

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**



FT43 - 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

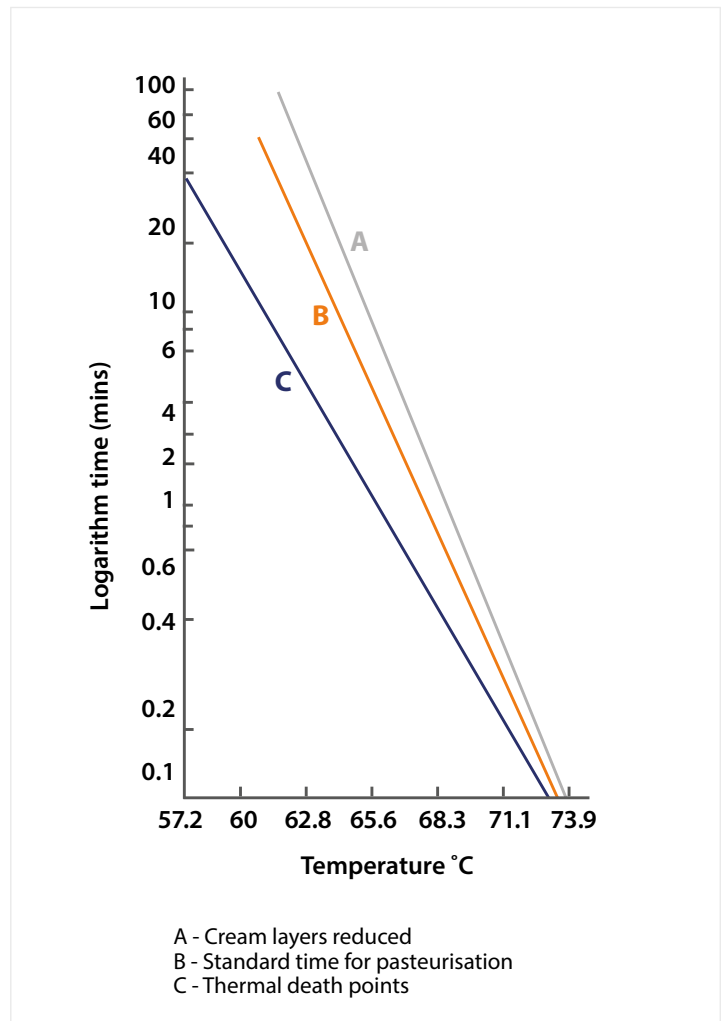
This self-contained laboratory unit is suitable for HTST (high temperature, short time) pasteurisation of up to 20 litres/hour of a wide variety of low-viscosity liquid foods. Products that may be pasteurised include raw milk, nectars, fruit juices, skimmed milk, ice-cream mix, soft drinks, pharmaceuticals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



Milk pasteurisation – time and temperature

## 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.



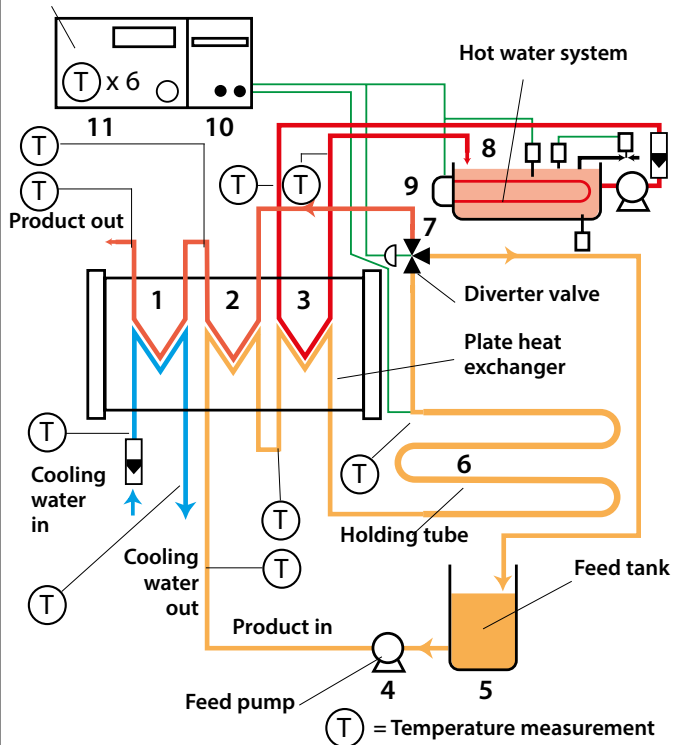
## Instrumentation

- ▶ 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         | T Temperature measuring locations          |
| 7 Diverting 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 30 l/h (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/h 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 <sup>3</sup>
Weight	145Kg

#### FT43-DTA-LITE

Volume	0.02m <sup>3</sup>
Weight	4Kg

## Requirements

## Scale



### Electricity supply:

<b>FT43A-A:</b>	220-240V / 1ph / 50Hz, 13 amp
<b>FT43A-G:</b>	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**

Armfield standard warranty applies with this product

## 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.

An ISO 9001:2015 Company



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## Aftercare

Installation  
Commissioning  
Training  
Service and maintenance  
Support: [armfieldassist.com](http://armfieldassist.com)