

Saving Money with Dry Air - A Drying System Needs to be Carefully Wrought

Jabil's implants are surface finished and subsequently cleaned and dried. The waste heat of their previous drying system entailed a loss of energy and unpleasant working conditions. A customized system by Harter has now changed the situation.

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Jabil's new basket dryer features three chambers for two baskets each. Its highlight is special air routing. (Photograph courtesy by Harter)

Jabil claims to make "everything possible and everything better". Following this philosophy, they manufacture various commodities and components at 100 sites worldwide. Jabil Healthcare of Baisthal, Switzerland, has specialized in developing and manufacturing cutting-edge technologies and products in their field. This includes medical devices for cardiology, neurology and diagnostics. And also implants for orthopaedics, as well as inhalators, syringes and blood pressure meters. Health products such as fitness trackers and sportswear round out their portfolio.

Implants are surface finished and subsequently cleaned and dried in the production process. This applies to tooling for surgical operations, such as bolts and drills of various sizes, as well. For drying, the Swiss company had used a basket dryer which did not only heat the products to 95 °C and over but also made a considerable contribution to heating the whole workshop. The excessive heating impaired both the products and the employees' well-being. When this hot air dryer ultimately could not be used any longer, Senior Process Engineer Bernhard Liechti searched for an alternative solution on

the market and eventually found one with drying system manufacturer Harter of Stiefenhofen, Germany.

Jabil made use of preliminary tests offered by Harter to take place at their pilot plant station. "This option is recommended to establish a basis for the layout of a drying system because we use these tests to determine which parameters will fulfil the client's specifications", says Reinhold Specht, Harter's managing owner. Time, humidity, temperature, air speed, air flowrate and air routing are the critical factors.

The technology developed by Harter to ensure successful drying is based on two essentials, namely efficient air dehumidification using a heat pump and adequate air routing. Harter uses an alternative physical approach for this purpose. The process air required is largely stripped of any moisture in the dehumidification module. The extremely dry and thus unsaturated air obtained is passed into the dryer and over or through the items to be dried therein. In this process, the air absorbs any moisture present. Once returned to the dehumidification module, the air is cooled and the humidity condenses to form water. The process air is then reheated using the energy recuperated and passed to the dryer again. Drying temperatures may vary between 40 °C and 90 °C as required for the specific application.

Thorough Testing for Best Results

Preliminary drying tests at the pilot plant station are invariably conducted on the items least easy to be dried. In Jabil's application, these were needles and bolts of challenging geometries. The outcome of the tests was positive – 15 minutes at 70 °C – and when the obsolete dryer suddenly became unserviceable, quick action was required.

