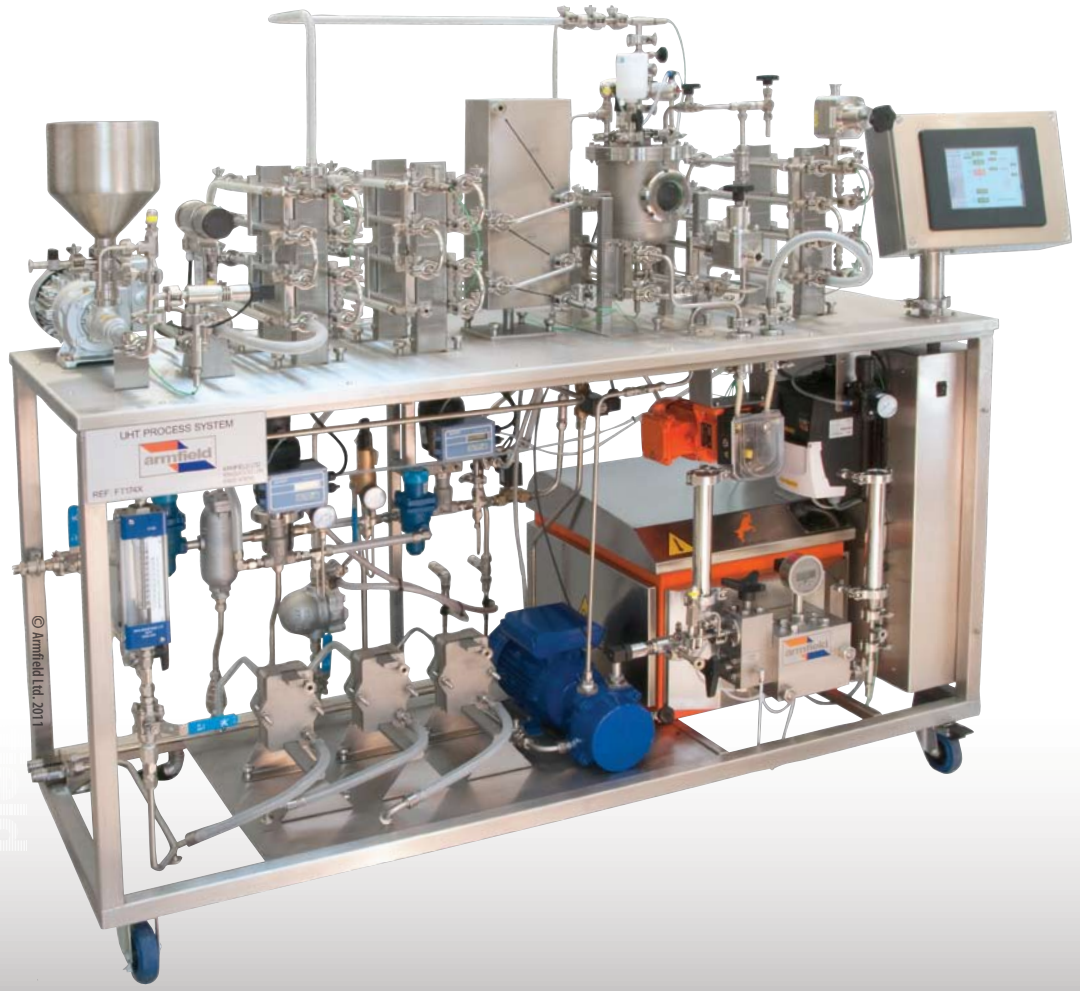
armfield
An ISO9001 Company

FT174X MODULAR MINIATURE SCALE HTST/UHT PROCESS SYSTEM

NEW product



Miniature-scale research & development technology

features

- Totally Modular System
- Direct and/or indirect heating
- Tubular and plate heat exchangers
- Full sterile capability options
- Touch screen control panel for ease of use
- Hygienic fittings as standard
- Integral homogeniser option
- Standard throughputs from 12–60 lph
- Process temperatures >150°C
- Controllable Pre-heat - option
- Built-in CIP facility
- USB data logging - option
- Electronic flow meter option

benefits

- High degree of user configuration
- Rapid start-up
- Switch over between heat exchangers is quick and easy
- Links directly to sterile filling bench
- Small footprint can contain tubular, plate heat exchangers, DSI module & homogeniser
- Low product hold-up

