

Case Study

Delivering robust corrosion protection for liquid propane gas (LPG) tanks



Customer

Antonio Merloni Pressure Vessels
Matelica, Italy

Coating Technology

Powder

Segment

General Industrial
(Fuel Tanks)

PPG Coating

PPG ENVIROCRON® powder
coatings



PPG powder coatings deliver robust corrosion protection for LPG tanks

Over 50 years ago, Antonio Merloni Pressure Vessels s.r.l. started manufacturing liquid propane gas cylinders, eventually adding the production of small and large capacity tanks in the 1970s.

Today, with production sites in Matelica and Sassoferato, Italy, the company serves more than 1,200 customers in 48 countries and is one of the largest European manufacturers of cylinders and tanks for LPG storage. All of their products require adherence to stringent construction standards and compliance with UNI EN 1442 European Directive 2010/35/EU for cylinders or UNI EN 12542 European Pressure Equipment Directive (PED) 2014/68/EU for tanks.

In 2020, under the new leadership of Paolo Sparvoli and the support of a PPG team based in Verbania, Antonio Merloni began to implement a plant renewal and modernization program to increase productivity and product quality, upgrade facilities and reduce their environmental impact.

Phase one of the process started with transitioning the painting lines of the aboveground and underground tanks – with capacities of 290 to 3,000 liters (77 to 793 gallons), diameters of 800 to 1,200 mm (31 to 47 inches) and heights of up to 3 meters (9.8 feet) – from liquid to powder coatings.

“Sustainability is one of our corporate values, requiring respect of the environment and enhancement of the workplace,” stated Valeria Tassotti, Merloni technical manager. “Because powder coatings are generally made without solvents that release harmful volatile organic compounds, it is a more sustainable technology and eliminates the need to manage hazardous wastewater that is inherent in the liquid coating process.”

But the transition also had benefits that extended beyond good environmental stewardship. According to Valeria, the change also improved the overall well-being and productivity of plant workers who were now able to operate in a cleaner setting.



Improved process and quality control

Powder coating is a multi-step surface finishing process and Antonio Merloni invested in a fully automated chain painting system

to measure all machine operating parameters and, consequently, improve finish quality.

"With powder coatings, we can automate each phase of the application and rely on the machine parameterization for a more accurate data control of the production flow compared to liquid coating," added Valeria. "We can monitor data about temperatures and times of all application steps, for instance, but also the translation and rotation speed of the piece that helps us to quickly detect the causes of any quality defects."

For Antonio Merloni, the success of the project depended, above all, on the reliability of the company that installed the new coating plant and the powder supplier, as well as on their ability to collaborate.

Every year, Antonio Merloni Pressure Vessel produces one million small cylinders for domestic use with a capacity of 5 to 25 kg (11 to 55 lbs.) at their plant in Sassoferato, Italy. Aside from their size differences, these powder-coated cylinders also have different coating cycles, colors and protection requirements compared to the tanks.

A powder production facility in Verbania, Italy, once part of Arsonsisi's powder coating business before PPG acquired it last year, had been providing the plant with polyester

powder coatings for domestic use small cylinders since 2015.

With the decision to replace liquid with powder coatings on the small tanks produced at their Matelica plant,



Valeria Tassotti, Antonio Merloni Pressure Vessels technical manager

Antonio Merloni needed a new powder coating system and new customized powders for the small tanks produced there. PPG immediately proved to be the right partner for the project.

Antonio Merloni Pressure Vessels inaugurated its new, fully automated powder coating facility at the plant in Matelica in the spring of 2022.

Achieving a stable production flow in a large new coating plant requires time. Initial challenges can stem from both the plant's operational conditions and the characteristics of the powder itself. To address these, PPG's R&D powder coating laboratory conducted extensive testing to finalize product formulas that ensure optimal protection against environmental aggressors such as moisture, UV radiation and chemical exposure.

Corrosion-fighting coatings play critical safety role

Standards in the pressure vessel manufacturing sector require that a

tank's final finish be resistant to both soil and atmospheric corrosion.

The coating process plays a key role in the efforts, along with the sandblasting pretreatment, to prevent corrosion and ensure the safety of the tank.

Both the sheet metal and the vessel structure's welding provide resistance to pressure. But the tank must also resist corrosion from the soil or the atmosphere, and this is where the finishing makes a difference.

"The corrosion rate makes the sheet metal thinner and no longer resistant to pressure. If the tank is well protected, then it will operate safely the way it was designed," Valeria explained.

For the underground tanks, PPG developed and customized the epoxy powders according to the customer's coating system and tank colors.

"Antonio Merloni employs the single-layer fusion-bonded epoxy technology for the corrosion protection of the underground steel pipelines used for the transport of gas, oil and water," explained Fabrizio. "These pipes, like the tanks, are first sandblasted and then coated with epoxy powders with excellent resistance to corrosion in tough soils and mechanical shocks."

Temperature is a key element in the underground tank painting cycle, where the coating film must have a greater thickness to ensure anticorrosive and mechanical performance. In order to obtain a 500 µm thickness and reach paint crosslinking with a single coat of green epoxy powder coating, the tanks must be preheated at a temperature ranging between 130-140° C (266-284° F).

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The aboveground tanks are protected from corrosion by a double coat of an epoxy polyester primer, followed by a Qualicoat Class 1-certified white polyester topcoat.

The epoxy polyester primer is formulated to be very versatile both for heat retention during curing and for overpainting, while the polyester topcoat helps to maintain gloss and color, even in adverse weather conditions.

Upgrading protection and environmental performance

The aboveground tanks are optimally protected from the elements by a PPG epoxy-polyester primer specifically formulated without zinc, followed by a white polyester topcoat that is Qualicoat Class 1 certified.

To protect the underground tanks, a single coat of PPG green epoxy powder coating with a 500 µm thickness is applied to elevate corrosion performance.

Today, Antonio Merloni Pressure Vessels produces more than 40,000 tanks every year; 30,000 of them are now coated with PPG powder coatings.



Underground tanks coated with PPG green epoxy powder coating at Antonio Merloni Pressure Vessels' plant in Matelica

PPG powder coatings used for tanks

Underground	<i>Envirocron P551E2202R</i> anti-corrosive epoxy coating (PCM - P5 Series), Green
Aboveground	<i>Envirocron P853P2109R</i> zinc-free epoxy-polyester primer (PCF - P8 Series), Avorio
	<i>Envirocron P451W2010R</i> polyester architectural topcoat (PCS - P4 Series), RAL 9010 Pure White



To learn more about the PPG *Envirocron* powder family, visit ppg.com/en-US/industrial-powder.

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