



Kitchen modules in various colours.



FOCUS ON TECHNOLOGY

SPECIAL ISSUE ON ARCHITECTURE & DESIGN



Fisher & Paykel Chooses a Nanotechnology Pre-Treatment Process for the Production of ELBA-Branded Household Appliances

Marta Fumagalli **ipcm**[®]

In collaboration with DN Chemicals, Fisher & Paykel has developed a nanotechnology pre-treatment cycle that evens out its raw materials' quality level in order to obtain end products with an excellent aesthetic and functional degree, as required by the extremely competitive market of household cooking appliances.

Preliminary remarks

In the extremely competitive market of household cooking appliances, where the demand for quality and production flexibility is increasingly greater, service is a decisive factor in distinguishing from competitors. This philosophy has led the ELBA commercial brand, owned by New Zealand multinational company Fisher & Paykel, to constantly grow and spread in over 70 countries in the world. ELBA appliances are inspired by passion and simplicity: they are completely made in Italy, from design to the production of individual components, which is carried out in different plants throughout Italy. This guarantees superior product quality and unique, elegant design, combining creativity and craftsmanship to create captivating but also practical products. Offering excellent aesthetics and meeting commercial requests while maintaining the highest quality level is not always easy: “We mainly use

steel and zinc-plated sheets for our products’ aesthetic details to be coated, such as our oven front frames. However, we sometimes encounter degassing and pitting problems on our coatings, due to the low quality of raw material. We have no control over this factor, because our plant’s workload is prone to sudden changes and it is not always possible to find materials that are standardised or directly come from steel mills. And the lack of consistency in raw material can cause various issues,” states Stefano Ceccon, the operation manager of Fisher & Paykel Appliances Italy. “In order to cope with such fluctuations in material quality, we use a pre-treatment cycle with a nanotechnology passivation stage developed by DN Chemicals (Calepio di Settala, Milan, Italy), which specialises in the production and distribution of chemical products for surface treatments. The combined



An enamel application booth.



The enamelling plant.



Enamelled parts.



The pre-treatment tunnel.

use of the chemicals they provide us with has proved to be crucial to improve and standardise our raw material, thus enabling us to achieve excellent aesthetics and repeatable results."

ELBA: superior quality

Elio Baggio established ELBA in Marostica (Italy) in 1950. Since then, this brand has always advocated Italian-made quality. Year after year, Elio Baggio has managed to grasp the requests and tastes of families, surrounding himself with partners who shared his values and were able to implement all his projects. Attention to detail, passion for technology, and talent led the company to become a fundamental part of the post-war "Italian economic miracle".

In 1960, it moved to Bassano del Grappa (Vicenza), in a larger production facility where it remained until 1987, when the De'



The new curing oven installed by Euroimpianti.

Longhi Group acquired it and transferred it to Borso del Grappa, where it is still located. Following this acquisition, ELBA began to focus on cooking and heating appliances, thus gradually moving away from its previous core business of wood stoves and gas and kerosene stoves. In 2006, it was acquired by the Fisher & Paykel Group, which further focussed on the design, production, and marketing of cooking products for domestic use, such as built-in hobs and ovens and freestanding cookers. All products are powered by electricity, gas, or a combination of both; about three years ago, the company also began developing induction and steam cooking appliances. In 2013, the New Zealand Group was bought by Haier, a Chinese multinational company that is number one in the world for the production of consumer electronics and household appliances.

Many elements contribute to the success of Fisher & Paykel Italy and of the ELBA brand: expertise, professionalism, design-orientation, and the continuous pursuit of excellence. All these values can be summed up in one word: talent. The ability to translate customer wishes into attractive, simple, and functional appliances have also enabled the ELBA brand to cross the borders of Italy and conquer the Middle East, Africa, and the Far East. Nowadays, Fisher & Paykel Italy is one of the undisputed



The new Wagner powder application booth.



Wagner's "Super Center" powder management unit,

leaders of the kitchen appliance market and the ELBA brand continues to represent the company's commitment to superior quality.

The importance of the pre-treatment cycle

"The finishing process is a key step for a product of this kind, also because our target has changed in the last few years. We are focussing more and more on creating products of excellence for the medium-high segments of the market, although we maintain a share of medium-low range products with some long-standing brands," explains Stefano Ceccon. "Our factory deals with numerous phases of our production flow, but our range is so wide that we necessarily have to entrust some processes to third parties. Only enamelling and coating are carried out exclusively by us, in order to have greater control and flexibility and, therefore, guarantee maximum product quality."

