The fully automatic tower brewhouse

SMALL BREWING PLANT | About six metres high, with an unusual tank design enclosed by a spiral staircase, the fully automatic Flecks Helix is a real eye-catcher. Who built the tower brewhouse? What was the idea behind it, and – first and foremost – what are its notable technical features?

AUSTRIAN SYSTEMS MANUFACTURER for small breweries Flecks Brauhaus Technik GmbH is based in Frohnleiten near Graz where its final assembly hall, show brewery and brewery training centre are also housed. Twenty-five years ago, father Vinzenz Fleck (microbiologist and biotechnologist) and son Michael Fleck (electrical engineer and innovations manager) began developing and constructing their brewery systems together with former master brewer Fritz Schneeberger.

The Flecks have earned recognition for the special technical features of their brewhouses, such as the external boiler operated with hot water, weighed vessels and patented vertical mash mixer. Their brewing plants feature a high degree of automation and are distinguished by the typical design of both their standard and customized equipment.

To date the family company, now in its second generation, has constructed 182 small, micro- and pub breweries with outputs of 3, 5, 10, 20 or 30 hectolitres in 43 countries on all continents of the world.

Tower brewhouse – a preliminary highlight

During the palpable downturn triggered by the Covid-19 pandemic, the people at Flecks were far from idle; instead, they dug out an old concept they had hidden away in a drawer and applied all of their engineering skill and expertise to produce Flecks Helix, a fully automatic, five-hectolitre tower brewhouse.

About six metres tall, 3.5 metres wide and with its extravagant tank designs, the tower brewhouse is an interesting solution for tall rooms and is a real eye-catcher to boot.

The first plant of this kind was erected in Bergen in a former dairy on the German island of Rügen in Mecklenburg-Western Pomerania for Witchkraft. The company not only makes natural cosmetics, but also now brews beer in its new tower brewhouse. The entire setup has been designed to encourage tours by visitors. In the meantime, a second Helix has been installed at the brewery training centre in Austria.

Special technical features

External boiler

As with all Flecks brewing technology, the external boiler is powered by hot water that has a maximum temperature of 103 °C. The supply of energy is usually hybrid and consists of electricity plus a heat buffer storage tank fuelled by solar power, wood and district heat. The external boiler prevents overheating or underboiling – also at high altitudes – and aims to minimize energy costs and be sustainable. The result is evident in the wide variety in taste of the beers produced. The system is also ideal for beers with a low alcohol content and for malt drinks.

The external boiler has three functions:

- to heat or boil product in the tube coil;
- to provide a hot water circuit for the heating jackets in the mash tun/brew pan and hot water tanks;



Michael (left) and Vinzenz Fleck, managing directors of Flecks Brauhaus Technik in Austria
Photo: Green Rocket

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Twenty- and five-hectolitre brewhouses at the brewery training centre in Frohnleiten, Austria *Photo: Frohnleiten Tourist Board, Rene Vidalli*

- to act as an energy buffer for lower electrical connected loads.

Vertical mash mixer

The patented Flecks Mixer, a vertical mash mixer, enables fast, low-energy agitation without shear force or streaks. It is often installed in combination with light bottom agitators. The temperatures measured in the mash tun/brew pan are thus always current and free of smear fluctuations often caused by agitators that merely rotate.

The mixer is an extremely simple and robust agitation system that is operated pneumatically and has been built into all Flecks mash tuns/brew pans for the last six years. It also perfectly mixes large and tall tanks with just four or five agitations per minute. The shear force is minimal. Mashes with a high viscosity are quickly homogenised. The Flecks Mixer also proves itself when malt grist is mashed in by a chain conveyor like the one installed in the Helix, as it regularly draws the added grist down to the base and dissolves it.

Brewery with a weigher

Precise weighing of the mash tun/brew pan/whirlpool (one vessel) makes for robust and extensive automation and assures product quality.

Tank design

The brewhouse vessels have an unusual shape and are something of a homage to mathematician Euclid. They are clearly designed for their respective functions: the brew pan is wider at the top for optimum boiling, with the lauter tun broadening lower down to create a very wide filter bottom. The spiral heat exchanger in the external boiler perfectly fits into a sphere and is extremely well insulated, forming a real powerhouse at the heart of the system.

