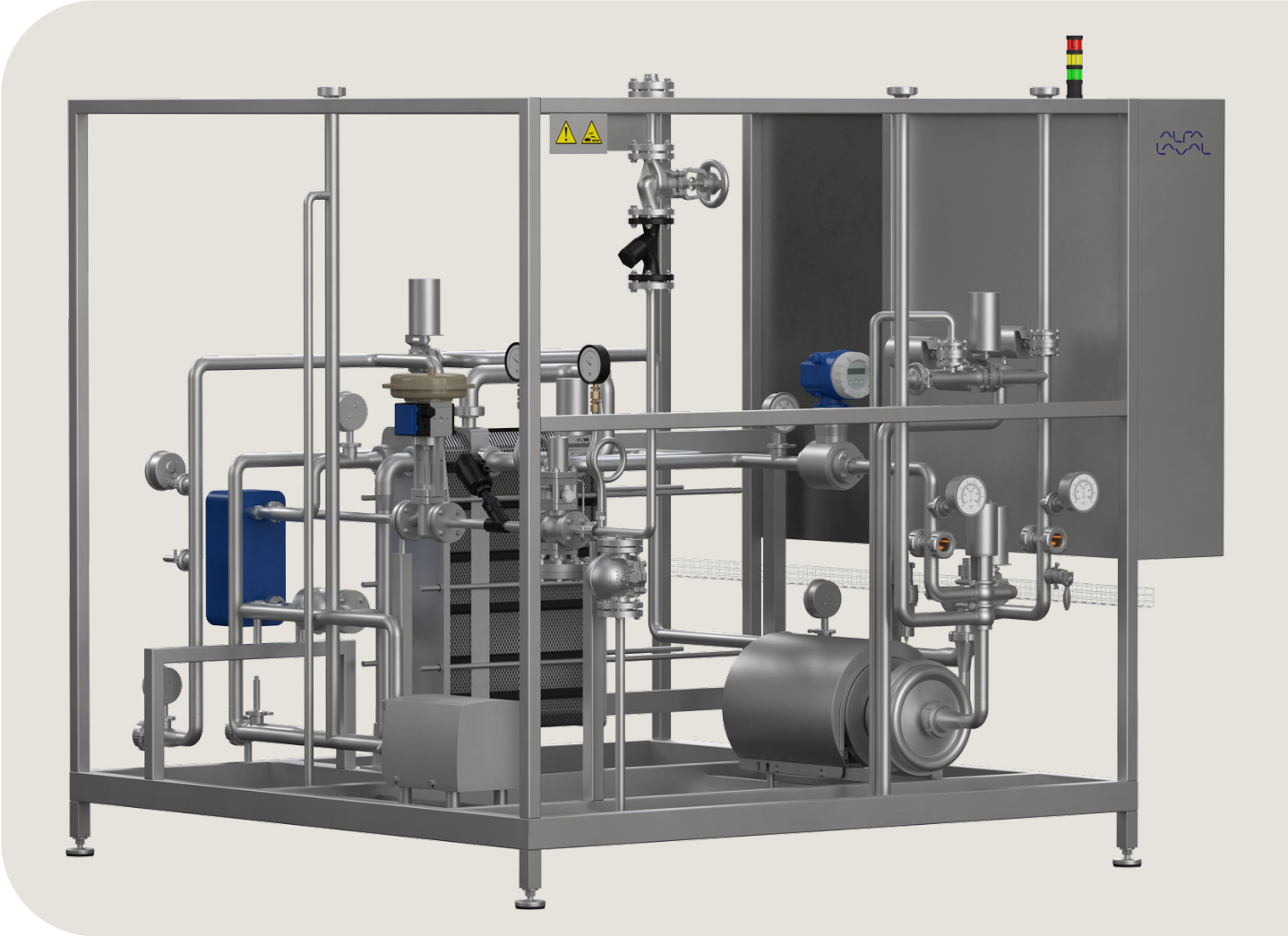
Alfa Laval Yeast thermolyzer

Thermal deactivation of spent brewer's yeast



Introduction

The yeast thermolyzer module is designed to thermally deactivate spent brewer's yeast by raising the yeast temperature above a pre-defined treatment threshold, and holding it at that exact temperature for the specified time. The deactivated yeast can then be used as an ingredient in other products, such as food supplements and animal feed, or disposed of safely.

