

## FT94X HTST/UHT MINI PILOT SYSTEM



### features

- Touch screen control for ease of use
- Compact, mobile, easy to install
- Continuous operation
- Standard throughputs from 30 to >100 L/h (dependent on conditions)
- Units available to 200 L/h on special request
- Process temperatures up to 150°C
- Capable of aseptic operation
- Fully instrumented
- Pre-heating by hot water (indirect)
- Heating by steam (indirect)
- Plate and tubular heat exchanger options
- Controlled product pre-heat and heating temperatures
- Simple and rapid switch over between heat exchangers
- Automatic product divert with temperature on tubular heat exchanger
- Built in clean in place (CIP) and sterilisation in place (SIP) facilities
- Integral USB data logging
- Two-stage cooling option
- Electronic flow meter option

### benefits

- Compact design and easy installation
- Low product hold up (can operate with as little as 15 litre process batches)
- Suitable for producing large batches of material for extensive product testing
- Suitable for a wide range of products due to both plate and tubular exchangers
- From cold start to steady state operation in a matter of minutes
- Switchover from one heat exchanger to another in a matter of seconds
- Designed for easy integration into a process line
- Links directly to sterile filling bench or sealed bag filling systems

**Note:**

For tubular heat exchanger only applications, a version is available with slightly less functionality. Please ask for the FT94LT data sheet.

Miniature-scale research & development technology



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The Armfield FT94X HTST/UHT Mini Pilot system extends the range of continuous operation scaled-down units offered by Armfield to 200 L/h (30-100 L/h for the standard FT94X).

The unit combines full flexibility – plate and tubular heat exchanger options - with comprehensive instrumentation demanded of research and development equipment.

The FT94X is designed for operation as both a stand-alone unit and also for seamless integration into a full processing system with the capability of aseptic packaging of processed product.

### **FT94X Service Unit**

The FT94X service unit contains the services, controls and instrumentation required to operate the tubular and plate heat exchangers described below. The FT94X may be specified with either or both of the heat exchangers. Switching between the two heat exchangers takes a matter of seconds.

The service unit comprises: an 8 inch touch screen control panel with the required controls and displays; a variable speed progressive cavity product feed pump with inlet level sensor and alarm to warn of low product level; a steam-heated hot water system for product pre-heating; automatic steam control valves for product pre-heating and final heating; a centrifugal CIP pump and other facilities required for CIP and SIP.

Sensors show product inlet, pre-heat, final heating and outlet temperatures. Product pre-heat and final heating temperatures are set by the operator. Inlet and outlet product pressure is also shown. There are various service sensors: pressure, level and temperature – see process flow diagram for details.

A sophisticated data logging package allows the measured data to be recorded onto a standard Windows PC (not supplied).

The software records all temperatures, product and steam pressures, feed pump speed and many other sensor values. Data from optional accessories (e.g. the flow meter) is also recorded. Data may be displayed in tables and graphs (both real time and comparisons across previous runs), and may also be exported to MS Excel.

Interface: USB

Software requirements: Win 98, ME, 2000, XP

An alternative data logging system (FT94-46) allows the temperature information to be recorded on an external computer via an ethernet connection without any operator intervention. This is an ideal system for quality control purposes.

### **Tubular Heat Exchanger**

The FT94-20 is a standard tubular heat exchanger design using a series of concentric 316 stainless steel tubes for product pre-heating, final heating and cooling. In all cases the product passes down the inner tube and the heating/cooling medium passes through the annulus. Two heating tubes of 1.5 m length are used to pre-heat the product. Four similar tubes are used for product heating and an additional four tubes are used for product cooling.

Product is gently pre-heated using a hot water system, which is itself heated by steam via a secondary service heat exchanger. In the main heating section the product is indirectly heated using steam itself.

Product is cooled normally using water or chilled water. The cooling section can be configured to allow two stages where the first stage is water/chilled water and the second stage is water/glycol.

The FT94-21 is a set of static mixers for two tubes. These significantly improve heat transfer with more viscous products and can be used for improving both heating and cooling efficiency. Multiple sets can be used to optimise both heating and cooling performance.

The FT94-22 product divert option enables product that has not been processed to a sufficiently high temperature to be diverted to drain thus ensuring product quality and heat treatment.

