



Donelli Alexo Inaugurated CX, a New FBE Powder and Liquid Coating Plant for Components Intended for Critical Environments

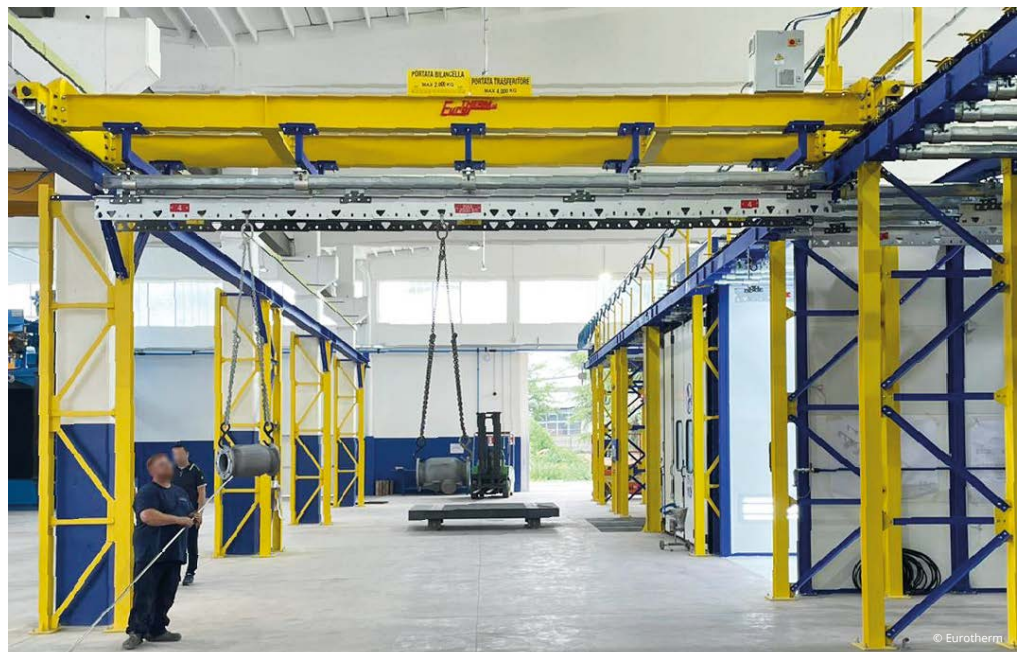
Monica Fumagalli **ipcm**[®]

According to Donelli Alexo, the future of corrosion protection lies in the use of FBE powder coatings for the interior of structures intended for critical environments and in the ecological and digital transition of companies in the sector. With this forward-looking vision, the Lombardy-based group has already started to rethink its organisation and integrated its production equipment with a new 4.0 plant for the powder and liquid coating of the internal and external surfaces of valves and actuators.



Donelli Alexo Srl specialises in FBE powder surface treatments for valves in contact with drinking water and hydrocarbons.

The Donelli group is one of the longest-standing corrosion protection specialists in Italy. Founded in 1911, it has always evolved at the same pace as the history and development of metal corrosion prevention and protection. “When I joined the company about twenty-five years ago,” states Alessio Trisolino, now the CEO of Donelli Alexo, “we still employed an inorganic zinc coating, which at that time was very difficult to apply, to protect components intended for very harsh conditions of use. Today, the corrosion protection coatings market has made giant strides. The challenge for firms like ours, specialising in protective treatments for various substrates (metal, concrete, wood, etc.) intended in particular for the petrochemical, energy, industrial, and construction sectors, is to be able to pick up on the most innovative trends and anticipate any developments. Currently, in particular, the ecological transition that is affecting the entire manufacturing industry globally is underway in the corrosion protection field, too. Donelli is coping with this by applying powder coatings, including FBE (Fusion Bonded Epoxy), for protecting not only internal surfaces, which is already an established technology, but also of the external surfaces of structures.” One of the companies in this century-old group, Donelli Alexo Srl (Cuggiono, Milan, Italy), focuses on the FBE coating of valves for contact with drinking water, in compliance with the main KIWA, AWWA, and WRAS standards, and with hydrocarbons up to 95 °C, in compliance with the most stringent end-user specifications such as, for example, SAUDI ARAMCO (APCS-102A, APCS-102B, APCS-102C). It also coats the external surfaces of fittings with both one-layer and dual-layer FBE systems (2LFBE, DLFBE), with the possibility of adding a finish featuring high abrasion resistance (Abrasion Resistant Overcoating, ARO).



