Energy Efficient Drying Technology - There are no Limits to Possible Applications

Those who built or refurbished their houses themselves know very well how much material is hidden behind walls or below floors - masonry, wood, insulation, foils, fabrics, conduits, cables and much else. Such materials are made by specialised companies who want to optimise their manufacturing processes again and yet again in order to meet the rising standards of the market. This is particularly true in these pandemic times where the already flourishing building sector is experiencing still another boom. Where drying comes into play, insulating panels made by a renowned German manufacturer are an interesting example application.

A renowned German company focusses on manufacturing insulating panels requiring very high insulating capacity and resistance to high loads in the field. This is important in bathrooms, for example, where the plaster coated panels are tiled and are supposed to do their job for all eternity. The panels in question here come in various sizes and are intended for use in walk-in showers.

Said manufacturer used to allow their plaster coated insulting panels to dwell for three days to air dry, to put is simply. As the building trade soared, however, the drying process became a problem because it prevented the company from increasing their throughput. A solution had to be found for this final operation - a dryer capable of reliably drying the plaster coat to a residual humidity of exactly three percent so that the insulating panels could afterwards be stacked without any problems.

The first contact with drying system manufacturer Harter GmbH of Stiefenhofen, Germany, was made at the Powtech fair in Nuremberg in 2017. Harter's low temperature condensation drying process appeared to be expedient for the panel manufacturer's purposes. Tests were conducted both at Harter's test station and at the customer's premises to determine the controlling parameters for successful drying. On the basis of these parameters, Harter developed a customised solution for this application, and the customer invested in two chamber dryers.

Drying Partial or Full Loads

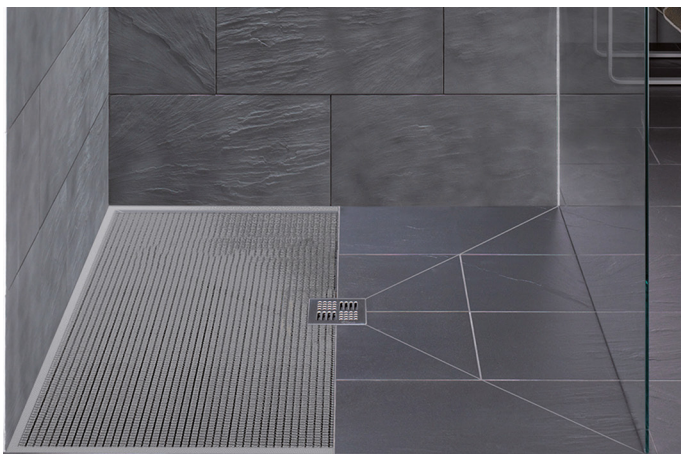
Each dryer accommodates five vertically arranged trays. Each tray is 2000 mm long, 1100 mm wide, and 1100 mm high. Upon application of the 1.5 mm approx. thick plaster coat the panels are manually loaded into the trays and dried to the desired residual humidity within 35 minutes. The drying temperature is 67 °C. This is in perfect compliance with the customer's requirement for six litre of water extraction within 20 minutes.

The insulating panels are made in various sizes ranging from 900 mm by 900 mm to 1800 by 900 mm maximum. For perfect drying, it does not matter if panels are placed in all trays or if panels of different sizes are placed in trays. Air routeing inside the drying chamber is engineered to ensure best drying quality of either partial or dissimilar loads. This offers the customer high flexibility.

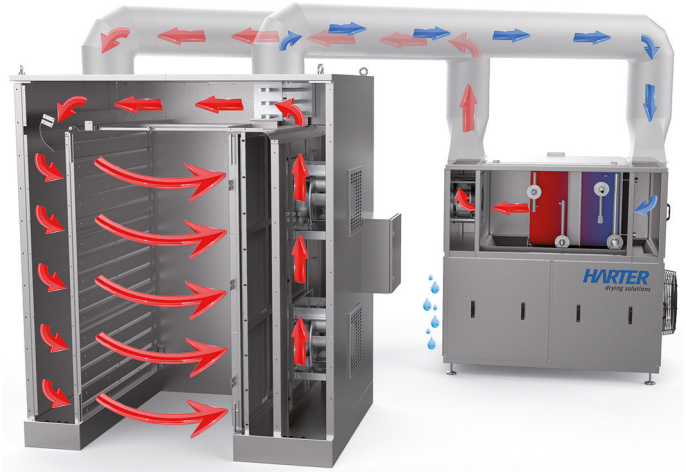
An exact dry matter content of the plaster coated insulating panels is one of the parameters that ensure long life under heavy load (Photo: Harter GmbH)

Subsidies for Energy Efficiency

The dryers are connected to a common Airgenex® dehumidification module to condition the required process air to the



The boom in the building trade made a manufacturer of insulating panels optimise their manufacturing process in order to increase production (Photo: Harter GmbH)



Chamber dryer operating principle – The air is routed inside a closed system which results in high energy efficiency while ensuring best drying results (Photo: Harter GmbH)

two chamber dryers. For this special drying method, Harter uses extremely dry and thus unsaturated air. Such air, when offered moisture, absorbs atmospheric water ('humidity' in plain language) extremely quickly. This normally results in very short drying times. The humid process air is subsequently cooled. The moisture condenses to form water, and the condensate is drained off the system. Then, the process air is reheated and returned to the products to be dried. This process takes place in a closed air circuit. Such drying does not involve any exhaust air and is fully independent of any external climatic conditions. The rated power of the drying system in production operation is about 30.3 kW.

The heart of each dehumidification module is a heat pump featuring highly efficient operation so that extremely much energy and carbon is saved. This technology was classified eligible for government subsidy some years ago. Ever since, Harter customers may apply for such subsidy with BAFA (Federal Office for Economic Affairs and Export Control). Harter co-operates with an energy consulting firm to see that applications are processed smoothly which has so far proved 100 percent successful. For the project described here, the customer obtained a grant amounting to 30 percent of the subsidizable cost, which is the maximum that may be obtained. For small and medium-sized businesses, this bonus is increased by 10 percent to a total 40 percent maximum. Customers in Switzerland and Austria may meanwhile obtain subsidies, too.

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