



A furniture supplier's wooden fronts are reliably dehumidified by heat pump drying. Additional benefits are energy savings of more than 67 percent and government subsidy.

HARTER: SYSTEMS IN FURNITURE INDUSTRY SUPPLIER APPLICATIONS

Efficient Drying with a Heat Pump

Drying processes shall dehumidify products gently leaving them completely dry and with no stains. It is also important to reduce cycle times and make processes reliable. And, of course, energy and carbon shall be saved. All these qualities are combined in the Harter developed condensation drying process with a heat pump. It offers many benefits as demonstrated by various examples of applications in the furniture supplies industry.

When the German drying system manufacturer Harter developed their heat pump based condensation drying technology 30 years ago their customers' focus was on just having their drying problem solved. „Today, operators continue to need excellent and reliable drying“, explains Jonas List of Harter Technical

Sales. „Plus, energy saving and carbon reduction have finally come into focus.“ Exhaust air free drying with a heat pump has always been ahead of its time in this respect.

A company manufactures solid wood and painted front panels for premium kitchen brands. Their previous exhaust air dryer caused blistering of their painted MDF fronts in the humid

summer months. Its high energy consumption had also become intolerable. Harter converted their existing drying chamber into a Harter system installing a special air recirculation system. The adjunct heat pump module produces the process air and is also responsible for the condensation process.

The process air flows through insulated piping into the drying chamber where it dehumidifies the furniture fronts at only 20 °C. The front panels are moved through the chamber on a chain conveyor. There is no more cracking and blistering. The process is reliable today, the result is very good. Interestingly enough, the drying period was reduced by 50 percent: from 40 min to only 20 min. While the connected load of the obsolete dryer was about 90 kW the power rating of the new system is only 29.2 kW.

The heat pump drying system is exhaust air free. It is a closed air system. This makes the furniture supplier independent of the seasons and the climate. All these substantial improvements were topped off by a government subsidy amounting to 30 percent of the investment volume.

Companies producing surface finished components of complex geometry require reliable drying. Drying failure may render a whole processing line inoperative. „Many of our customers used to have a real drying problem“, explains List. „And we could resolve it.“ dormakaba Schweiz AG, for example, needed to dry components of door locks. The company is a supplier of locking and entry systems for both private homes and public buildings such as office blocks, hotels or airports. Their Swiss site machines and nickel plates components thereof. The components have threaded holes and are thus very challenging in terms of drying.

There are two requisites for drying to be successful. First, efficient air dehumidification. The process air used for drying is extremely dry and thus unsaturated. By its physical nature, it absorbs humidity of the products very quickly. List continues to explain: „This is when air routing comes into play because even the driest air is not useful unless directed exactly



Components of door locking systems are reliably processed to become dry and stain-free within 10 min at 70 °C.



Drying tests revealed the requirement for additional air blowing of the water entrapping plastic plates.

to where it is supposed to absorb humidity.“ Optimum air routing engineering is among Harter’s key know-how. A Harter rack dryer is installed in dormakaba’s plating line today. Following nickel plating the racked locks are dried in this dryer at 70 °C. The components are completely dehumidified after only 10 min. Robert Haller, Plating Shop Manager of dormakaba, reports: „We chose this drying system to ensure a perfect, stain-free and dry result.“

A plating subcontractor has specialised in plating plastics. One of their customers is the market leader for bathroom facilities. Chrome plating of toilet flush plates is one of the services rendered for this customer. These seemingly plain components when viewed from behind turn out to be items extremely difficult to be dried. They tend to entrap a certain amount of water from the last rinsing operation.

To resolve this problem Harter used an option to their proven technology: non-compressed air blow-off. As the racks with the suspended flush plates leave the rinse, the plastic components are air blowed to remove the better part of the water

Harter dryers improve the energy balance of Lehmann, Minden

In-barrel drying of bulk material in fully static or minimal intermittent movement mode is state of the art today.



A number of dryers is available for tests in Harter's Test Center.

entrapped. Subsequently, they are moved into the rack dryer. The line includes two rack dryers. The racks dwell in any one of the dryers for two cycles. The cycle time is six min. After about 10 minutes drying the flush plates are completely dry all over. The low drying temperature of 45 °C ensures stain-free surfaces. The total power rating of the two rack dryers including the heat pump modules is 21.2 kW. The operator states that the essential criterion for making this investment was to finally obtain dry plates of perfect appearance. In this application, the heat pump modules were installed on an equipment floor beside the plating line. Harter dryers may be freely arranged and may be placed separately. They are connected through insulated piping. Restricted space is often an issue which may be resolved in this way. The family business Lehmann has also specialised in mechanical and electronic locking systems. Several Harter dryers are in operation in their in-house electroplating shop, and also a barrel dryer for bulk material. In-line bulk material drying - omitting the detri-

mental and laborious spinning - was a novelty on the market. In 1996, Harter created a milestone by successful in-barrel drying - at low temperatures, fully static or with minimum intermittent movement. Harter has since successfully designed and built hundreds of bulk material dryers despite the persistent notion that complete and uniform in-barrel drying is impossible. These are classic barrel dryers for in-line plating operations. Sometimes, bulk material is also dried in trays of baskets. Or rinse operations are followed by drying. A special bulk material drying application is the dehumidification of minute parts in screen baskets as used in the electronics or watchmaking industry. Lehmann of Minden has a barrel line. Lehmann integrated two barrel dryers with a heat pump in their plating line. Several tons of zinc die-castings and steel parts are dried in their barrels after rinsing. The drying temperature is about 60 °C. The cycle time is 7 min. This bulk material also dwells in the dryer for two cycles and is completely dry after 12 min approx. Each minute,



the barrels are slowly rotated for 10 sec. The power rating of the barrel dryer is 22.6 kW. Sönke Schlüter, General Manager of Lehmann, describes this project as „essential for the sustainability efforts of the Lehmann company. Our energy balance is further improved by the minimal energy input to gently dry our parts within short cycle times. We are proud to operate a zero carbon plating shop.“ Harter runs tests in their in-house Test Center to see how products respond to drying. There are various dryers available for testing. Harter also builds special set-ups to best simulate conditions in the field. Harter engineers first ascertain basic drying feasibility. They also determine the parameters relevant for drying. These are temperature, time, humidity, air-flow rate, air speed and the important air routing. A multitude of products has been tested here because Harter’s dryers find successful applications in many sectors – from food, pharma and medical devices, automotive, electronics and optics to

industrial and waste sludge. For the furniture industry, components of plastic windows and aluminium drawers were tested recently. For this purpose, plastic panels and shapes were primed, flashed off, dried, painted, flashed off and dried again locally in accordance with customer specifications. The two dehumidification operations showed optimum drying results after 30 min at 50 °C. The drawer components to be dried were bent aluminium sheets without seam, with one and with two edge seams. They were suspended in the rack dryer as specified. The smaller sheets showed no drops after only 5 min. The larger sheets of more complex geometry were dry within 20 min. Among the important things to be determined in these tests was the perfect fan speed to prevent the items from coming off their rack while ensuring maximum air recirculation. So, the Test Center becomes the place where ideas for individual, effective and clever drying solutions are hatched.

#GENTLE
#EFFICIENT
#PROCESS-SAFE
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**HOW TO
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