

Lab-Scale HTST/UHT System Unit

Specifications

The unit should have heat exchangers having both tubular and plate heating systems (PHE) which can be interchangeably used.

The unit should contain following:

1. A feed tank
2. A product pump
3. Instrumentation for the heat exchangers
4. Electrically powered hot water boiler with recirculation pump.
5. The system should be controlled by an integral Programmable Logic Controller (PLC) with a high-resolution full colour touch screen panel providing the operator interface.
6. The heat exchanger should give product output temperatures below 5°C.
7. Feed pump, which has two speed ranges. The low speed range is for UHT processing and a higher range for Clean-In-Place (CIP) or for processing at higher throughputs and lower temperatures.

Tubular Heat Exchangers

The standard tubular heat exchanger should be provided with a series of concentric 316 stainless steel tubes to heat and cool the product.

A gentle preheat can be achieved by adjusting the hot water flow to the first two tubes. Four further heating tubes for both 2s and 15s holding time are provided as standard.

The cooling tubes (set of four) which can be used either as a single cooling stage, or split into two stages of tubes for enhanced cooling when used in conjunction with a cooling water supply and a chilled water/glycol supply.

Plate Heat Exchanger

The standard plate heat exchanger, comprising a regeneration section, a heating section and a cooling section, made of miniature 316 stainless steel plates. Holding tubes of 2s and 15s should be provided as standard.

The system should also contain **Homogeniser with interconnecting plate** which can be fitted into the regeneration section and permits connections to an upstream (i.e. before heat treatment) homogeniser to be made. It should include a temperature sensor on the homogeniser return, which can be displayed on the data logger. Homogeniser interconnecting plate enables the homogeniser to be connected after the heat treatment (downstream).

Note: only one interconnecting plate should be fitted at a time.

Cooling: Two stage cooling option should be provided with a complete additional cooling stage. The second cooling stage can be used in conjunction with a chilled water/glycol supply for the best possible product cooling. Output temperatures below 5°C should be possible, dependant on the product and the flow rate.

Variable Holding Tube

The system should have provision of variable holding time (seven different holding times between 30s and 120s. The system should also be compatible for providing low holding time for UHT (1 or fraction of sec).

Heat Exchanger Service Unit

Feed pump

Progressing cavity variable speed pump, with standard and high flow modes.

Particulate handling: 0.8mm

Fibre handling: 25mm

Standard flow: 10-30 l/hr

High flow: up to 120 l/hr

Pressurised water circulator

Water capacity: 4.0 litres

Pump circulation rate: Variable up to 6 l/m

Water temperature: 165°C maximum

Safety cutouts for Low level, High pressure

Mechanical pressure relief valve

Heating duty: 4kW maximum

Tubular Heat Exchanger

Number of tubes: 10 (2 preheat, 4 heating, 4 cooling)

Tube diameter (product side): 8.1mm

Overall diameter: 15.8mm

Length (heated): 0.4m

Material: 316 Stainless steel

Assembled test pressure: 10 bar

Working pressure: 15 bar (maximum)

Standard holding tubes: 2s and 15s

Plate Heat Exchangers

Plate overall dimensions: 75 x 115mm

Effective diameter: 3.0mm

Plate thickness: 0.5mm

Wetted perimeter: 153.0mm

Materials:-

Plates: 316 Stainless steel

Gaskets: Food grade silicone

Working pressure: 10 bar (max)

Standard holding tubes: 2s and 15s

Number of plates: 9 heating, 10 cooling, 10 regeneration

Variable holding tube

Nominal holding times (@10 l/hr): 15, 30, 40, 60, 70, 90, 100 seconds.