



# Maximizing of Performance and Quality

Powder coating of industrial refrigerators

Frost-trol S.A., Spain

*Performance by design*



# Refrigeration system manufacturing 4.0: From series production to project production

The act of stocking large industrial sized refrigerators now-a-days are a thing of the past. Frost-trol, the Spanish refrigeration system specialist, supplies name-brand supermarkets with brand-specific refrigeration systems configured to the customer's requirements..



## The Company

Industrial refrigeration systems are used in supermarkets, grocery and convenience stores. In order to develop customized refrigerated cabinets and cooling systems specific to its customer's needs and to manufacture them economically in small series, the Spanish specialist Frost-trol has commissioned a state-of-the-art production facility.

"Our current customers are the large chains in the food retail market, who no longer just buy equipment from us, but desire tailor-made solutions for their very brand-specific outlets," says Jorge Herreros, plant manager at Frost-trol, describing the effects of a change in strategy at Frost-trol over the past few years. This has also had major impacts on production: "We used to mass-produce the different cooling modules and store them until they were sold. Today, we produce exactly the elements needed to process an order. This is highly efficient, but also poses an enormous challenge to the flexibility of our production," says the plant manager.

## The Challenge

The task for the powder coating line was to completely reorganize both the pretreatment and coating processes and to integrate them into the operations of the entire production. "To achieve a constant material flow, it was essential to determine the process times of all machines and work steps. When coordinating them, it was necessary to consider, the workpieces pass through the various plant areas at different speeds. Based on this data, we ran through countless conceivable options and alternatives in extensive simulations and in the end calculated the optimum configuration of the plant," says Rubén Cubillas, who is responsible for the coating plant at Frost-trol, briefly summarizing the planning phase. The result of this intensive preliminary work stands in a newly built production hall near Castellón. "For 25 years, we had a single powder coating line," says Mr. Cubillas, "...but the flexibility in production required today can only be achieved with a highly automated, integrated production with two lines."

## The Solution

Key elements of the coating line are the two ColorMax<sup>3</sup> powder coating booths, one of which was built in late 2017, while the second was added the following year. In the place of these two booths, there were three conventional booths before the conversion and although the number of booths has been reduced, the performance has increased enormously: "We consistently rely on Nordson's HDLV<sup>®</sup> dense phase technology," explains Jorge Herreros, adding as an explanation: "The eight Encore<sup>®</sup> HD automatic guns spray with a very soft powder cloud that hits our workpieces at a low speed and applies a consistent coating on them. This produces an excellent coating quality that hardly ever requires rework, and we benefit from efficient powder application."

Another advantage is the fast cleaning. "We are prepared for up to 40 product and color changes a day with this system," reports Mr. Herreros. "This is only economically feasible if downtime is minimal!" Powder is transported by the Encore HD pumps, which deliver powder consistently and accurately – a prerequisite for the maximum process control and reproducibility of coating results that Nordson HDLV (High Density, Low Velocity) dense phase technology excels at. "We typically coat at 60 to 70 μ, creating a particularly homogeneous surface that eliminates the need for rework," Mr. Herreros says.



A special feature of the installation at Frost-trol is that two additional PowderPilot<sup>™</sup> HD screens were installed directly on the booths for system control. "This also increases efficiency and optimizes process," explains Rubén Cubillas. "Depending on where the operator is at the moment, the time in which he can read information about the current status of the plant modules or initiate the next steps are reduced." The control panels themselves are Nordson standard and feature icon-driven and intuitive user ability.

## The Results: Industry 4.0 – Top quality and economy

What has been created is a smart factory of the kind that the development toward Industry 4.0 will increase: All plant areas are networked, communicate and complement each other to provide fully automated production. It enables customers to move away from series production and manufacture the various modules of a refrigeration system exclusively on a project-by-project basis as required.

The overall production is based on the high flexibility of the individual modules, especially in the powder coating system. "On average, we carry out about eight color changes per shift. This is a big step forward compared to the old system; whereas it used to take




Thanks to the new coating line, the production capacity has increased considerably. A doubled output is achieved and with a reduction in powder consumption of about 20%.

around 25 consuming minutes for a color change, it is now done in 10 to 12 minutes, without stress and almost automatically," says a pleased Mr. Cubillas.

Similar to the entire plant, the dense phase powder coating system operates in two shifts, 16 hours a day, five days a week. For powder coating of surfaces that come into contact with food, an antibacterial powder is used that is somewhat difficult to handle. Nevertheless, the system produces an uniform quality finish. Refinishing is virtually unnecessary. "Consistently achieving this quality every time is very important for us, because the finished refrigerated cabinets later stand in the very bright light of our customer's retail outlets, and their demands for a perfect finish are quite high."

A major advantage of the innovative coating system can also be seen with the two new coating systems; a doubled output is now achieved with a nearly 20% reduction in powder consumption at the same time.

 The coating is applied at 60 to 70 μ and at the same time it provides a highly uniform finish that eliminates the need for reworking.





## Nordson HDLV Dense Phase Technology

Nordson's patented HDLV® pumps, called Encore HD Pump, use dense-phase technology with high-density powder, low-velocity air to pump more powder to the spray gun with a minimum of air, and maximum process control.

This results in superior efficiency, unmatched coverage, and reliable self-clean color change, boosting productivity and reducing operating costs.

With more than 15 years of field-proven experience, Nordson remains at the cutting edge of dense phase pump technology in the powder coating industry.

- Powder output stability and process control, for precise applied coating thickness and significant powder savings
- Highest application efficiency with soft spray pattern
- Superior coverage of recessed areas through optimised spray velocities
- Unmatched wear life of the internal pump components significantly reduces maintenance downtime for maximum productivity
- Contamination free color change of the entire spray system due to an automated purge clean system

For more information please visit: [www.nordson.com/hdlv](http://www.nordson.com/hdlv)

Jorge Herreros concludes, "The new coating line with Nordson HDLV technology plays a major role in our high demands for quality as well as sustainability of our products and fulfills our modern project production with batch size one absolutely economically."



### Nordson Industrial Coating Systems

[ics.eu@nordson.com](mailto:ics.eu@nordson.com) | [www.nordson.com/ics-de](http://www.nordson.com/ics-de)

 /NordsonICS

 /company/nordson-ics

© 2021 Nordson Corporation | All Rights Reserved  
PWR-21-6134 • 01/2021