

The art of drying pasta

Quality pasta needs two ingredients – expert preparation of the dough and correct drying. A controlled drying process is vital to ensure the pasta does not crack or become discoloured. The food-processing machine manufacturer Bühler deploys numerous humidity probes in its equipment to obtain exact measurement results for regulation of the drying climate.

It is easy enough to make pasta yourself: mix flour and water, knead, then turn the dough through a noodle machine and hang the finished pasta on a clotheshorse to dry. Industrial production is more or less the same, albeit on a far larger scale and, of course, automatic. Bühler, a technology corporation based in eastern Switzerland, manufactures machines with a capacity of up to six tons per hour.

Unlike in your own kitchen, however, the noodles cannot simply be dried in the surrounding air – instead they run through numerous temperature and humidity zones in the drying machines. To obtain the necessary quality of pasta, this process must be controlled. If the moisture is withdrawn too quickly, the pasta can crack, rendering it useless for sale.

Christian Mühlherr, process engineer at Bühler, explains: “It is extremely important that we use reliable humidity probes

in our machines so that we can measure the drying climate as accurately as possible to enable us to regulate the drying process optimally.” The company’s engineers use humidity probes from the HygroClip2 series from Rotronic for this. Every drier is modular in construction and comprises four to 10 zones; each is equipped with a humidity probe.

Different drying phases

After preparation of the dough, the moisture in the product lies at around 30%. The pasta then passes through pre-



Dry pasta may not contain residual moisture of more than 13%.

drying, main drying and finally stabilising phases, in which the noodles give off hardly any moisture anymore. Since

the pasta dries from outside to

inside, its moisture content at the end of the process is higher inside than outside. This results in tensions, which are reduced in the stabilisation phase. After drying, the moisture content in the product lies at about 12%.

“The drying process follows a diagram in which temperature and moisture are plotted,” says Kurt Lieberherr, who is responsible at Bühler for energetic design of drying machines. “These drying charts were obtained empirically,” he says,

adding: “The moisture content of the product at the end of the process depends on many factors,



Pasta driers are modular in construction and contain four to 10 climate zones.

such as shape of the pasta, wall thickness, holding time, and temperature and humidity conditions in the climate zones as well as on the quantities of air circulated in the product area.”

Compliance with regulations

The final moisture of the pasta can be determined via regulation of the drying process. In this regard there are framework conditions that must be complied with. Mühlherr explains: “The law states that dry pasta may not have a water content of more than 13%.” If there is more water in the end product, undesirable reactions that have a negative influence on the foodstuff can occur. The case is different with so-called soup foods. In them pasta is filled in bags with other foodstuffs. “Here it is necessary to consider the critical water activity values of the individual ingredients,” says Mühlherr. These products are therefore dried to a lower final moisture content so that the prescribed limit value can be achieved.

Easy to calibrate

Since the moisture content of the end product plays such a great role, the measurement accuracy of the humidity sensors is an important criterion. The high-quality driers from Bühler have lifetimes of up to 30 years and more. The demands on the long-term stability of the probes are correspondingly high. “No matter how good the drier is as a whole, if the climate is measured incorrectly, we will have rejects in production or problems in process control,” says Lieberherr, adding: “Our experience with Rotronic has been very good.” For calibration of the probes, Bühler supplies its customers with a handheld instrument and other accessories. The machine is equipped with blind plugs for control measurements – a further advantage, as Lieberherr says: “In this way our customers can calibrate the humidity probes themselves. Sensors

from other companies often have to be sent in to the manufacturer for this.”



Bühler AG, Uzwil

Bühler is a specialist and technological partner in the manufacture of machine, systems and services for the processing of basic foodstuffs and for the production of high-quality materials. The group operates in more than 140 countries, employs a workforce of around 8,800 worldwide and turned over CHF 2131 million in fiscal 2011.



The HygroClip2 from Rotronic produces precise measurement results, according to which the humidity in the climate zones is regulated.