EXTENDED WARRANTY 2 years
2YR WARRANTY ON ALL ARMFIELD PRODUCTS

BM TRADA CERTIFICATION ISO 9001:2008
UKAS QUALITY MANAGEMENT 012

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Overview

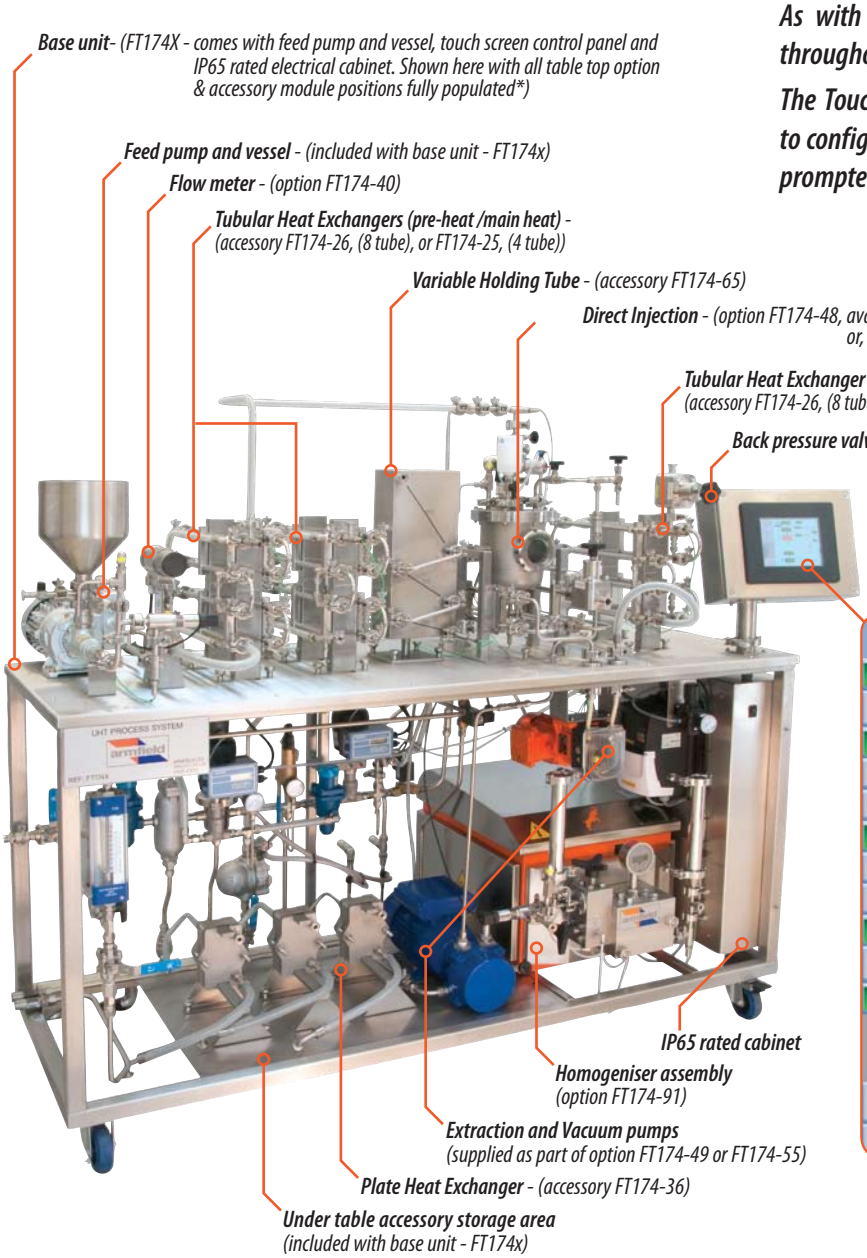
The FT174X is a modular HTST/UHT processing system designed to treat products at flow rates of 12-40 lph or up to 60 lph for water (or similar low viscosity products).