The divert temperature is adjustable. Diversion is achieved using a low hold-up twin diaphragm valve block operated by compressed air and PLC controlled. Diverted product is cooled in a tubular heat exchanger before being led to drain.

The FT94-20 has a one second holding tube (at 50 L/h) as standard. Contact Armfield for longer holding times.

### **Plate Heat Exchanger**

The FT94-30 uses the sanitary heat exchanger employing the latest plate design for efficient heat transfer. Performance scale-up is straight forward. The standard unit is a three stage system with pre-heat (hot water) final heating (steam) and cooling (water/chilled water).

The plates have a complex pressed profile to maximise turbulence and minimise dead zones. There is a relatively large gap between plates to allow handling of more viscous products. The plates are fitted with food grade Viton paraclip gaskets for easy replacement as these are simply clipped in place rather than glued.

A number of options are available to enhance the performance of the standard plate heat exchanger. These options involve additional plate configurations which can be supplied and fitted or may be easily retro-fitted by the user.

The FT94-32 homogeniser interconnecting plate allows the homogeniser to be connected downstream of the heating section. The plate is fitted into the cooling section.

The FT94-33 two-stage cooling option provides a complete additional cooling stage which can be used in conjunction with a chilled water/glycol supply for the best possible product cooling. Output temperatures below 5°C are possible depending on the product and the flow rate.

An interconnecting link is provided so that the two stages can be operated as a single stage when required.

The FT94-30 has a 5 second holding tube (at 50 L/h) as standard. Contact Armfield for longer holding times.

### Flow meter option (FT94-40)

Type: Electromagnetic

Flow range: 30-100 L/h

Accuracy: <1% error at 50 L/h

### Feed Vessel (FT94-51)

The FT94-51 Feed Vessel option, is a 50 litre stainless steel vessel with lid, fitted with a product outlet valve and a drain (or recirculation) valve. The assembly is mounted on castors for ease of movement.

### Associated Equipment

#### FT83-94 Sterile Filler

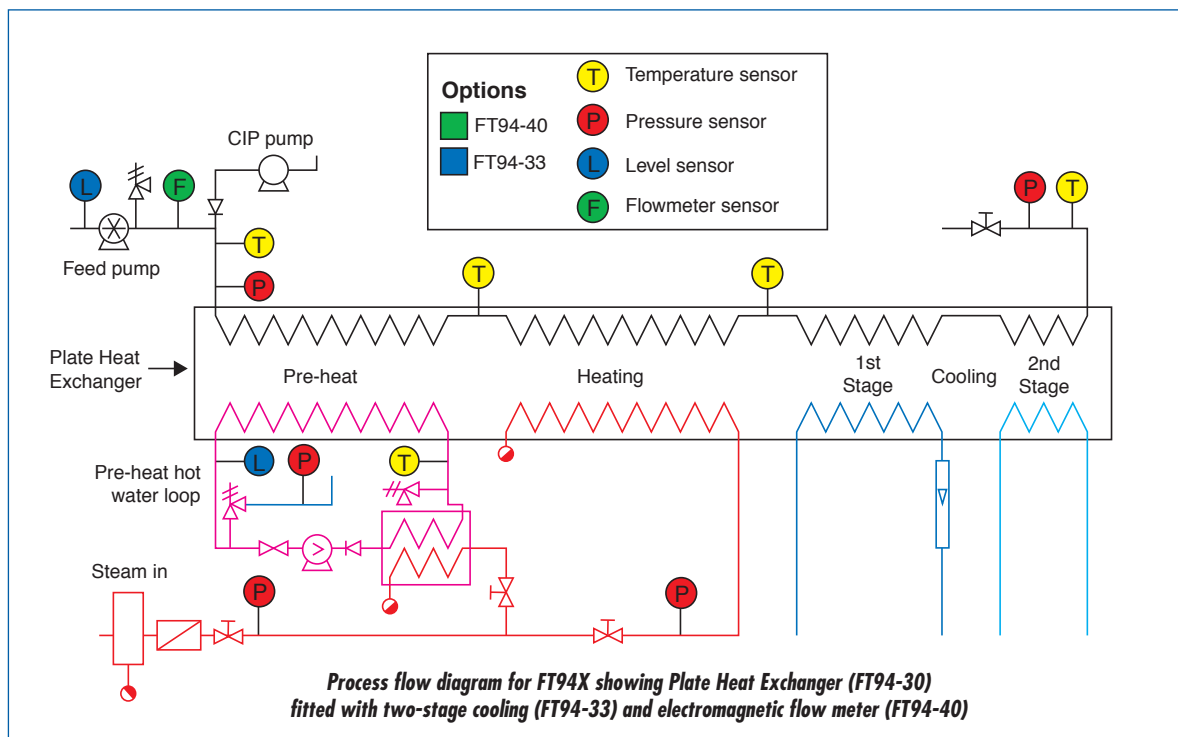
The FT83-94 allows sterile product produced by the FT94X to be packaged into pre-sterilised containers in a sterile environment – see separate data sheet.

