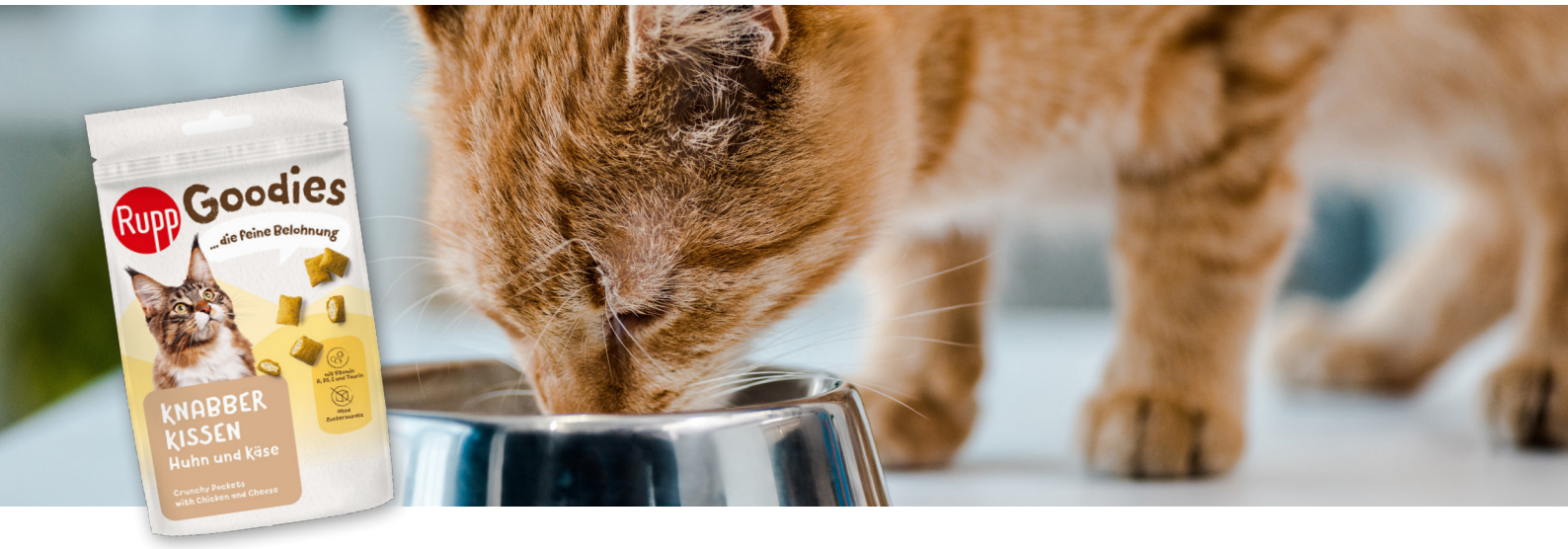


Energy-saving and Reliable Drying of Cat Food

An Austrian pet food manufacturer replaced their gas operated dryer with a heat pump based system. This helped to reduce their cost of operation considerably. The company is more than satisfied with the reproducible and energy-saving drying process and the excellent drying quality they can now enjoy.

Rupp Food Austria GmbH is a fourth-generation family enterprise selling dog and pet food around the world today. The business started by acquiring a mill to produce flake cereals at the beginning of the last century. Oats have been an important part of the Austrian company's portfolio to the present day. In 1975, they started manufacturing pet food which has been their primary product ever since. Managed by Hubert and Christoph Rupp the company produces quality dog and cat food with a workforce of about 160 with a focus on meeting highest quality standards throughout their business.

They used a gas operated belt dryer for producing cat food. The dryer had got long in the tooth and they intended to put it out of service. It goes without saying that, today, the focus is as much on energy consumption as on good drying quality. So, Rupp studied alternative drying methods. They got in touch with Harter at the Powtech fair in Nuremberg in 2017. Harter is a drying system manufacturer specialised in heat pump based dryers for industry with a record of more than 30 years. „We viewed this as a great opportunity to reduce our extremely high gas consumption and the resulting cost of operation while optimising our process " reports Klaus Schiller, COO of Rupp in retrospect.