The powder and liquid coating plant installed by Eurotherm and the overhead conveyor with an automatic transfer system.

“With the aim of quickly becoming a centre of excellence for corrosion protection in Central and Southern Europe,” says Luca Donelli, the Market Development Manager of the Donelli, “we have been investing for years in the latest technologies to implement our production capacity and respond more and more flexibly to customer requirements. The latest investment concerned our fourth powder and liquid coating plant, installed in June this year, which complemented the three systems already in operation at our Cuggiono, Ravenna and Voghera (Pavia, Italy) sites and which was supplied to us by Eurotherm (Volpiano, Turin, Italy). We chose the name “CX” for this plant because it has a dual meaning: if read as Roman numerals, it refers to our group’s 110-year history, whereas in letters it stands for the most extreme corrosion category that was included in the 2018 updated ISO 12944 standard for offshore and industrial environments with high humidity.”

Reliability and durability: a winning combination for Donelli Alexo

“Our customers,” emphasises Trisolino, “require higher and higher asset durability. This is why our surface treatments are always conceived

based on the combination of two concepts, reliability and durability, which at first glance might seem synonymous, but are in fact very different. Standards such as ISO 12944 indicate the steps needed in order for a coating to be more durable, but it is through the optimal management of surface preparation and coating processes that we can reliably guarantee a high-quality product. This in turn can be achieved with a corporate organisation based on skill differentiation: whereas until 2010 our group’s plants were able to perform all kinds of treatment to serve customers from different sectors within a radius of 75 km, we have now chosen to have each site specialise in one process. At present, the Voghera plant performs thermosetting liquid coating operations; in the Cuggiono CX facility, we powder and liquid coat products up to 2 tonnes; and the plant of the Cuggiono facility – our headquarters that is located 700 metres away - treats components up to 100 tonnes.”

From Alessio Trisolino’s words, it is clear that the future of the company also includes increasingly environmentally friendly technologies: “Our vision (and forecast) for the ecological transition takes the form of the further development of powder coatings, which



The manual shot blasting cabinet.



The FBE application.



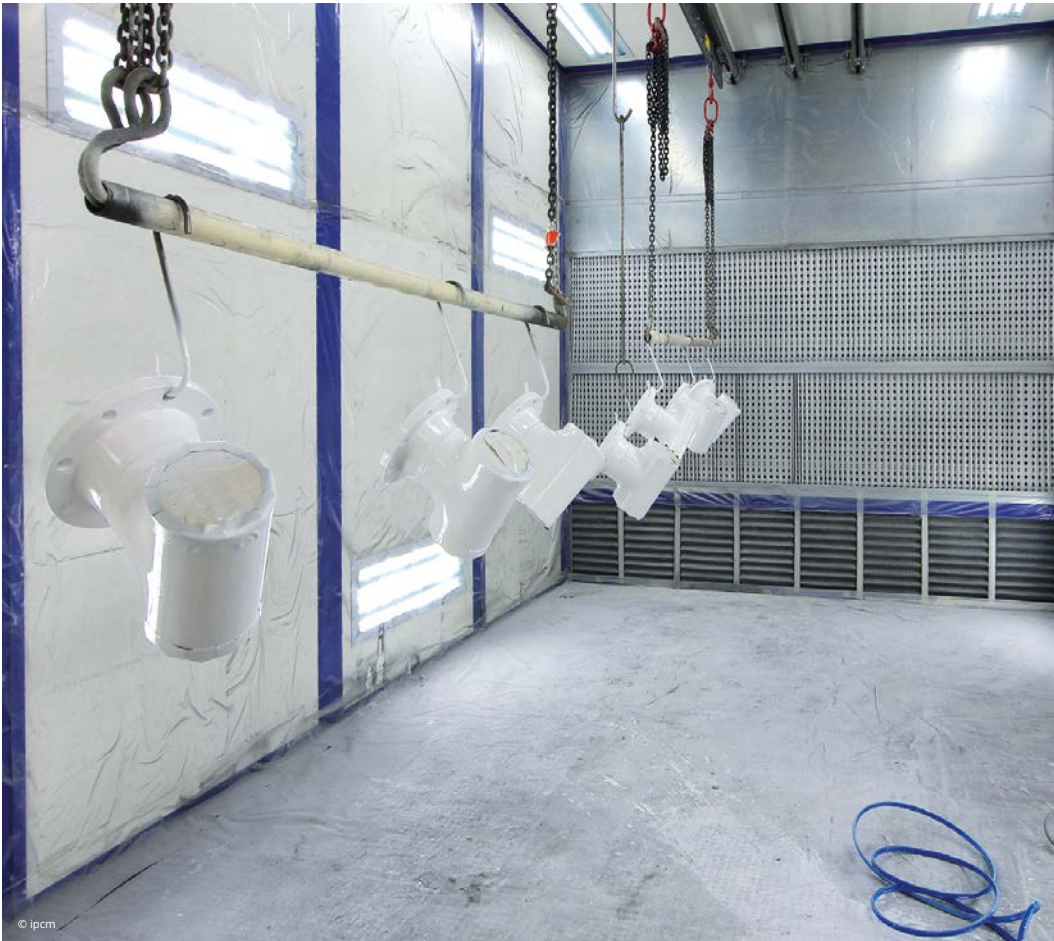
FBE powder coatings call for higher thicknesses than conventional powders.