Standard Modules for direct heating (steam injection) or indirect heating (using tubular and/or plate heat exchangers), aseptic processing, upstream or downstream homogenisation and additional chilling are available.

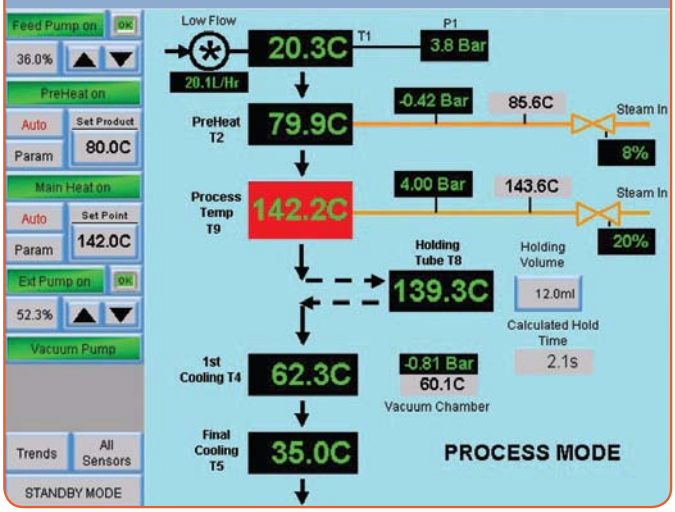
These, along with many other options, allow multiple modules to be included in the same system, giving high process adaptability by reconfiguration of flexible product hoses, using quick release connections. The sterilisation options allow it to be linked to an Armfield sterile filling bench to produce aseptic product, even when using long holding tubes and/or downstream homogenisation.

As with all Armfield systems, it comes with hygienic fittings throughout as standard, it is easy to clean and very flexible in use.

The Touch screen control panel makes it extremely user friendly to configure and monitor processing parameters. The operator is prompted at every stage whenever intervention is required.



Typical screen shot from the touch screen control panel - *(included with base unit - FT174x)*



***Note:** *The above configuration shows a selection of the options[1] & accessories[2] available for the FT174X and represents one of the many configurations made possible by the flexibility of this versatile modular system.*

[1] *options to be defined at time of order*

[2] *accessories can be added at any time*

Description

Base Unit (FT174X)

The base unit comprises a stainless steel table for mounting the process equipment, a feed pump and vessel, the touch screen control panel and all associated electrical controls housed in an IP65 cabinet.

On top of the table are four mounting positions for the selected heat exchangers. There is also space for a variable holding tube.

Under the table top are storage positions for unused heat exchangers, plus space for the optional vacuum and extraction pumps used for direct heating. There is also space for the optional integrated homogeniser.

The system is PLC controlled, with a high resolution TFT 8" colour touch screen panel. All operation functions are controlled from this panel, including configuration, mode of operation (sterilisation, process or clean in place).

Different sets of processing parameters can be edited stored and quickly recalled using the menu capability of the system.

Similarly the ancillary items such as the homogeniser and sterile filler are also controlled from this panel. The system can be quickly and easily interfaced to other free-standing Armfield process items such as a mixing vessel, a chiller (FT63 or FT64) or a sterile filling system (FT83).

APPLICATIONS

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

The base unit provides the services to the heat exchangers.
Four sets of services are provided:

- **Main Heat**

  Steam is applied to the service side of the heating section of the product heat exchanger using an electro-pneumatic steam control valve. The product temperature is measured at the end of the heat exchanger (or holding tube) and this value is used by a PID control algorithm, implemented in the PLC, to control the steam regulating valve ensuring the user defined set point is maintained. The same steam output and control valve is used to provide the steam injection for the optional Direct Steam Injection module

- **Preheat**

  A gentle preheat action is achieved by using steam at sub-atmospheric pressure (and hence low temperature). In this way, steam temperatures at or significantly below 100°C can be produced and low differentials between steam temperature and product temperature are achieved. Stable temperatures of 60°C or less are feasible. Control of the steam pressure/temperature is achieved by a manual steam control valve Automatic PID control is an available option.

