



© Cabycal

Opening photo: Diseños Y Decorados Ceramicos SL (Navalcarnero, Spain) specialises in the artistic decoration of ceramic and glass objects.



FOCUS ON TECHNOLOGY

A New Automatic Coating Line to Increase the Production Capacity of a Glass Objects' Manufacturer: the Positive Result of the Industry Teaming Up with Craftsmanship

Barbara Pennati **ipcm**[®]

In most industrial sectors, the general trend of the last few years has been to automate processes as much as possible by implementing increasingly Industry 4.0-oriented advanced technologies. However, some companies have chosen to employ technologically advanced processes while maintaining an essentially artisanal approach. These include Diseños Y Decorados Ceramicos SL (Navalcarnero, Spain),

established in 1946. Now managed by the third generation of the Nogales family, the company has 62 employees and specialises in the artistic decoration of ceramic and glass objects (**ref. Opening photo**). "Much of Diseños Y Decorados Ceramicos' work is still done manually, including loading and unloading. We believe in the importance of our operators' control of all production phases," explains general manager



Figure 1: Diseños Y Decorados Ceramicos' products require mostly manual and artisanal operations.

higher production rates. It became necessary to install a second automatic coating line, which now operates together with the first one, installed eight years ago and also supplied

by Cabycal," says Cristina. The new coating line is 7.5 m long and it is equipped with a 45 m

“ Diseños Y Decorados Ceramicos deals, above all, with the artistic decoration of porcelain and glass products for the hotel, cosmetic, and promotional sectors. Precisely their intention to conquer the latter led the company to install a new coating line that could increase the productivity. That is why they turned to Cabycal, a Valencia-based company specialising in the construction of industrial coating systems.”

Cristina Nogales. Although the company philosophy and the peculiarities of Diseños Y Decorados Ceramicos' products call for mostly manual operations, especially due to the artistic meticulousness required, the firm equipped itself with a new coating plant that combines high-performance technology with craftsmanship (Fig. 1). "We deal above all with the artistic decoration of porcelain and glass products for the hotel, cosmetic, and promotional sectors. Precisely our intention to conquer the latter led us to install a new coating line that could increase our productivity," states Cristina. "That is why we turned to Cabycal, a Valencia-based company specialising in the construction of industrial coating systems with which we had already collaborated."



Figure 2: Glasses are decorated by silk-screen printing or automatic liquid coating.

long SPINDLE type conveyor featuring 392 pinion spindles and with a motorised rotator in the chamber to ensure that all surfaces are covered. The chamber's pre-filtration system ensures that the coating application takes place in the best cleanliness conditions (Fig. 3).

Figure 3: Cabycal's new coating line with a SPINDLE type conveyor.



"The second line is symmetrical to the first one. The only change made was the replacement of the old line's conveyor with the type used for the new one, in order to achieve the same production level and the same timing on both plants," states Cabycal's project engineer Sergio Mateo. "The system is equipped with two coating booths featuring only Atex-certified components; the first one has three guns and the second one two (Fig. 4). They are followed by a polymerisation oven with a natural gas supply and an air-vein burner that maintains a temperature of 200 °C

The new coating line

"At the beginning, we mainly decorated ceramics for the contract sector. Over time, we have expanded to other industries, such as the cosmetic and promotional (product branding) ones, and we started decorating also glass by silk-screen printing or automatic liquid coating (Fig. 2)," states Cristina from Diseños Y Decorados Ceramicos SL. "This choice has enabled us not only to offer both standard and customised decoration options, but also to establish ourselves in the European and Eastern markets, for example in India." "However, the promotional sector required



Figure 4: The automatic application of liquid coatings provided by Pinturas Benicarlò (Grupo Ferro SL).

for 20 minutes. Dry filtration systems with the Edrizzi® technology have been installed in the booths for overspray collection and environmental protection purposes (Fig. 5).” Diseños Y Decorados Ceramicos can therefore count on four decoration lines, of which two devoted to the automatic coating of glass products, one for porcelain, and a manual silk-screen printing one, and on four ovens, of which three for glass and one for porcelain. The glass processing performed requires a pre-treatment stage that is usually entrusted to manufacturers. “We receive already treated and cleaned parts. Only in some cases, when we notice that the paint has not adhered perfectly, we perform a glass annealing process from 450 to 600 °C, depending on the product,” says Cristina.

“The new coating line is 7.5 m long and it is equipped with a 45 m long SPINDLE type conveyor featuring 392 pinion spindles and with a motorised rotator in the chamber to ensure that all surfaces are covered. The chamber’s pre-filtration system ensures that the coating application takes place in the best cleanliness conditions.”

The coatings applied are water-based two-component products specifically formulated for glass. “Our cycle includes a curing stage at 200 °C for about 20 minutes. We use coatings supplied by Pinturas Benicarlò (Grupo Ferro SL). Although they are more difficult to apply than the solvent-based ones, we chose to use water-based paints for environmental reasons and for better waste management,” states

Cristina. “We also ran some tests, which showed that the products treated with these coatings and polymerised with the cycle chosen by us can withstand up to 500 washes.”

“We use organic colours available in different shades. We usually apply more than one layer, depending on the required effect. For one of our treatments, for instance, we coat the inside of a glass with an aluminium-effect coating and the outside with more evocative colours, such as pink or light blue; if you look inside it, it feels like you are drinking from an aluminium object, but it is actually glass,” says Cristina.

Conclusions

“Glass requires a lot of attention during application, mainly due to adhesion issues. It is always necessary to make a correct assessment of the quantity of product to be applied and of the right curing temperature. A more limited range of colours can be used on glass than on porcelain, and some of them, such as gold and silver, require a very precise manual decorative process,” explains Cristina. “Although glass is a difficult-to-treat material requiring artisanal skills, the adoption of a flexible and robust advanced system that can work uninterruptedly and integrates perfectly with our manual processes proved to be the optimal solution for us.”

“We relied on Cabycal because we already knew their know-how and product quality level. In terms of capacity at the exit of the ovens, the new line, which is managed by one operator, enables us to decorate and coat around 80,000 products a day. This investment has allowed us not only to increase production and establish ourselves in the promotional sector, which was our goal, but also to spread Diseños Y Decorados Ceramicos’ craftsmanship to a variety of sectors and markets,” states Cristina Nogales. ○



Figure 5: The line is equipped with dry filtration systems with the Edrizzi® technology.