



FT43 Laboratory Pasteuriser showing 45-second holding tube installed

## 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

- > 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

## BENEFITS

- > Tests can be carried out quickly and easily
- > Simulates the conditions used in a production plant
- > Small quantities of liquid product can be processed



FT43 controller



Optional 15-second holding tube included in supply

## APPLICATIONS

- HTST pasteurisation of milk
- Destruction of spoilage organisms
- Arresting of enzyme activity
- Arresting of yeast activity
- Quality control

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.



## 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

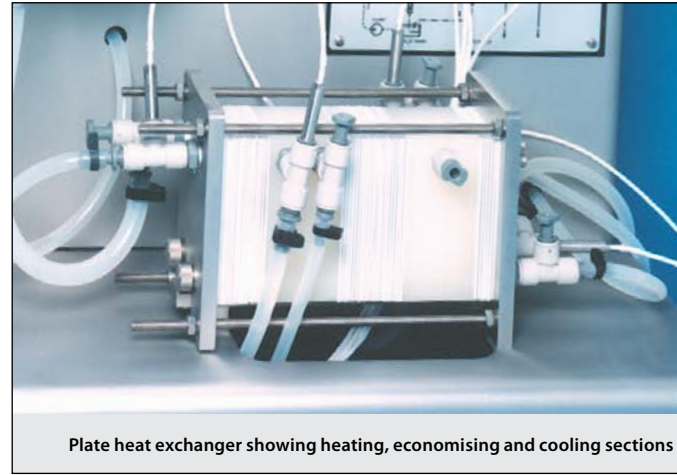
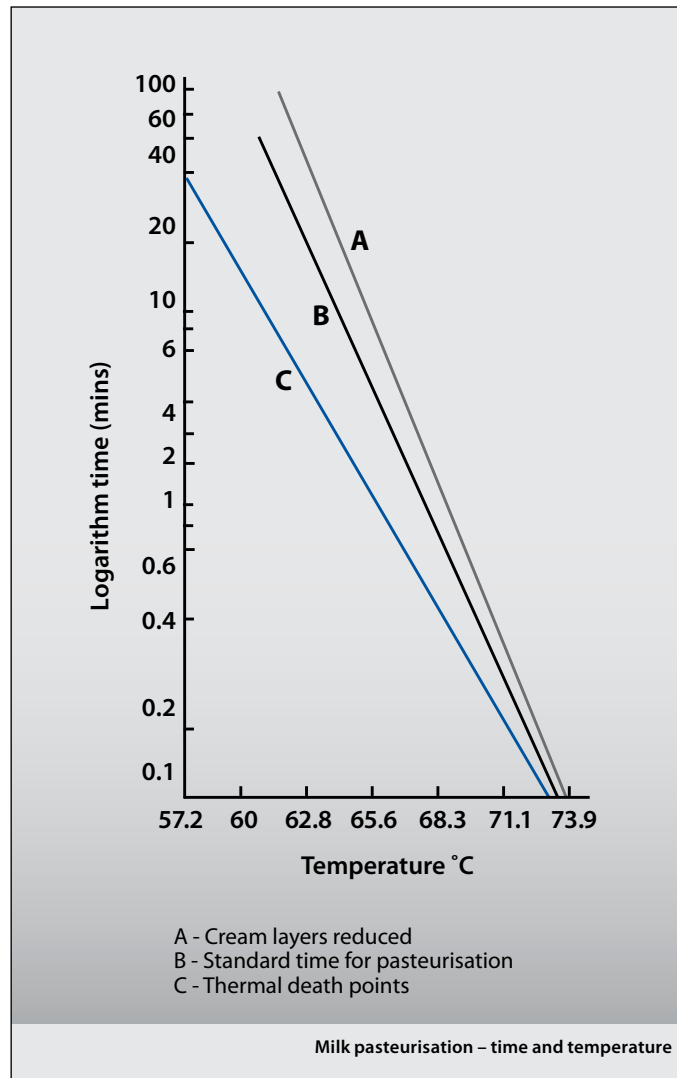


Plate heat exchanger showing heating, economising and cooling sections



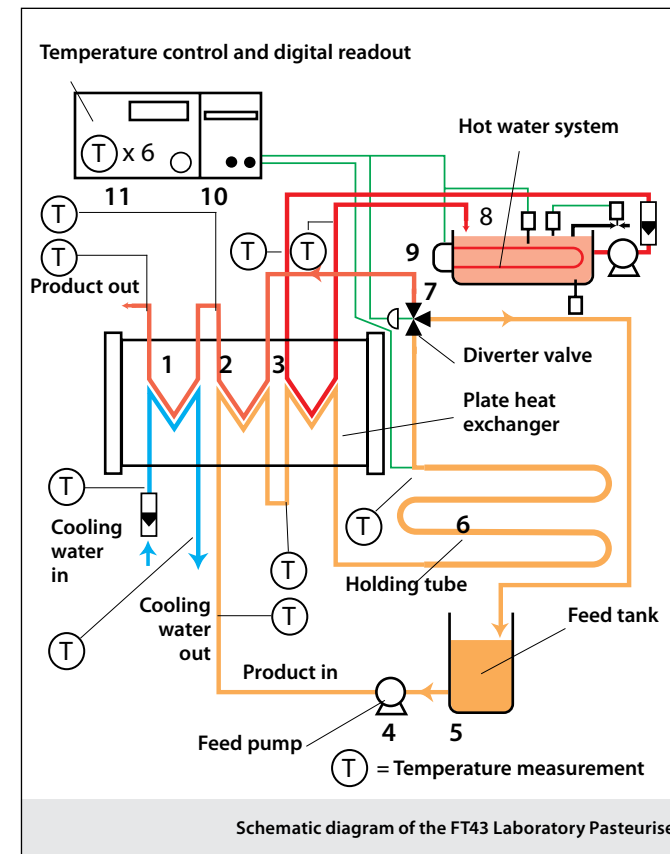
## PROCESS DESCRIPTION

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.



- |                        |  |
|------------------------|--|
| 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       |  |

## 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

### 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 98 or above, with a USB port.

FOR FURTHER INFORMATION ON THE ADVANCED FEATURES OF THE SOPHISTICATED ARMFIELD SOFTWARE VISIT:  
[www.discoverarmfield.co.uk/data/armsoft/](http://www.discoverarmfield.co.uk/data/armsoft/)

## REQUIREMENTS

### Electrical 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.

## OVERALL DIMENSIONS

### FT43A Pasteuriser:

Height: 0.70m

Width: 0.80m

Depth: 0.60m

### Control console:

Height: 0.20m

Width: 0.35m

Depth: 0.30m

## SHIPPING SPECIFICATION

### FT43A with console:

Volume: 1.0m<sup>3</sup>

Gross weight: 145kg

### FT43-DTA-ALITE:

Volume: 0.02m<sup>3</sup>

Gross weight: 4kg

## REQUIREMENTS

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

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

## ORDERING SPECIFICATION

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

### 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



\* Excluding DUM range



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