

Drying - Brought into Line



Fotos: Harter GmbH

Fine metal blanks are in-barrel dried at 70 °C to become completely dry.

In-line drying of bulk material eases the flow of operations. For 15 years now, a metal working company has banked on a technology for in-barrel drying of bulk material.

Phoenix Feinbau GmbH & Co. KG of Luedenscheid, Germany, had discarded their previous centrifugal dryer as early as in 2005 and replaced it by a barrel dryer. They wanted to improve the drying process for their highly sensitive metal blanks while at the same time eliminating the annoying quality loss induced by centrifugation. The company had had word of an alternative drying technology provided by Harter who prided themselves on being capable of direct in-barrel drying. “At that time, it was about retrofitting an existing

facility. The result was so good that future facilities were supposed to be including Harter technology only”, says Frank Daube, Section Leader Manufacture Plating. The story continued when the business expanded so that a new facility was required. The manufacturer of terminals, who is specialised in the manufacture of tools and blanks, plating, injection moulding and assembly, built a completely new plating shop intended to obtain higher throughput. A new Harter dryer was expected to meet the specified quality and drying time requirements. This

included, of course, that the fine special parts produced were to be dried uniformly and completely – a difficult job to be done considering the fact that some of these parts are highly liable to fluid entrapment.

Drying system manufacturer Harter designs each barrel dryer, in fact each dryer, for the specific application. Each manufacturer, each plating contractor has its own product portfolio and its own process. The drying system must be customised to meet the specific requirements. Prior to starting design, Harter normally runs drying tests with customer parts. Harter uses its in-house pilot plant station to determine the parameters relevant for drying, namely time, humidity, temperature, air speed, airflow and correct air routing. The customer may witness these tests to assure themselves of the performance capability of Harter's heat pump based condensation drying. Reinhold Specht, managing owner of Harter, explains: "More than a few of our prospective barrel dryer customers initially considered it plainly impossible for Harter to be capable of drying their parts in the barrel. Evidence thereof is furnished when they can watch the tests with their very eyes." Phoenix Feinbau waived these drying tests because the previous project with Harter had been so successful.

Barrels with Extremely Fine Perforation

For Phoenix Feinbau, a company of the globally operating Phoenix Contact Group, the following drying system was

designed. Three drying stations (2,946 mm long, 1,450 mm wide and 1.894 mm high) and one Airgenex® dehumidification module. Once a given barrel assembly has left the last rinse station it is loaded into one of the dryers and remains there for three cycles. In this way, three barrel assemblies are loaded in turn into the three dryers. Upon completion of the drying period, the barrels leave the dryers. By this time, the bulk material contained in the barrels is completely dry. Each barrel dryer has six special fans and an appropriate air routing system installed. The fans are speed controlled, which means that their speed may be programmed for each type of article to be dried. An appropriate air routing system ensures uniform drying of all items. In the drying process, the barrels are carefully rotated for ten seconds at intervals of 50 seconds to further drying. Rotation is slow to prevent any deterioration of the items being dried. The rotation intervals may also be programmed for each article. The drying temperature for Phoenix is about 70 °C. The barrels are 1,470 mm long and 500 mm in diameter. Perforations are between 0.25 and 2 mm in diameter.

Drying without Exhaust Air

The three dryers are connected to one dehumidification module. This module conditions the required process air, thus constituting the core of the drying system. It is in this module that the air is dehumidified and reheated. The



Each drying station features an automatic lid system to retain the precious heat. Drying takes place in a closed air system.

now unsaturated air is passed to or rather, in this application, over and through the items to be dried. By physical reaction, the air quickly absorbs any humidity present. Back in the dehumidification module, the air is cooled and condenses to form water. The air is then reheated and returned to the dryer. It is important that this circuit be a closed one. The closed air system with integrated heat pump technology makes drying energy efficient and carbon saving. Also, Harter's heat pump based condensation drying is the only system on the market that operates without any resulting exhaust air. Both the production areas and, above all, the workers are unaffected by such exposition.

Low Carbon Emission and Energy Consumption

All items must be uniformly dehumidified. To achieve this, the flow of air must be uniformly distributed

through the barrel. "We have engineered a special provision installed in barrel dryers for in-barrel drying. Only with this provision is the flow of air through the barrel and out again ensured" Specht hints at his know-how without wanting to expand on this matter.

Harter dryers are also very attractive under energy aspects. The integrated heat pump technology saves much energy and carbon emission. This is the reason why government subsidy has become available for these systems. The rated power of Phoenix' drying system is about 38 kW which is 70 percent less than normally required by conventional convection ovens. "For us, the liaison with Harter and their technology is crowned with thorough success", says Daube in conclusion.

www.harther-gmbh.de

www.phoenixfeinbau.de

HARTER
drying solutions

NIE WIEDER UNSICHERHEIT
BEI DER TROCKNUNG.

Wie Sie Ihre Produkte sicher
trocknen, deren Qualität steigern
und dabei noch CO₂ sparen.