presumably will replace solvent-based products in various instances. This is not going to happen in short term, because we are convinced of the need to first create an industrial culture that fully embraces this technology and the associated surface preparation processes. Once the ground has been prepared, the relevant bodies will finally be able to integrate the ISO 12944 standard with specifications for the application of powder coatings on exterior surfaces as well, an item that is still missing precisely because this technology is still in the development phase."

The new CX plant with a special oven

In its Cuggiono CX facility's plant, Donelli Alexo handles smaller asset components. The parts treated in the new coating system have a maximum size of 6x2x3 metres. "This plant is designed for manual

painting," explains Eurotherm CEO Paolo Ghiazza, "and it is equipped with an automatic transfer system and two lifting stations with a maximum load capacity of 4 tonnes each. Donelli Alexo required two powder coating booths, a special curing oven capable of reaching a temperature of 350 °C, two pressurised liquid coating booths with oblique flow and a drying unit reaching 80 °C, and a manual shot blasting cabinet with an automatic shot recovery system. All stations are aligned at the front and fed via an overhead conveyor equipped with sliding guides and mechanical switches, so that the workpiece-holding bars are automatically moved along the path and stopped at the various workstations through manual insertion, with the additional possibility of storing them in a buffer area. The rail is made of press-folded galvanised sheet metal and it accommodates the trolleys onto which the workpieces are hooked."



The special feature of the plant is certainly its curing oven. "In order to achieve the required temperature," indicates Ghiazza, "we used interlocked modular panels made of galvanised sheet metal on the outside and of stainless steel in the inside. To optimise insulation and create an effective barrier to heat loss, several layers of high-density rockwool (100 kg/m³) were inserted inside the panels for a total thickness of 250 mm (350 mm for the access door) instead of the standard 150 mm. In addition, the oven's internal structure is specifically designed to enable the inner walls to adapt to the expansion caused by the high working temperatures. Based on this specific requirement, we also designed special load bars and a large trolley that can withstand the highest temperatures. For the largest valves, there are also additional trolleys in the oven and the shot blasting cabin, which run on rails on the floor, designed to support higher loads. The entire plant is linked to a production management system 4.0 integrated with the company's whole workflow."

"With this machine," says Trisolino, "we mainly coat valves and actuators for the energy and water sectors. These are the smallest components of large assets, but they still require timeliness, superior quality, and

quick responses to customers. The high oven temperature is actually necessary to cure FBE coatings and all other thermosetting coatings, such as PTFE. Finally, we requested two liquid painting booths because we also are coating aeronautical components in this plant, for which we are currently awaiting certification."

Ecological and digital transition

The standard system for components intended for the energy sector includes the manual shot blasting of those parts that, due to their conformation or masking needs, cannot be processed automatically, the application of the primer, a pre-heating phase, the application of the FBE coating, and curing. It is also possible to carry out combined systems involving the application of powder + liquid paint or the application of powder in one or two coats, particularly in the case of aesthetic finishes with epoxy or polyester powders applied through dry-on-dry or dry-on-fused techniques.

"In this sector," adds Trisolino, "tolerances are kept to a minimum, and the Industry 4.0-oriented features of the line that we have designed with Eurotherm help us maintain full control of the process thanks to



the recording of data characterising the different processes. These powder coatings call for higher thicknesses than conventional powder paints and, therefore, for a greater use of product, which needs to be monitored to optimise consumption. Moreover, we aim at collecting CO₂ emission data as well. Our plants in Voghera and Cuggiono are already able to formulate an energy balance for each process. However, we would like to be able to tell each customer what was the environmental impact of the processing of its specific order. For us, this will be an additional element of differentiation on the market.”

