

The Armfield Laboratory Pasteuriser is a benchtop unit designed to provide practical training for the operation of a large modern pasteurising plant. The unit may also be used for project work, in particular to measure the effects on product quality of different process conditions.

**HTST PASTEURISATION OF MILK
DESTRUCTION OF SPOILAGE ORGANISMS
ARRESTING OF ENZYME ACTIVITY
ARRESTING OF YEAST ACTIVITY
QUALITY CONTROL**



The Armfield Laboratory Pasteuriser

Process Capabilities

- ▶ Operation of a continuous HTST pasteurisation plant using selected liquid foods
- ▶ Learning the importance of Clean-In-Place (CIP) procedures
- ▶ Varying and controlling holding times
- ▶ Measuring heat transfer coefficients in a plate heat exchanger, for various plate and gasket configurations
- ▶ Measuring heat recovery in a regenerator

Features/Benefits

- ▶ Miniature plate heat exchanger
- ▶ Fully self-contained design with integral hot water system
- ▶ Choice of holding tubes
- ▶ Variable product temperature and holding time
- ▶ Control console incorporating comprehensive instrumentation
- ▶ CIP facility benchtop operation
- ▶ Tests can be carried out quickly and easily
- ▶ Simulates the conditions used in a production plant
- ▶ Small quantities of liquid product can be processed

Description

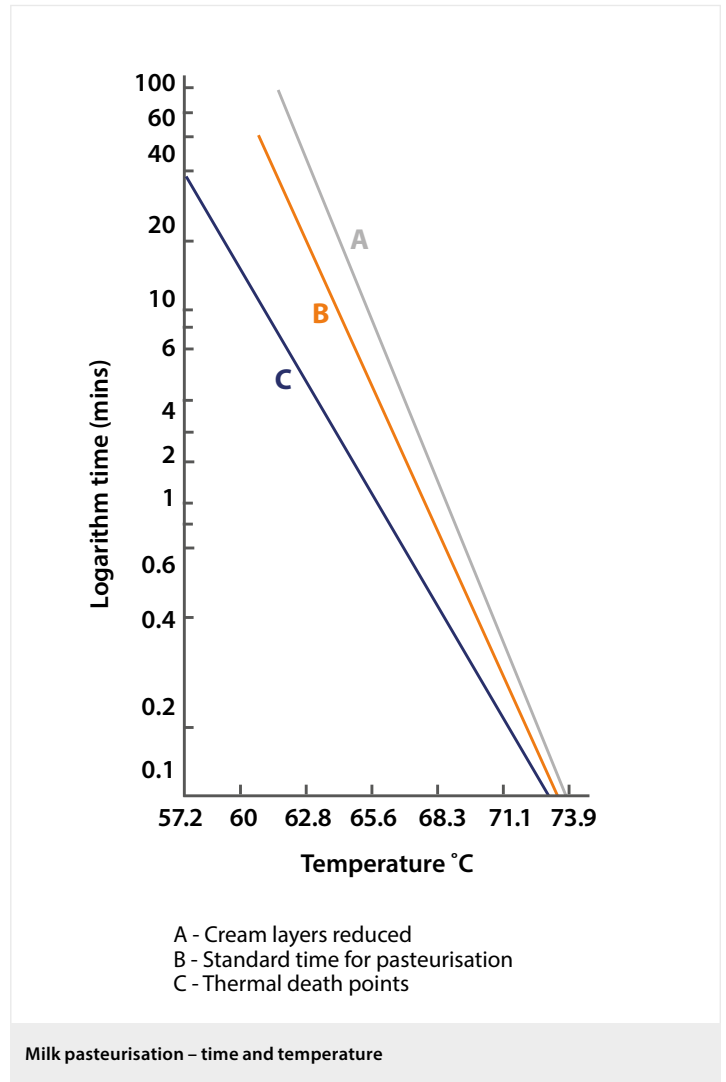
This self-contained laboratory unit is suitable for HTST (high temperature, short time) pasteurisation of up to 20 litres/hour of a wide variety of low-viscosity liquid foods. Products that may be pasteurised include raw milk, nectars, fruit juices, skimmed milk, ice-cream mix, soft drinks, pharmaceuticals and margarine emulsion.

A CIP (clean-in-place) facility is incorporated which allows disinfection, pre-rinsing, detergent washing and final rinsing. The ability to vary process conditions has been built into the unit in the form of the following features:

- ▶ Variable speed, peristaltic, hygienic feed pump allowing flow rate variations
- ▶ Plate-type stainless steel heat exchanger – the cooling, regenerating and heating sections, mounted on a common frame work, are easily dismantled to allow re-configuration and inspection of the heat transfer surfaces
- ▶ Electrically heated hot water circulating system for both pasteurisation and CIP cycles – any required holding tube outlet temperature is set on the indicating microprocessor-based power output controller of the water heater
- ▶ Stainless steel holding tube, allowing holding times between five seconds and two minutes
- ▶ Flow rates of feed pump, cooling water and hot water are monitored accurately
- ▶ Temperatures in the system are monitored with thermocouple sensors at each of six chosen locations (nine available)
- ▶ Maximum process temperature 85°C



Laboratory pasteuriser heat exchanger



Process description

After an initial disinfecting process, the raw liquid is placed in the feed tank [5] and pumped [4] to the regenerative section [2] of the heat exchanger. The liquid passes to the heating section [3] to be brought up to pasteurising temperature. Any product not at the required temperature after passing through the holding tube [6] is diverted back to the feed tank by a diverting valve [7] through the action of the temperature controller [10].

Heating is accomplished using water at a high flow rate only 5-6°C hotter than the pasteurising closed-circuit system [8] also controlled by temperature controller [10].

