burners. Besides that, the new plant's coating process is an exact replica of the previous one, including powder primer and top coat application and final curing, all in one pass. We only had one problem: the space available to install it."

A complete line, including an IR tunnel, in just 160 m²

The need for plant investments sometimes clashes with the reality of a company's floor space, which is not always suitable or ready to accommodate new machines, nor can it be expanded at will. "The only way to install a new coating line was to convert an old 8x20 m receiving and shipping warehouse located in a mini single-span hall," illustrates Andrea Spinelli. "This space had to include a complete three-stage pre-treatment line, two powder application booths, an IR tunnel, and a drying and curing oven for parts with a length of up to 1.8 m. We found the right partner in LEM Impianti, with whom we carried out an in-depth study of the space and a series of renderings to assess the actual footprint for each of the machines that would make up the line." Another requirement, which further complicated the project, was for a loading/unloading area of at least 4 m, which reduced the actual space for the plant to 8x16 m." "We supplied Cassetto with a three-stage tunnel with an osmosis system for the final rinse, as this solution takes up less space than a traditional demineraliser," says Paolo Sala from LEM Impianti. "The custom-built booths are made of the latest generation of plastic material. We placed the final dust filters outside the building, one on each side, along with the exhaust pipes and the ATEX-compliant firefighting system, complete with a closing barrier. Under the filters, we positioned a silo with big bags for collecting fine paint particles. The cyclones were also built to fit the space Cassetto had available for the new line. The application booths were equipped with our powder centre, also custom-made to fit into a small space, and nozzles of our own design."

From left to right:

All components of the powder coating line were made to measure to fit the very small space provided by Cassetto Srl for its installation.

The powerful IR gelling tunnel equipped with RHT panels by Infragas is positioned between the two application booths.

The majority of Cassetto's production is coated with a two-layer powder system (primer + topcoat).

"The oven has a single chamber divided into two zones (performing curing in the first section and drying in the second); its high hot air flow rate ensures a maximum dwelling time of 15-20 minutes at 180 °C, even for workpieces that do not undergo IR gelling because they are painted with a one-coat system. Inside the curing section, the parts follow a U-shaped path keeping them in the oven for the necessary time," continues Paolo Sala from LEM. "We have installed air curtains at both the inlet and outlet areas to contain the heat inside the oven, which is very large. Finally, the section devoted to drying after pre-treatment is closed with metal walls to retain more heat in the curing one."

Switching from catalytic to RHT panels: the reasons behind this choice

"The requirements for the intermediate gelling phase were roughly the same as for the previous line," comments Andrea Spinelli. "The coating products applied are the same because we only use industrial polyester powders included in specifications, and having over 80 colours in stock, we employ them for Chy Metal Valley products as well. The thicknesses applied are also essentially the same, ranging from 0.8 to 30 mm on welded and coupled mechanical parts. Although these process variables had remained unchanged, however, we decided to move from infrared catalytic technology to high-temperature burners based on an in-depth study conducted by Infragas' laboratory through various gelling tests at different chain speeds. The results with RHT technology have been extraordinary. Just think, we achieved complete curing on a 15-mm plate painted in CAT yellow, as tested with an adequate cross-cut test, with only infrared radiation simply by increasing the power of the radiant panels!"