The million dollar question was if this technology could meet the high quality requirements. Harter provides an answer to this question through series of tests run at their in-house pilot plant station. The German drying system manufacturer has always offered their

prospective customers this option as a reasonable approach to define the exact drying parameters. Of course, products are more or less easy to be dried. This is when Harter's typical innovation spirit comes in to find a suitable solution. The solution was found, to put it in a nutshell.

Testing and Solution

In initial tests, Harter determined the drying time, the feasibility of 70 °C as the drying temperature, and the potential bulk density. Tests of the 90 °C heat-up step revealed that the relevant portion of the conveyor belt would require a separate air recirculation system. Subsequently, Harter designed the drying system based on the parameters determined by these tests and, of course, Rupp's specifications – 2 tons per hour maximum throughput. Another issue revealed by these tests was the formation of dust resulting from abrasion of the food. Harter first determined the quantity of material abraded per hour to be able to design the required filtering and discharge system.

To meet Rupp's requirements and the parameters obtained by testing a belt length of 19 m was required. As space was restricted, Harter's dryer had to be designed to include five separate belts arranged one above the other. The dryer is about 5 m high and the individual belts are 5 m long each. The extruded food mass is fed into the dryer automatically. Conveyor belts connect the extruder, which is placed elsewhere, with the dryer.

While being dried, the pressed mass has more and more humidity removed until the specified residual humidity of six percent on average is obtained. On its way from the topmost to the lowest belt, the mass becomes gradually drier and breaks up into the shape desired. Exiting the dryer, the cat snacks are conveyed, on a traverse belt, to the next processing station. They are f inally flavoured and packaged. Harter integrated a filter

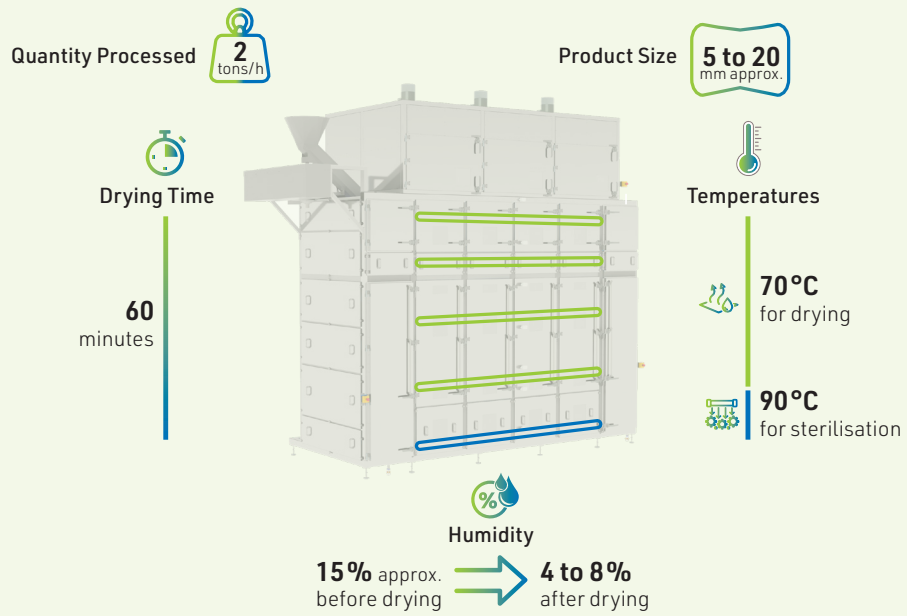
at the dryer exit

Fig. 1: Extruded mass of cat food before and after the drying tests. The tests were conducted to determine all parameters required to ensure successful drying

as an anti-dusting provision. The German drying system specialist also installed additional filters inside the dryer, plus a worm and belt conveyer to discharge the material abraded.