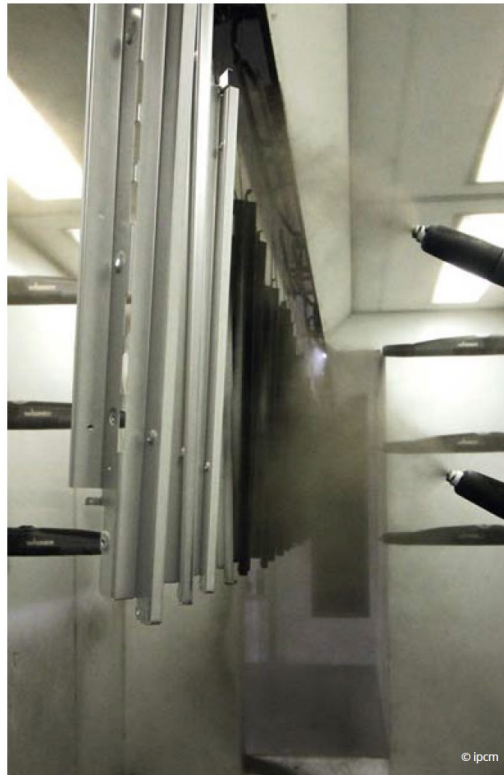
"We have a powder coating plant that has been recently modified with the installation of a new Euroimpianti curing oven and a latest generation spray booth, a Wagner SuperCenter type with an automatic colour change system. This has replaced the two booths we used previously and it has enabled us to significantly increase efficiency and reduce paint waste. We have organised our production in order to perform about three colour change operations per day, although we have a long-standing catalogue of a dozen tints to coat the aesthetic details of our appliances," states Gianfranco Marin, the production manager of Fisher & Paykel. "Due to the aforementioned problem related to galvanised sheets' inconsistent quality, we have also improved our pre-treatment process with the aim of increasing our coatings' quality degree."

“Fisher & Paykel’s plant was originally designed to perform a simple phosphating operation,” explains DN Chemicals area manager Gianni Zilli. “Over time, it has been converted to perform a pre-treatment cycle including two active stages and their related rinses. The first stage is a pre-degreasing process using a neutral surfactant. It is followed by a nanotechnology conversion phase based on zirconium salts, a rinse with mains water, a rinse with demineralised water, and a final rinse with directly-sprayed 20-microSiemens demineralised water. Although the cycle is pretty simple, it has increased the quality of our pre-treatment process and, therefore, of our coatings.”

“Our quality control laboratory performs impact and adhesion tests and, above all, a hot water immersion test, which is fundamental for our products,” indicates Gianfranco Marin. “After implementing DN Chemicals’ cycle, we have noticed an improvement in our tests results, especially the cross-linking adhesion one. If our components’ zinc-plated sheets have not undergone any treatment prior to coating, with our pre-treatment process we are able to improve their substrates’ quality through the passivation phase based on zirconium salts. If they have been, for example, chromed, we have to calibrate the operation in a different way, but that does not pose any problem as this is a very flexible cycle.”

Future improvement projects: the implementation of Soft Rain equipment

“After modifying the application and curing stations of our plant, we also intended to enhance our pre-treatment tunnel and drying oven to take a further



The application of powder coatings.



“Visual” quality control.



Plates subjected to adhesion tests.



A part of the laboratories.

leap forward. However, after the lockdown due to the Covid-19 pandemic, we (luckily) had lots of orders to handle and we had to pause the project, but we will try to carry it out as soon as possible," says Stefano Ceccon.

"In this revamping operation, in order to improve pre-treatment quality, it may be interesting to implement a nanotechnology passivation process through the Soft Rain nebulisation technology," states André Bernasconi, the sales manager of DN Chemicals.

"Soft Rain is a state-of-the-art nebulisation system inspired by the nanotechnology applied to the pre-treatment of metal surfaces, which is able to perfectly combine the principles of effectiveness, efficiency, and sustainability. One of its main advantages is the application of a freshly-mixed nanotechnology solution that is never recycled together with the pollutants carried over from the previous stages. This solves any dragging

problems affecting the treatment's effectiveness. Finally, Soft Rain guarantees nanotechnology product consumption optimisation, absence of waste water to be treated, and performance consistency, as the workpieces are always hit by the same quantity of solution.

Conclusions

Very often, the great variability of the materials available on the market causes problems for manufacturers, which must

provide their customers with consistently high quality. "Thanks to the help of DN Chemicals, we have obtained an extremely flexible nanotechnology pre-treatment process that allows meeting the high quality standards imposed by the market. However, we have further goals to achieve and several projects ready to be developed," says Stefano Ceccon. ○



From left to right: Stefano Ceccon, the operation manager of Fisher & Paykel Appliances Italy, Gianni Zilli from DN Chemicals, Gianfranco Marin, the production manager of Fisher & Paykel, and Alessia Venturi from ipcm®.