Application

Thermal deactivation of spent brewer's yeast.

Benefits

- Fully automated with PLC control of all system operations
- Standardized plug-in design for short delivery time
- Pre-assembled and factory tested for a minimum of on-site installation and commissioning
- Low maintenance requirement.

Design

The design is optimized for thermolyzation of spent yeast based on the following conditions:

- Yeast inlet/outlet temperatures of 15°C and 25°C, respectively
- Yeast inlet/outlet pressures of >50 kPa and 200 kPa, respectively
- Holding temperature of 75°C for 10 seconds at maximum capacity (or up to 30 seconds, using optional equipment)
- Regeneration effect of 85% (or up to 90%, using optional equipment).

Automation: The operator selects specific functionality via an easy-to-use colour touch panel that displays a comprehensive array of process data (including current status, actual and set point temperatures, alarm conditions and controller settings).

Cleaning and hygiene: The yeast thermolyzer module is designed for complete cleaning-in-place (CIP) of all contact surfaces and is therefore equipped with a built-in (CIP) programme. The cleaning frequency depends on yeast quality, holding temperature and fouling level. A typical routine would involve CIP with caustic acid once per shift, followed by acid cleaning once a week. In order to significantly prolong the periods between the required CIP sequences, the module can be flushed with hot water. The hot water connection is placed adjacent to the yeast inlet to make it as easy as possible to undertake automatic flushing during operation.

Options

- Enhanced thermolyzation (30 seconds holding time)
- Enhanced energy recovery (up to 90%)
- CIP booster pump
- Thermolyzed yeast cooling
- Cooling media recirculation
- Hot water flush monitor
- Steam pressure regulation
- Automatic media shut-off valves
- Extended data communication
- Valve position feedback.

Working principles

The yeast thermolyzer module renders spent brewer's yeast inactive by using a plate heat exchanger in tandem with a holding cell to heat the yeast in order to destroy the cell membranes. The heat treatment at the heart of this process is achieved through a combination of temperature and holding time – normally 75°C for 10 seconds. The heat treatment can be expressed in Pasteurization Units (PU), calculated via the formula:

$$PU = t/60 \times 1.393^{(T-60)}$$

in which t is the holding time (in seconds) and T is the pasteurization temperature (in °C).

The incoming flow of cold yeast is heated to the target temperature for thermolyzation in two steps, using a high-efficiency Alfa Laval plate heat exchanger. The yeast is first heated in the heat recovery section, where it circulates against already thermolyzed yeast, and then in a heating section, in which circulating hot water is used to bring the yeast to the specified temperature.

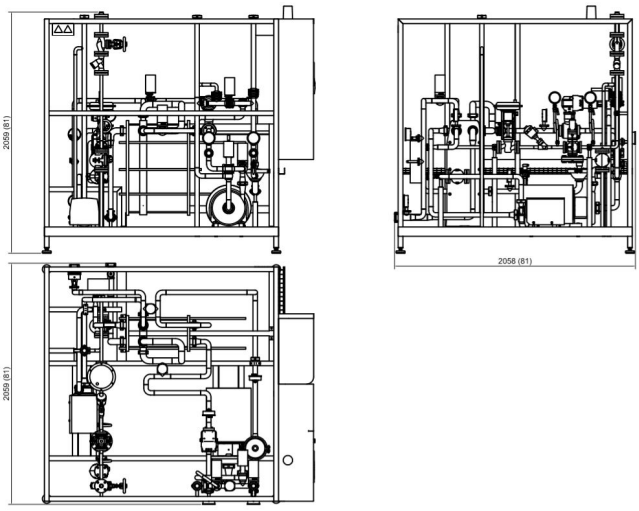
The yeast is held at this thermolyzation temperature in a holding tube for the prescribed time to achieve the desired PU effect, before being regeneratively cooled in the heat recovery section of the heat exchanger.

Technical data

Standard capacity ranges	25, 50 and 100 hl/h
Heat recovery	75-85%
Max. working pressure	1.0 MPa (10 bar)
Utility data	Depending on capacity range

Dimensional drawing

Approximate dimensions and weight depending on capacity range, e.g. 25hl/h, L=2m W=2m H=2m. Weight 1500 kg.



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