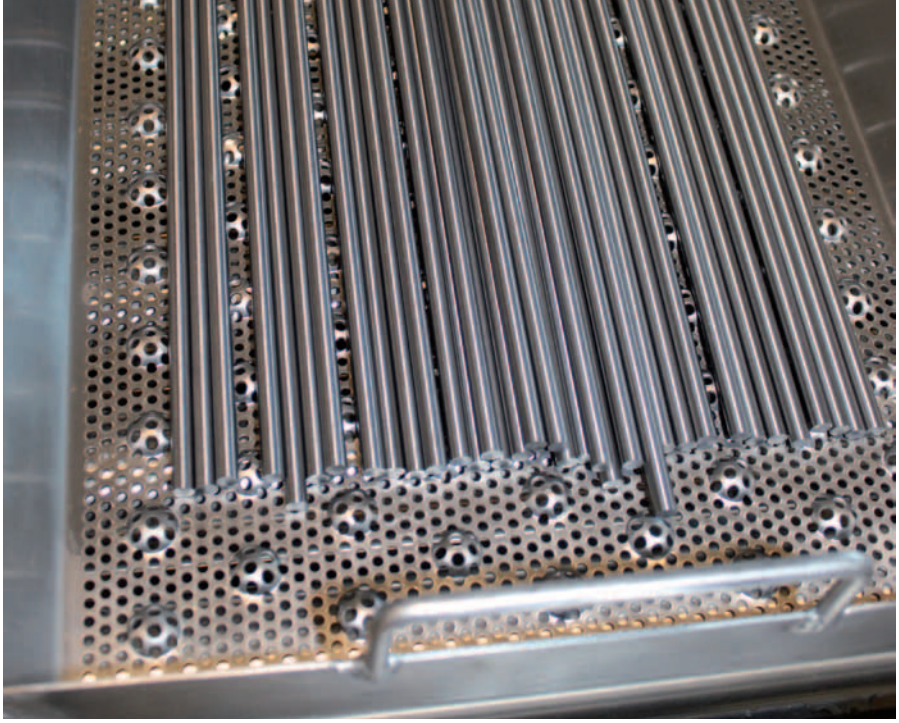

Picture: Ceratizit

Enhanced passage of air through small hemispherical bosses in the perforated sheet bottom

Dryer for Hard Metal Rods

Complete and Stain-free Drying at No More than 45 °C

Drying of wet hard metal rods touching each other in baskets is an extremely difficult task. With a new condensation drying system CERATIZIT can now dry this material much more gently, at lower temperatures while avoiding heat-induced staining.

CERATIZIT AUSTRIA's Breitenwang, Tirol, Austria, site produces hard metal rods for drills and milling cutters intended for use in medical and dental applications. The products of the Tyrolean company are also used in the automotive, aerospace and many other industries. CERATIZIT controls the whole process chain from powder production and forming, through sintering until final surface finishing. Following grinding or cutting, the hard metal rods are cleaned and must be dried thereafter. There had been a bottleneck in the production process for certain types of metal rods which the expansive company wanted to eliminate. Following cleaning, the rods lying in baskets were subjected to compressed air blowing and subsequent static drying on heating plates at 200 °C.

This process was unsatisfactory for various reasons. First, the whole portfolio could not be dried using this method. Second, working in the area designated for drying was less than pleasant given the intense heat and noise induced by compressed air blowing. Also, the hot plates consumed an enormous amount of energy radiating heat into the area for 24 hours a working day. Plus, after drying the metal rods were hot enough to be handled only with gloves and great care. All these shortcomings were to be eliminated.

Drying Tests

CERATIZIT conducted an online search and ran into HARTER Oberflächen- und Umwelttechnik. It soon turned out that the neighbouring Plansee site of the CERATIZIT group had successfully implemented HARTER drying systems before. When a new project is launched HARTER offers to have the items to be dried subjected to trial testing in HARTER's pilot plant station. The purpose of these tests is to determine the parameters required for optimum drying. The perfect combination of time, temperature, humidity, air speed and air flow is identified and reflected in further design. For logistic reasons, CERATIZIT wanted to have these tests conducted at their premises using a mobile test station. The tests demonstrated that the biggest challenge was posed by long rods lying unmoving and closely together. In such cases, HARTER uses a special blowing-off provision before the drying proper commences. This provision is usually combined with the dryer and uses always non-compressed air. Combined blowing-off and drying fulfilled CERATIZIT's requirements.

Ensuring Free Passage of Air

First of all, the baskets were modified to introduce hemispherical bosses in their formerly flat perforated bottom plates. The Tyrolean company uses a large variety of baskets as required for the different sizes and finishes of their rods. HARTER modified these baskets to suit CERATIZIT's portfolio. This is to say that baskets for thicker rods have larger perforation holes and protrusions while those for small rods have holes as small as 1 mm or less. This design tends to provide equal rather than overly dense rod spacing. Also, the rods do not touch the basket bottom over their full lengths. This basket design is ideal to ensure free passage of air. The two existing cleaning rooms – measuring about four metres in length and width - hold a cleaning facility with an adjacent roller track and a drying system each. After manual cleaning the baskets are placed on the roller track and moved to the dryer. The dryer door opens at the push of a button, the baskets are inserted and the door closes again. Then, the product specific procedure is started. First, the baskets and the hard metal rods have water blown off by horizontally movable nozzles. Then, the drying proper commences. After three minutes the rods are dry and available for further processing.

Picture: Ceratizit

A roller track (left) is used to move baskets, without much effort, from the cleaning station to the dryer (centre)

Condensation drying was much of a relief for CERATIZIT's manufacturing process. Not only does the new drying system dry the complete surface of all rods, but the staining problem was also resolved. Drying is now accomplished at 45 °C. The items are dried gently. Heat-induced staining, particularly of high gloss lapped rods, is safely prevented. Employees, too, benefit from the new drying solution. Before, they had to carry the sometimes heavy baskets from the cleaning station to the heating plates, now they can place the basket comfortably onto the roller track and move it to the dryer with not much effort. HARTER installed a drip pan underneath the roller track to collect water dripping from the baskets so that no spillage must be removed. The low drying temperature also eliminates any health and safety risks for the employees. Having an overall connected load of but 7 kW the system is also energy efficient.

The Right Air at the Right Place

HARTER's purpose devised heat pump based condensation drying technology can quickly absorb humidity, by physical action, and thus dry items. This is done by passing extremely dry and thus unsaturated air over the items to be dried. The air absorbs humidity in this process. The humidity laden air is then stripped of the moisture it carries. The moisture is condensed and the resulting condensate is drained off the system. Subsequently, the cooled air is reheated again to the desired process temperature and returned to the drying chamber. This circuit is closed. This alone, however, does not suffice to ensure successful condensation drying. Adequate air routeing is equally essential. Reinhold Specht, managing owner of HARTER, puts it like this: "Much know-how and experience is necessary to configure the ideal air route for the specific process and product. This is our strength and the resulting success of our drying technology as implemented with CERATIZIT."

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