www.oberflaeche.de

mo

8-9/2020

August/September

Magazine for Surface Technology

Gentle Drying of Carbide Inserts

Bilder: Harter

Bulk items are gently and completely in-barrel dried at 50 °C within ten minutes.

Gentle Drying of Carbide Inserts

Condensation dryer for gentle processing of bulk material at very low temperatures

15 years ago, a metal-working company invested in a novel drying technology which has proved to be reliable to date. Now, they planned to apply this gentle and very efficient condensation drying method to two new cleaning lines.

TIGRA GmbH manufactures carbide inserts and other cutting material for the wood-working industry. The reversible knives, saw tips and planer knives are subject to high stress in operation. Therefore, TIGRA makes a point ensuring quality and long life of their products by adequate processing methods. Most of the carbide items are ground at some stage of production. Subsequently, they must be cleaned to remove cutting fluid and swarf, and then dried. In 2004, TIGRA wanted to replace their existing hot air dryer which had become obsolete. Searching for a replacement they learned of drying system manufacturer HARTER who claimed to be able to perfectly dry bulk material in their container using a novel method. HARTER could demonstrate their ability through tests in their own pilot plant station. This opened up the opportunity for TIGRA to swap to condensation drying.

HARTER had launched heat pump based condensation drying on the market almost 30 years back. The method had originally been intended to be used for extracting humidity from predewatered sludge resulting from sewage treatment. The Southern German company optimized their method for use in manufacturing processes because conventional hot air dryers had frequently posed a quality challenge for operators. The then novel heat pump based condensation drying method offered a real alternative. This gentle and all the same efficient method is capable of drying at low temperatures. "Moreover, air routeing inside the dryer is critical", explains Reinhold Specht, managing owner of HARTER, "because dry air must be accurately targeted to actually absorb humidity". If the airflow goes past the items to be dried or past the baskets it literally misses the mark. Harter's first in-basket dryer installed at TIGRA's site was capable of processing bulk items without removing them from their baskets after cleaning. The first HARTER in-basket dried items after cleaning in a uniform and reliable way and within the specified cycle time.

Barrel Dryer for the Plating Shop

More than ten years later, TIGRA required a dryer for bulk items after barrel cobalt plating. HARTER installed an in-barrel dryer at the end of the line. The drying vat was built to exactly accommodate the barrel assemblies. The bulk items are comfortably dried in-line at a temperature of 50 °C. The small items are uniformly dry after no more than 10 minutes and may undergo subsequently processing immediately. In-barrel drying is much gentler than common centrifugation plus it relieves the need for manual transfer of the items.

In 2016, TIGRA added a new production building to expand their business. This, in turn, required more cleaning capacity, and they decided to install a larger cleaning facility including two autonomous lines. Their choice of HARTER condensation dryers was never put into question. "This technology had proved to be successful", says Thomas Schnitzer, TIGRA's cognizant project engineer. The in-basket dryers ordered in 2019 were commissioned this year.

Corrosion-resistant steel carriers with plastic liners are used in this application. The carbide metal items are cleaned and dried in cleaning baskets sized 425 long x 225 mm wide. Items of various geometry and size are cleaned and dried in these baskets as required by the specific job order. The two dryers have two drying places, each, designed to be operated independently. The carbide metal items are gently and completely dried at 45 °C. Any humidity present on the surfaces of the items to

It takes no more than three minutes to dry the various carbide metal items loaded in four baskets.

be dried is removed within the specified 160 to 180 second cycle time. This is made possible by the high efficiency of the heat pump based dryer.

Air-wise Closed Drying Process

Each dryer has normally one Airgenex dehumidification module attached to produce the required process air. As space was restricted, the two dryers in this application are equipped with only one common dehumidification module. This module largely strips the air of its humidity and heats it to the required temperature. The now unsaturated air is passed into the dryer to flow over and through the items to be dried. In this process, the air quickly absorbs, by physical action, any humidity present on the surfaces of the items. Once returned to the dehumidification module, the air is cooled, moisture condenses, and the condensate is drained off the system. Subsequently, the air is heated using the waste heat of the heat pump and passed into the dryer, again. The drying process is thus closed air-wise. HARTER claims this system to be the only one on the market that does without any exhaust air.

Each dryer includes two speed-controlled fans. This saves energy cost. These fans control the air speed and flowrate inside each dryer.

Heat pump based condensation dryers are also an interesting option under energy aspects. TIGRA's drying system has an overall connected load of 19 kW. The rated power in production operation, however, is only about 12 kW. This includes the in-built recirculation fans with a connected load of only 1.6 kW. The heat pump technology employed is carbon saving enough to make HARTER dryers eligible for government subsidy.

Harter GmbH, www.harter-gmbh.de

Tigra GmbH , www.tigra.de