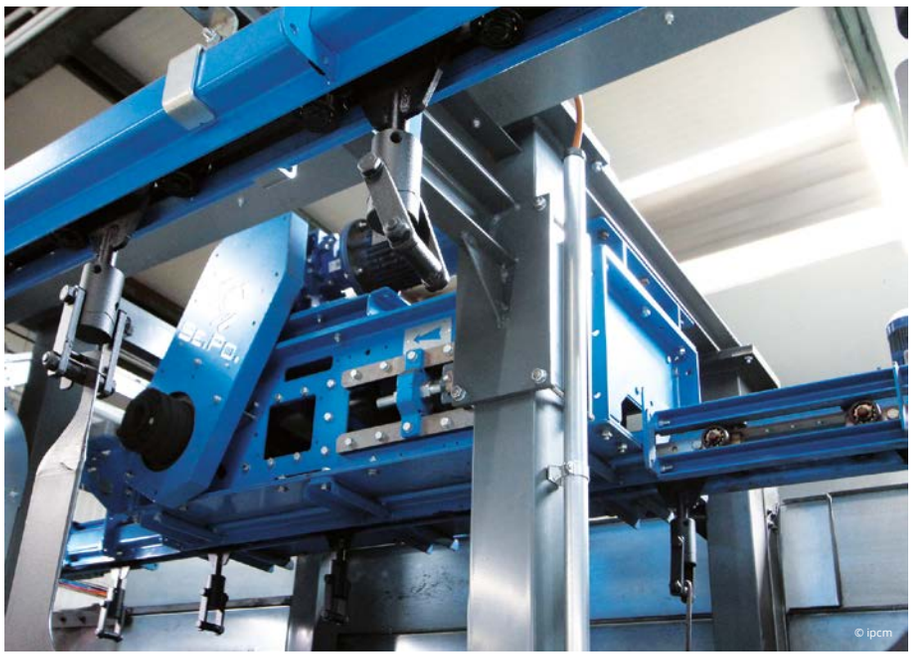
"Radiant high temperature technology uses short-wave infrared to provide radiation with a power density ten times higher than medium-long wave infrared, used in catalytic infrared technology. The great advantage of RHT units is that, having a sintered metal fibre on the front, they can reach a temperature of 1,000 °C with a power of approximately 200 kW/m^2, compared with 20-30 kW for catalytic infrared," explains Francesca Marabotti, business development & marketing manager at Infragas.

"They are the most powerful product in the Infragas infrared range, developed a dozen years ago because the industrial world lacked short-wave coverage in the infrared spectrum. RHT technology meets the needs of customers with very short cycle times, very high chain speeds, or the ability to treat large volumes with significant thicknesses, such as in the case of components for the ACE sector, which can reach up to 3

Infragas RHT - Radiant High Temperature

- Pre-mixed air/gas short-wave infrared burners
- Solutions selected for Cassetto: . 4 x RHT 4C and . 1 x RHT 8L
- Total installed power: 240 kW max. – 120 kW min.
- NG consumption with all panels on: 24.0 m^3/h max. – 12.0 m^3/h min.

The IR oven supplied to Cassetto is partitioned, meaning each RHT burner is independent and can be managed via a PLC for both on/off and power adjustment. The end user can choose which burner to turn on and at what power for each production batch, resulting in obvious energy savings. In the case analysed in this report, where only 2 RHT 4C burners were switched on, that corresponded to 80 kW of installed power, used at 60% of capacity, resulting in a consumption of 4.8 m^3/h of natural gas.



A detail of the monorail conveyors supplied by SEPO.

From left to right: Michele Di Mauro and Francesca Marabotti from Infragas, Andrea Spinelli from Cassetto and Alessia Venturi from ipcm®.

cm in thickness and have challenging aesthetic specifications in terms of film uniformity and distension. By focusing only on the organic part, i.e. the powder coating, without heating the mass of a heavy piece, RHT provides the ideal response.

"It goes without saying that RHT panels can be used in applications where gentle radiation on the components is not required, but rather a high power density, as is typically the case with super-compact and high-speed lines. At Cassetto's premises, for example, we installed four vertical panels and one floor panel. In a two-coat application cycle for components up to 6 mm thick, the company uses only two vertical panels opposite each other at 8% of power, with a chain speed of 0,5 m/min."

"Another significant difference between a catalytic IR panel and an RHT panel is immediate ignition," adds Francesca Marabotti, "because the electrode produces an initial spark that causes the panels to ignite instantly. Within 20 seconds (the pre-cleaning time required by the Machinery Directive), the system is on and immediately up to speed. In the case of the system supplied to Cassetto, this operational immediacy allows us to reduce the size of the gelling tunnel: as mentioned, RHT is the ideal technology for systems with space constraints. Compared to catalytic panels, consumption does not differ too much: while it is true that RHT burners have a significant gas flow rate, we can, however, modulate it, there's no energy waste during on/off phases, and the process times are extremely fast."

RHT is still the future

"Our initial requirement for Infragas was to provide a system that was very fast, very effective, capable of emitting heat that was well absorbed by treated parts, and unaffected by frequent stop-and-go cycles," concludes Andrea Spinelli. "It definitely hit the target with its RHT burners, to such an extent that in the near future, I would also like to convert our first gelling tunnel's infrared catalytic panels to RHT ones. Indeed, in the revamping we carried out on our first coating line in January 2025, we replaced the electrical control cabinet with a new generation one equipped with a touch screen and, above all, already designed to access and control RHT units."