- **Cooling**

  Cooling water is applied to the cooling section of the product heat exchanger via a rotameter in order to measure flow rate.

- **Chilling**

  (Optional), using an external recirculating chiller such as the Armfield FT63, FT64 or other chilled water supply.

Feed Pump System

A progressing cavity feed pump is used as this gives consistent volumetric flow rate for a wide range of liquid viscosities. It consists of a stainless steel rotor within a food-grade rubber stator. All metal parts of the pump which come into contact with product are made from 316L stainless steel. A mechanical seal isolates the product from the drive system.

This pump provides a very wide range of flow capability, from as low as 12 lph to as much as 120lph (used for CIP). The pump is fitted with a feed tank and level sensor, a pressure relief valve and temperature and pressure sensors.

Modules, Options and Accessories

Options (to be defined at time of order)

Flowmeter Option (FT174-40)

The standard unit displays an estimated flow rate calculated from the feed pump speed. This is accurate enough for many applications, but where more accuracy is required a flowmeter is available for measuring the product flow rate.

Additional Cooling Stage (FT174-43)

Adds the location points and plumbing for a fourth heat exchanger.

Sterilisation Option (indirect heating) (FT174-45)

Sterilisation is achieved by applying steam onto the outside of the cooling tubes instead of cold water. This sterilises the cooling tubes and gives the power to sterilise a downstream homogeniser. The FT174-45 option provides the switching valves necessary to perform this. Note; sterile operation is limited to single stage cooling.

The FT174-45 is only needed when using indirect heat exchangers for the main cooling (i.e. not using the vacuum cooling vessel). However FT174-45 components need not be removed when a vacuum module is fitted.

Controllable Preheat Option (FT174-46)

This option is required when it is necessary to achieve an accurate pre-heat temperature (e.g. when it is important to homogenise at a particular temperature) or when using the preheat facility by itself for pasteurising at lower temperatures. It is also beneficial when using direct steam injection.

It replaces the standard manual preheat control valve with an automatically controlled electro-pneumatic valve. A PID loop is used to control the temperature to the operators desired set point by actuation of the valve. The option also includes an electronic pressure sensor to measure the steam pressure. This pressure and its equivalent temperature (determined in the PLC) are displayed on the control panel.

Direct Injection Option (FT174-48)

The same steam valve used to provide the main heating on an indirect heat exchanger can be used to provide the steam control for a direct injection heat exchanger. The heat exchangers themselves therefore become interchangeable.

The option comprises:

- steam conditioning unit, built into the service unit frame (including a culinary grade steam filter to clean any impurities from the steam prior to injection)
- steam injection port.

When using direct steam injection, conventional tubular (or plate) heat exchanger's are used in position 1 for preheat and 4 for final cooling.

Vacuum Evaporator Module (FT174-49)

This module is used in conjunction with a DI heat exchanger to evaporate away the injected steam and prevent dilution of the product.

It comprises:

- A module assembly located in position 3, inc:
  - Vacuum vessel with sight glass
  - Back pressure valve on inlet
  - Tubular HE (2 tubes) for cooling prior to the extraction pump
  - Pressure (vacuum) sensor and Temperature sensor
  - Mounting position for the steam injector, FT174-48
- Vacuum pump assembly mounted below the table with isolator valve and bleed valve.
- Extraction pump to pump out the contents of the vessel against the vacuum

Sterile Vacuum Module (FT174-55 (used instead of FT174-49))

This module is an alternative to the vacuum module, which is modified to make sterilisation possible.

The module adds a hygienic divert valve prior to the vacuum chamber, a cooling heat exchanger, a sterile breather and a second valve and steam trap at the filler (FT83). Steam is used to sterilise the system, injected through the direct injection port.

The divert valve allows product to be diverted away from the vessel until it is fully up to temperature keeping the vessel sterile during processing.

