



Photos: Harter

# Efficient Drying of Plated Needles

Even small, densely packed items may be dried efficiently if the proper process is employed.

Again and again, a drying system manufacturer's alternative technology proves to be a problem solver for tricky jobs. Let's have a look at an example from the textile industry where extreme quantities of bulk material were to be processed.

The job sounded simple. Plated industrial needles intended for use in textile machines lying densely packed in baskets by the thousands were to be dried efficiently. Yet, at first glance, it could hardly be imagined how air could possibly be passed through them let alone how all of these needles might be rendered completely dry. In view of this challenge, even the experienced drying system manufacturer HARTER was sceptical if their drying method might measure up to

this job.

When a prospective customer comes up to HARTER about such a most difficult requirement HARTER normally runs drying tests in their in-house pilot plant station first. The purpose of these tests is to try out various settings of the relevant process parameters such as temperature, time, humidity, air flow speed and volume. Air routing, in particular, is critical and often requires a special customized solution. In the case described here,

Needles for textile machines must be high precision plated so that the threads don't get snarled up. Compliance with this requirement was ensured for bulk material drying by extensive preliminary testing.

the tests performed were witnessed by the customer. Initially, baskets with a half load of needles (6,000 off) were placed in the test dryer. In a second go, HARTER tested baskets with a full load of 11,000 needles.

## Probing into System Performance in Actual Production Operation

Actually, all needles were completely dry after processing at 55 °C for only five minutes. The humidity test strips, too, did not indicate any residual moisture. The customer, nonetheless, decided to further probe into the performance of the drying system. They ordered a loan system for use at their premises. This system was integrated in their actual production and showed the same very good results as demonstrated in the preliminary tests. So, the last obstacle from acquiring a system was cleared out of the way. The company eventually had a means to resolve their drying problem.

## Dryer Customized to Meet the Specific Requirements

HARTER drying systems basically consist of the dryer proper and an Airgenex dehumidification module providing the necessary process air. The dryer designed for this customer was a basket type for manual loading. It features a side door and a basket pull-out provision for loading/unloading one basket filled with needles each. Resourceful engineering was required to design the dryer to accommodate the two basket sizes used by the supplier to the textile machine industry. The needles are completely dry after treatment at 50 °C for five minutes and may then be forwarded for further processing. The Airgenex dehumidification module was placed on a platform above

the dryer to save space. HARTER specialized in condensation drying thirty years ago. The technology is capable of completely drying items within very short cycle times at temperatures between 20 °C and 75 °C. Gentle drying, fast and efficient, has top priority. Perfect air dehumidification combined with air routing form the basis for success.

#### Air Dehumidification in a Separate Module

The air is dehumidified inside the Airgenex dehumidification module. This is where extremely dry air is produced and then passed over and/or through the items to be dried. By its very nature, the dry air very quickly absorbs any moisture present. Once returned to the dehumidification module, the air is cooled and the moisture condenses to form water. The air is then reheated and recirculated to the dryer. It is an established fact that Harter dryers are the only systems on the market with a closed air circuit and no exhaust air. Unsaturated air is one factor, the other is air routing because the dry air must be routed exactly to flow over or through the items to be dried. "We have acquired an extensive know-how over the decades" says Reinhold Specht, managing owner of HARTER. "It is only by the perfect combination of the two factors that we can achieve such big engineering success."

#### Brownie Points for Saving Energy



Up to 11,000 industrial needles are completely and uniformly dried in baskets within only five minutes.

Condensation drying with its centrepiece, the heat pump technology, is also an attractive solution in terms of energy consumption. The Airgenex dehumidification module, in this project, has a rated power of 5.2 kW. The two integrated special air recirculation fans have a power rating of 1.6 kW each. Plus, there is an in-built 4 kW electrical auxiliary heater used to boost initial heating-up. The rated power of the whole system in production operation is only 9.4 kW. Dehumidification module and dryer are connected through insulated piping.

Other HARTER drying system variants feature automatic lid systems to retain the precious heat inside the

system. The high efficiency of HARTER systems makes them eligible for government subsidy, which customers may apply for with BAFA (Federal Office for Economic Affairs and Export Control).

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+49 (0) 83 83 / 92 23-0 | info@harter-gmbh.de

**harter-gmbh.de**