

## Gentle Treatment and Process Optimisation

# Reliable Drying of Plated Plastics

A plastic plating contractor invested money in the refurbishment of his drying system to perfectly dry plastic automobile components. The system implemented provides gentle and stain-free drying at 60 °C, shorter process times and improved drying quality.

Obsolete dryers with air flowing at random, failing to fully dry and, on top of this, leaving stains - the innovative Fischer GmbH & Co.KG of Katzenelnbogen did not want to make do with the situation. The Rhineland-Palatinate based family enterprise with a 40 year success history had established itself well on the automobile market with injection moulding and plating of plastic components. One of their five production sites in Czechia and Germany is located at Katzenelnbogen where large quantities of plastic components are plated. The post-plating drying process desperately needed improvement. Fischer successfully implemented this project with the Allgövan drying system manufacturer Harter. Harter had developed its „heat pump based condensation drying system“ more than 20 years ago. Operating at low temperatures this system is ideally suited for sensitive products because of the gentleness of the drying process. For drying to be successful, temperature is not the only critical parameter but also time, humidity, air speed and airflow rate.

Considering that each product is specific and each company has its own requirements Harter offers drying tests in its in-house pilot plant station to determine the product-specific drying parameters. Once determined, they form the basis for further drying system layout. Upon a visit to the Fischer premises, it was agreed to follow this procedure. Customer requirements included temperature not to exceed 60 °C, which can easily be achieved with a system as temperature flexible as condensation drying, and drying time not to exceed the 15 min cycle time of the existing plating facility. The drying tests of Fi-

scher frames and parts produced excellent results.

### Fast and Stain-free Drying

The existing production line including four drying stations was replaced by three new rack dryers with an attached dehumidification module (type Airgenex) for automatic control of the environmental conditions inside the dryers. Leaving the deionised water rinse the frame with the racked components automatically moves to a position above the first dryer. The automatic lid system opens while an air blowing provision, which Harter installed additionally, is triggered to become operative.

So, water is blown off as the rack is inserted in the dryer. Subsequently, the plastic components are gently and

completely dried in the three drying stations at a temperature of 60 °C. The drying time could be reduced from 15 to 11 minutes. A frequency converter controls the speed of the airflow produced by the air blower as required for the specific component to be dried. This prevents smaller or lighter items from falling off the rack. Likewise, the speed of the recirculating air inside the dryers is controlled as required for each component type.

Following physical laws, this drying process is capable of absorbing humidity from items to be dried. This is done by passing extremely dry and, thus, unsaturated air over the items to take up humidity. The air is then stripped of the humidity it carries. The humidity condenses, and the condensate is drained off. Subsequently, the



Dryer Installation

cooled air is reheated to the desired process temperature and passed to the drying chamber. The circle is closed.

Another critical factor is adequate air routing. The dry air must be directed exactly to the place where it is supposed to absorb humidity. It is only this ideal combination which ensures high drying quality.

### Energy Savings and Process Improvement

Harter's condensation drying system is also a benefit in terms of power consumption. The dehumidification module of the Fischer system has a power rating of 8.6 kW. The rack dryers have a heating power of 30 kW. Each dryer includes 10 air recirculation fans purpose designed for plastic dryers. The fans feature plastic impellers and have a power rating of 0.9 kW, only. In contrast, the obsolete drying system had a heating power of 180 kW and 9 kW fan power. The Fischer employees are fully satisfied with the new system. Before, components had to undergo manual finish drying, cleaning and stain removal after the drying process. Now, there is no more need for such time consuming and onerous work. Mike Lorenz, Fischer's responsible process technology manager sums it up as follows: „Harter's drying solution has resolved our problems and fulfilled all our wishes. We could improve our process and, as a result, our production quality.“ So, heat pump based condensation drying has many benefits for the opera-

tor. Time savings raise the cost effectiveness of such systems.

### Operating Cost Permanently Reduced

Heat recuperation in the closed system reduces cost of operation. Low power ratings of dehumidification modules result in further cost savings.

Variable drying temperature setting prevents undesired product heat-up or deterioration. Staining of and residues on product surfaces as well as unnecessary rejects are avoided.

### Independence from Variations in Environmental Conditions

As drying takes place in a closed system, processes are uninfluenced by the seasons and resulting variations in environmental conditions in the production areas. Effects of the weather are almost safely excluded. Power consumption, which is low in condensation drying systems anyway, is further optimised by a smartly integrated heat pipe that requires no power. Power savings normally amount to between 50 and 75 percent.

Needless to say, the power saving percentage is largely dependent upon which technology and which type of power was used by the operator before. The reduction in CO<sub>2</sub> emission is com-

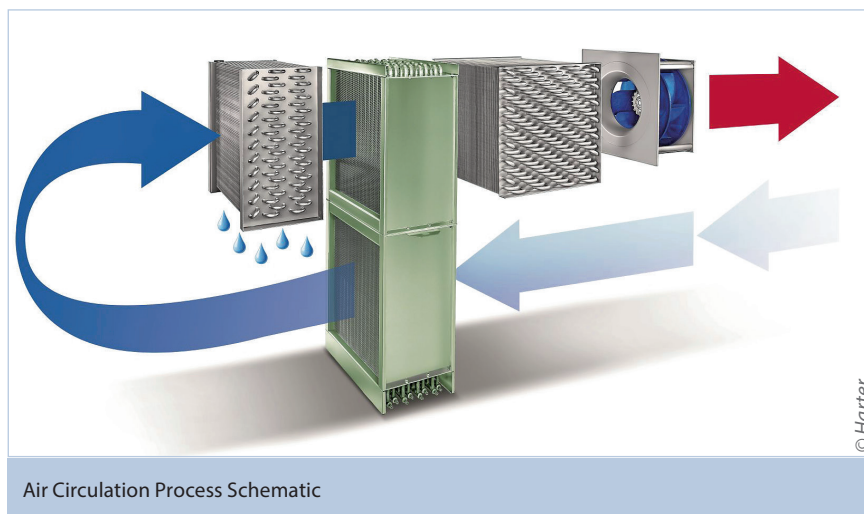


Fully Loaded Rack upon Insertion into Dryer

mensurate with the low power consumption. Harter's development provides highest efficiency for the drying process. ■



Dehumidification Module to Control Environmental Conditions inside the Dryers



Air Circulation Process Schematic

#### Contacts:

Harter Oberflächen- und Umwelttechnik GmbH  
 Harbatshofen 50  
 88167 Stiefenhofen  
 Germany  
 Phone: +49 8383 922315  
 reinhold.specht@harter-gmbh.de  
 www.harter-gmbh.de

FISCHER GmbH & Co. surface technologies KG  
 Auf der Wahnsbach 3  
 56368 Katzenelnbogen  
 Germany  
 Phone: +49 6486 91300  
 m.lorenz@fischer-galvanik.de