Automation

Full automation – necessary for a tower brewhouse – is achieved using Simatic S7 and Flecks brew manager software. The malt is first ground and fed in by a chain conveyor before being mashed in by the Flecks Mixer, followed by a malt quantity check. The mashing programmes are then run, with automatic preliminary dosing, preliminary mashing and then main lautering. Boiling takes place with automatic hop dosing, the temperature is lowered and vapours are extracted in the whirlpool and the wort is automatically cooled with aeration and sampling. The amount of wort is then precisely determined and at the end of the process the spent grain is removed automatically and the entire brewhouse including the wort cooler undergoes CIP. The tower brewhouse is operated and monitored by laptop and smartphone.



A real eye-catcher: the five-hectolitre tower brewhouse *Photo: Flecks*

Simple installation

The Helix consists of components that can be easily brought into a building. Depending on the height of the structure, it comprises three or four segments that are simple to assemble. All parts of the tower brewhouse can be accessed.

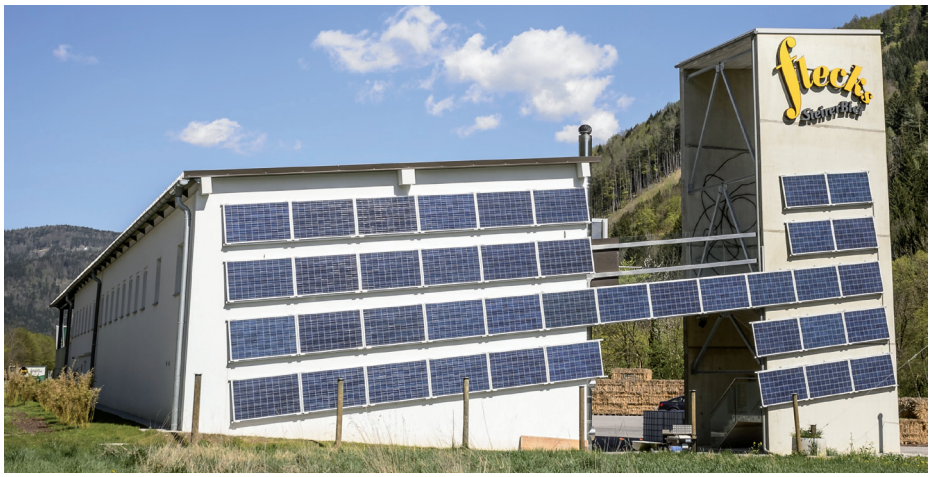
The brewhouse is two storeys high and five to seven metres tall. The construction is self-supporting and built on three columns, with two platforms and three stairways for inspection and maintenance that wind round the brewing vessels, hence the name "Helix".

The tower brewhouse's three structural columns not only support the brewhouse vessels but also accommodate the electric cables, valve manifolds and pneumatic piping. They are thus perfectly incorporated into the system and easy to access.

The Helix comes fully electrically wired ready for connection. The control cabinet



First fully automatic five-hectolitre tower brewhouse in Bergen on Rügen, Germany
Photo: Flecks



Headquarters in Frohnleiten, Steiermark, Austria *Photo: Ulrike Rauc*

can be compactly installed either directly beneath the stairs or at another location in the building. Very little cabling or wiring then needs to be done on site.

New brewing experience

All of the piping and pneumatic valves are visibly arranged and easily accessible, creating an interesting brewhouse design spread out across several floors with a full view of the entire brewing process.

The Flecks Helix tower brewhouse offers guests, visitors and brewers an exciting new brewing experience where the entire beer-making process can be observed from several different levels. This could be further dramatized by the installation of special lighting and sound effects. The tower brewhouse is an ideal option for buildings that are tall but have a small floor area. It is also perfect for tall structures in general, such as two- or three-storey brewery pubs, shopping centres, hotel lobbies or revitalised industrial complexes where historic architecture forms an impressive backdrop for ultramodern brewery design. On the **www.flecks.at** website the manufacturer provides prospective clients with a transparent price list and configurator that with minimum input computes the possible cost of investment for alternative sizes of equipment and gives a rough profitability assessment by way of orientation. ■