The product then passes back through the regenerator [2] and the cooler [1] to storage. (The final cooler [1] has been designed to achieve product temperatures below 10°C provided a chilled water unit is available in the laboratory.)

The regenerator is capable of achieving a high degree of heat recovery by using the surplus heat from the outgoing hot pasteurised liquid to preheat the cold liquid feed.



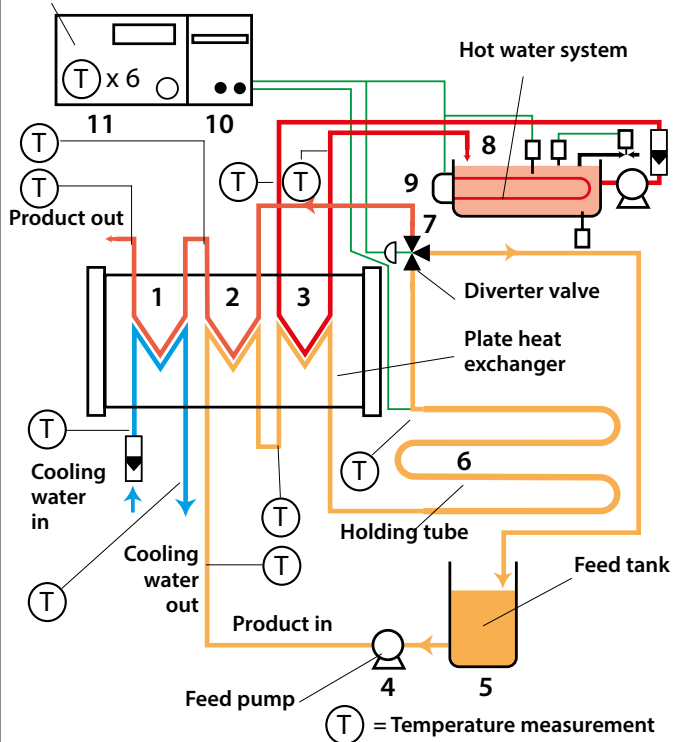
Instrumentation

- ▶ Individual conditioning for each temperature sensor
- ▶ Digital display unit with 6-way selector switch for temperature indication
Display resolution $\pm 0.1^\circ\text{C}$, accuracy $\pm 1^\circ\text{C}$
- ▶ Data logging outputs: 6-channel analog output 0-1V proportional to temperature
- ▶ Output port (on/off switch) for monitoring
3-way diverter-valve operation



Display unit

Temperature control and digital readout



Schematic diagram of the FT43 Laboratory Pasteuriser

- | | |
|------------------------|--|
| 1 Cooling section | 8 Hot water system |
| 2 Regeneration section | 9 Immersion heater |
| 3 Heating section | 10 Temperature control |
| 4 Feed pump | 11 Digital readout and computer connection |
| 5 Feed tank | |
| 6 Holding tube | Ⓧ Temperature measuring locations |
| 7 Diverter valve | |



Flow rate indicators

Accessories to FT43A

FT43-DTA-ALITE Data Logging Accessory

This accessory allows the six temperature sensor outputs to be logged on a PC. The package includes all hardware, software and connecting leads required (excluding the PC itself).

The software is compatible with Windows operating systems and provides a user-friendly operator interface with a flexible range of logging and display options. The logged data can be stored and subsequently analysed by most general purpose spreadsheets.

The software requires a PC (not supplied by Armfield), running Windows 7 or above, with a USB port.

Special features

- ▶ Pump: hygienic design peristaltic type with variable-speed drive, maximum capacity 100 l/hr (for CIP)
- ▶ Pipe fittings: stainless steel and food quality silicone tubing
- ▶ Hot water system: 1.5kW immersion type heater, self-filling water tank
- ▶ Hot water pump: magnetic-coupled circulator. Maximum pressure 0.15 bar, capacity 3 l/min
- ▶ Diverter valve: stainless steel, 3-way solenoid type
- ▶ Pasteurisation temperature controller: microprocessor-based controller, providing time-proportioned PID action to the heater, range 0-100°C, accuracy of indication $\pm 0.5^\circ\text{C}$
- ▶ Temperature measurement: 6 sheathed sensors, for use in 9 possible measurement points
- ▶ Process temperatures up to 85 °C
- ▶ A user instruction manual provides installation, commissioning and maintenance data, together with project exercises

Ordering specifications

- ▶ Self-contained, bench-mounted HTST pasteuriser of up to 20 l/hr capacity. CIP facility included. Main components made of stainless steel



Overall dimensions

FT43A Pasteuriser

Length	0.80m
Width	0.60m
Height	0.70m

Control Console

Length	0.35m
Width	0.30m
Height	0.20m

Packed and created shipping specifications:

FT43A with console

Volume	1.0m ³
Weight	145Kg

FT43-DTA-LITE

Volume	0.02m ³
Weight	4Kg

Requirements

Scale



Electricity supply:

FT43A-A:	220-240V / 1ph / 50Hz, 13 amp
FT43A-G:	220-240V / 1ph / 60Hz, 13 amp

Water:

A supply of cold tap water is required for the cooling section.
If a chilled product is required this can be achieved with a chilled water supply or by performing final chilling in a refrigerator.



Ordering codes

- ▶ **FT43A-A:** 220-240V / 1ph / 50Hz, 13 amp
- ▶ **FT43A-G:** 220-240V / 1ph / 60Hz, 13 amp
- ▶ **FT43-DTA-ALITE**

Knowledge base

- > 28 years expertise in research & development technology
- > 50 years providing engaging engineering teaching equipment

Benefit from our experience, just call or email to discuss your laboratory needs, latest project or application.

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