The FT94X contains all the necessary functionality to sterilise the FT83-94.

The FT94 can also be interfaced directly to a sterile sealed bag filling system. Contact Armfield for details.

#### Homogeniser Subsystems

Contact Armfield for details of the in-line Homogenisers for use with the FT94X.



## APPLICATIONS

- Baby foods
- Beer
- Condiments
- Confectionery
- Culture Media
- Desserts and Puddings
- Fruit and Vegetable Purees
- Health and Nutritional Products
- Fruit Juices and Cordials
- Gelatine Products
- Gravies
- Cream
- Ice cream
- Sauces and Soups
- Yoghurts
- Meat Pie Fillings
- Milk
- Pet Food
- Pharmaceuticals
- Ready Meals



An ISO 9001 Company



Miniature-scale R & D technology

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## FT94X Service Unit Technical specifications

### Feed pump

Progressive cavity variable speed pump

Solids handling: Soft 10 mm

Hard 4 mm

Flow rate: 30-100 L/h

Discharge pressure: 24 bar (max)

### Pre-heat water system

Water capacity: ~2-3 Litres

Maximum temp: 110 °C

Safety cut-outs: Low level

Temperature

Product pump

Pressure relief valve

### Heating system

External steam supply

Maximum temp: 165 °C

Safety cut outs: Relief valve (7 barg)

Product pump off →  
steam valve closes

Max product heating duty: 17 kW  
(pre-heat + heating)

### Tubular Heat Exchanger (FT94-20)

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

Tube diameter  
(product side): 8.1 mm

Overall diameter: 22.0 mm

Length (heated): 1.46 m

Product volume: 1.0 L

Material: 316 stainless steel

Assembled test pressure: 30 bar

Working pressure: 24 bar (maximum)

### Plate Heat Exchanger (FT94-30)

Plate overall dimensions: 150 x 480mm

Effective area per plate: 0.04m<sup>2</sup>

Plate thickness: 0.6mm

Product volume: 2.5litres

Materials, Plates: 316 stainless steel  
Gaskets: Food grade Viton

Max differential test pressure: 11.5bar

Max balanced test pressure: 12.5bar

Max working pressure: 9.6bar

Working temperature, Max: 170 °C  
Min: -4 °C

Number of plates:

FT94-30: Pre-heating 13, Heating 6, Cooling 13

FT94-33: Secondary cooling 7

### Requirements

Electrical supply:

FT94-A: 220-240V/1ph/50Hz (10 A)

FT94-G: 220V/1ph/60Hz (10 A)

Steam supply:

Heat output of 30kW (min 6.0 bar) – heating medium

Compressed air:

7 L/s (min 7.0 bar, max 10.0 bar) – valve operation

Cooling water:

10 L/min at 2 bar – product cooling

Chilled water:

Required if 2-stage cooling option is specified

### Overall dimensions

Height: 1.55 m (Fitted with FT94-20)

Width: 2.02 m

Depth: 0.70m

### Shipping specification

Volume: 5.0 m<sup>3</sup>

Gross Weight: 708 kg

The Armfield range includes HTST/UHT/aseptic systems, carbonator/filler/cappers, spray dryers/chillers, multifunction batch processors, ice cream freezers, margarine crystallisers, extractors, edible oils processors and more. For further information about our products and services, or to book a trial at one of our trials facilities, please contact us.