By November, the company will have completed the interconnection of all devices. “It is not enough to buy an industry 4.0 ready equipment to become a 4.0 factory: the actual transformation does not only take place at the logistical level, but also, and above all, at the mental level,” states Donelli. One has to learn to approach the work in a completely new way – and changing one’s own mentality is the most difficult aspect. A relevant effort was required by our administrative department, whose accounting and order management data had to be connected with those related to quality control and energy consumption: we opened up the production department to them and brought their administrative

management system into the factory. These two worlds sometimes seem to proceed on separate tracks but, thanks to our digital transition project, they are now becoming truly interconnected. This is made possible by the ongoing support of all partners involved in the Cuggiono CX investment including not only Eurotherm and OMSG, but also OMNICON (SCADA), Intech (medium to low voltage systems), Omis (overhead cranes), Clavenna (low voltage systems), Idroimpianti (gas and water systems), Oikia (civil works), Studio Croci (project management), Tecnohabitat (permitting), BCOM (IT, network) and Monti&Russo (administrative software).”

From left to right:

The liquid coating booth.

The curing oven can reach a temperature of 350 °C.

The OMSG automatic shot blasting machine.



The shot blasting plant is equipped with two hoists.



The turbines of the shot blasting machine.

Suppliers with high technical skills

The Donelli group has chosen the path of differentiating its sites' specialisations, but each division is able to support the other ones whenever necessary, since their equipment is complementary and interchangeable. "When we have to deal with a large batch that has to be delivered quickly or is characterised by parts with special shapes or weights," states Donelli, "we choose the most suitable system based on our experience. Over the years, we have integrated, learnt about, and optimised all the technologies available on the market. This expertise level gives us the flexibility to meet any coating requirement that comes our way. For example, if we have to process small parts whose external surface can be sandblasted automatically, we use the OMSG shot blasting machine that we acquired together with the coating plant with one of our latest investments."

"One of the most important aspects to achieve a high-quality coating

results is surface preparation. In the general industry sector, around 60% of powder applicators do not carry out any pre-treatment before coating. Shot blasting, however, is crucial for the removal of contaminants and for guaranteeing proper paint adhesion," confirms Trisolino. The shot blasting machine installed in February is a hanger type from the CAPRI 20/25 H22 series, equipped with two 2000-kg hoists and four direct-drive 7.5-Kw turbines and capable of integrating into the company's main management system 4.0. The two hoists allow carrying out workpiece loading/unloading and shot blasting operations simultaneously.

"Donelli was also a pioneer in the adoption of the most advanced liquid coating equipment," notes Trisolino. "We were among the first companies in Italy to implement a number of Graco product lines, but also to use both traditional powder application technologies where required, namely the Venturi system and the Smart Inline technology,

supplied by Gema Europe. This should offer a glimpse into the variety of requests we receive and into the flexibility level that must characterise a company like ours: it is the type of component to be treated that dictates the choice of the right coating system and, consequently, of the most suitable equipment to apply it.”
 “We operate in a niche market,” points out Donelli, “and we cannot afford to choose partners that are not up to the mark: our customers demand a certain level of technical expertise from us and we do the same with our suppliers.”

A corrosion protection hub of excellence

“The journey into the world of corrosion protection that Donelli undertook more than a century ago still continues, with the aim of achieving new goals,” concludes Donelli. “First of all, the ecological transition towards the use of solvent-free paint products such as powders, for the use of which, however, as mentioned before, there is still fertile ground to work on, particularly in terms of improving their effectiveness on exterior coatings. The second objective is to transform ourselves into a centre of excellence and a benchmark supplier, expanding our market and reaching other Central and Southern European countries in addition to those we already serve, from Portugal to Slovenia. The success of Donelli and of these projects can only be achieved with the support of the passionate people who are part of our team, always attentive to the latest innovations, and through our partnerships with suppliers boasting high technical know-how, starting with Eurotherm.”



The full Donelli Alexo team.



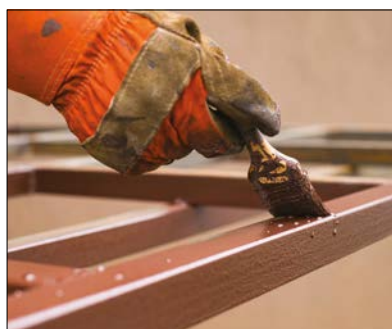
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