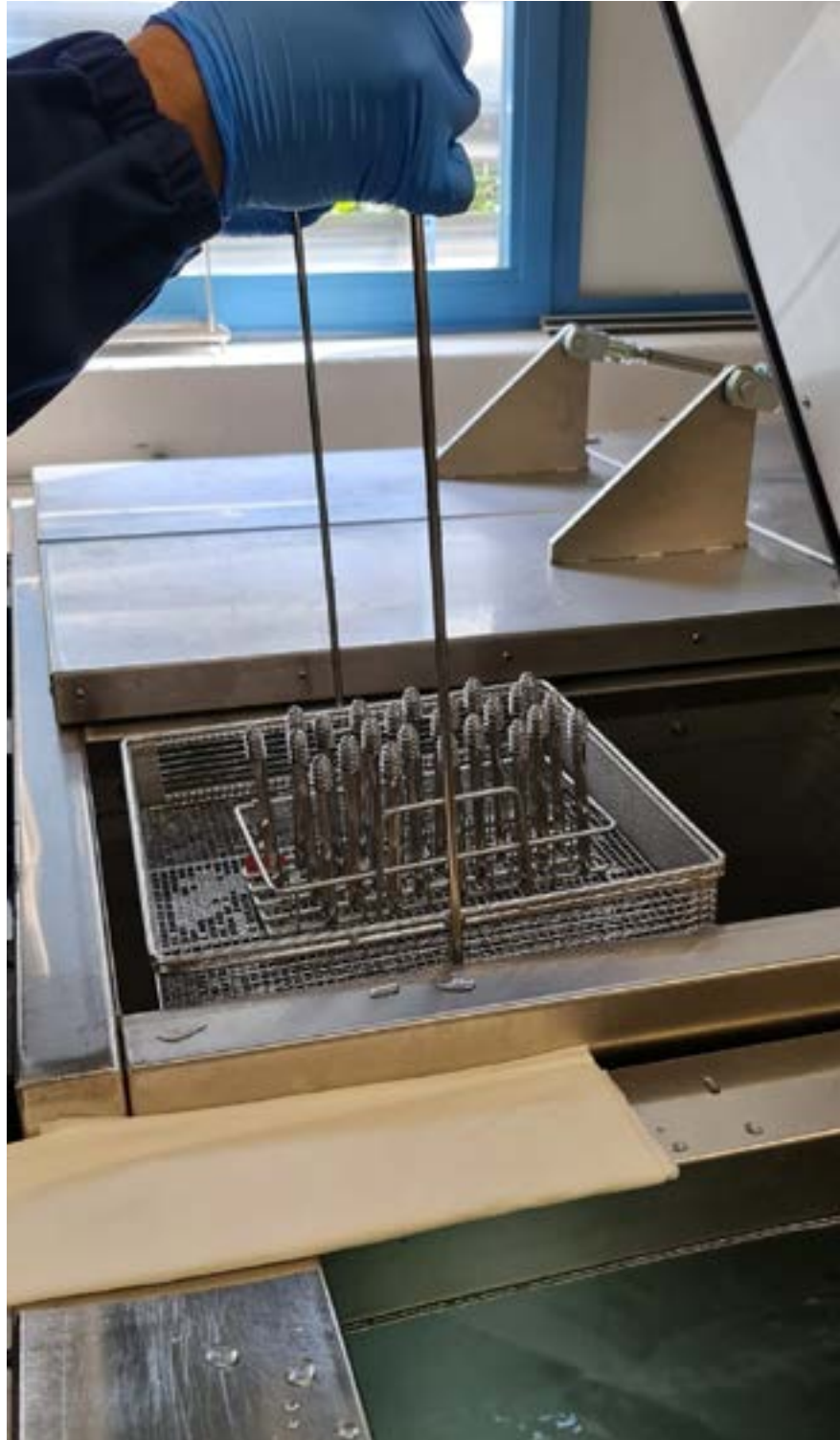
The new basket dryer features three drying chambers accommodating two baskets each. Other than in the obsolete dryer, the chambers may be opened individually. The chambers can be opened by pressing a button and are manually loaded with two filled baskets. Today, the basketed items are completely dry after 15 min maximum at 70 °C. The drying time is shorter for items with simple geometries. Splitting the dryer in three compartments makes sense because opening any single chamber entails less heat loss than would be encountered when

opening the whole dryer. Also, the three chambers are separated air-wise and operate independently. The dryer may thus also be used with partial loads.

The process air is conditioned by a dehumidification module and passed to the dryer through insulated piping. Due to lack of space, Jabil's dehumidification module was installed in another room. The dryer features a total of three special controllable recirculation fans. A small heating battery is used to boost initial heating up and is then powered off. The rated power of the system in production operation is 11.2 kW. Critical for successful drying is targeted air routing ensured by a special mask in each chamber.

"This way of drying is the optimum solution for us: dry product parts, short drying times, low temperatures, short assembly times and, as a goody, government subsidies on top of it" reports Liechti contentedly.

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The dehumidification module, which treats the process air, can be installed separately if space is limited. It is connected to the dryer by insulated piping. (Photograph courtesy by Harter)

Basket with parts being loaded into the dryer. At 70° C, geometrically demanding parts are dried gently and safely in 15 minutes. (Photograph courtesy by Harter)