Air Routeing and Dehumidification

Extremely dry process air is used for drying. The airflow rate is controlled to meet the requirements of the specific product. For one thing, the product is supposed to be dried as efficiently as possible. For another thing, the snacks must remain on the belts rather than fly through the dryer. Yet, it is not only the quantity and speed of the air that matters. „Air routeing is always a major factor contributing to successful drying



130 kW
Rated power in production operation

Electric using a heat pump
Power type

1,000 MWh/a approx.
gas saved

because the air, by its very nature, invariably follows the path of least resistance" explains Michael Richter of Harter Technical Sales. It is one of Harter's secrets of success to know how to direct the air to follow the correct path and to know the engineering tricks to achieve this. This is why there are no details disclosed here. „What counts at the end of the day is that the product is perfectly and uniformly dehumidified - and this is the goal we achieve" summarised Richter. Yet, where does the process air come from and what happens to it?

The big success of this low temperature process is its physically alternative approach. Drying is accomplished using extremely dry and thus unsaturated air passed over or through the items to be dried. It absorbs humidity excellently. Subsequently, the air is cooled – the humidity condenses to form water –, reheated and returned to the drying chamber. The temperature may be varied between 20 °C and 75 °C as required for the specific product or process. If sterilisation is desired – Rupp did – Harter will provide for an optional 90 °C to 110 °C high temperature process step. The same applies to an optional cooling process step if required for the specific process. The drying period depends on the degree of the residual humidity desired or required. For packaged food, where the wet package needs to be dried, the drying time is often restricted to a few minutes to meet the specified process cycle time. For direct food drying, the drying time is often longer and as needed to obtain the residual humidity of the product.

This process air is conditioned in a dehumidification module, which is also responsible for the condensation process. This so-called AIRGENEX®food module may be installed in various locations as required for the situation on site. With Rupp, the module is located in the same room, placed on a platform above the dryer. It is connected to the belt dryer through insulated ducting.

Exhaust-Air-Free

Harter's system uses a completely closed air circuit. Exhaust air free and thus emission free drying means that Rupp is now independent of the climate and the seasons. Production areas are not affected by any humidity or exhaust air emitted by the dryer. Humans, materials, and machinery are all spared from such adverse effects. The process is reproducible and thus provides maximum reliability. Exhaust air free drying has demonstrated, in many projects, to be beneficial in terms of appearance, flavours, vitamins and other ingredients. These benefits vary, of course, with the type of product and the dryness desired. „This project was a big profit for us because using this technology we save very much money and obtain a high quality product result on top" summarises Schiller contentedly.

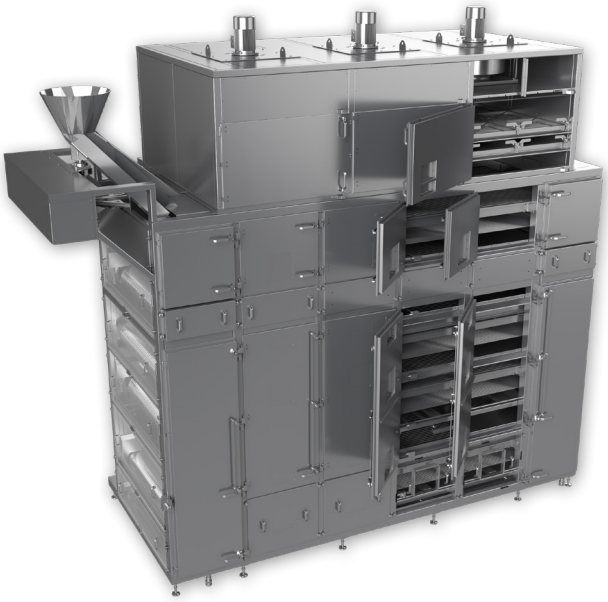


Fig. 2: The cat snacks are dried on five belts in vertical array to obtain the exact degree of dryness and to ensure uniform dryness. The drying process is reproducible and extremely economical owing to the heat pump technology employed.

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