Note: Products with certain particulates can be processed on the Direct Steam Injection option. Please consult with Armfield regarding your particular application.

Data Logging Option (FT174-44)

This option allows the various operating parameters to be recorded on a standard Windows PC (not provided) via a USB interface. It also displays calculated values such as steam equivalent temperatures and f0 values. Graphs and tables can be displayed and updated in real time. Data can be saved to Excel file format

Homogeniser Assembly (FT174-91)

Twin piston two stage variable flow rate homogeniser with pulsation damping devices, bleed valve to control input pressure, plus temperature, product line pressure and homogenisation pressure sensors all integrated within the FT174X frame, allowing upstream or downstream processing.

The homogeniser is controlled from the FT174X touch screen. The pump speed can be controlled to automatically match the product flow rate.

Homogenisation pressure:	400bar max
Maximum flow rate:	55 lph

Accessories *(may be added at any time)*

Various heat exchanger and holding tube options can be easily added to the service unit.

Tubular Heat Exchanger (FT174-25)

A single bank of 4 tubes, with temperature sensor. The product flows through the centre whilst the service fluid (heating or cooling fluid) flows through the outer tube.

The FT174-25 is normally used for lower flow rates, (typically 10-20 lph).

Can be used for :

Preheat Main Heat (indirect)
Cooling Chilling

i.e. more than one FT174-25 can be used at the same time.

Static mixers are available to promote turbulence in the tubes and improve heat transfer. (Order code FT174-21 for mixers for two tubes).

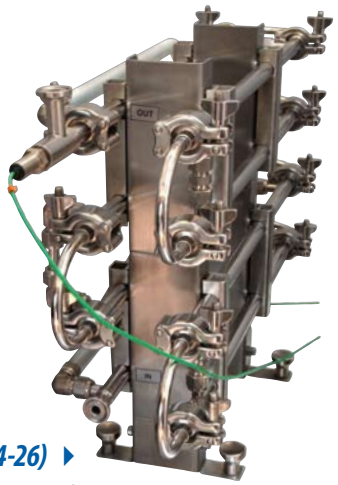
Extended Plate Heat Exchanger (FT174-36) ▸

Single stage plate heat exchanger comprising 18 plates.

Can be used for :

Preheat
Main Heat (indirect)
Cooling
Chilling

i.e. more than one FT174-36 can be used at the same time, and FT174-36's can be mixed and matched with tubular heat exchangers if required.



Tubular Heat Exchanger (FT174-26) ▸

A single bank of 8 tubes, with temperature sensor.
The product flows through the centre whilst the service fluid (heating or cooling fluid) flows through the outer tube.

The FT174-26 can achieve higher flow rates than the FT174-25, (typically up to 60 lph).

Can be used for :

Preheat Main Heat (indirect)
Cooling Chilling

i.e. more than one FT174-26 can be used at the same time, and FT174-26's can be mixed and matched with FT174-25's.

Static mixers are available to promote turbulence in the tubes and improve heat transfer. (Order code FT174-21 for mixers for two tubes).

Pneumatic Back Pressure Valve Accessory (FT174-42)

The FT174-42 is a pneumatic pinch valve which provides much better performance than the standard sprung back pressure valve when used with products containing particulates.

Variable Holding Tube (FT174-65) ▸

Provides nominal holding times of 15, 30, 45, 60, 75, 90, 105, and 120s for a flow rate of 20 lph.

Note: FT174X display shows the actual hold time based on the measured or estimated flow rate used during processing.

Other Holding Tubes

Other Holding tubes can be provided to suit your holding time and flowrate requirements.

Please contact us with your specific requirements.

Further Accessories

Sterile Filler (FT83-174)

When used with one of the sterile configurations (FT174-45 or FT174-55) the FT83 can be used to fill pre-sterilised containers in a sterile environment. The FT83-174 version is completely compatible with the FT174X and is controlled from the FT174X's touch screen.

Recirculating Chiller (FT63 or FT64)

A recirculating chiller, used in conjunction with the additional cooling stage option (FT174-43) allows product to be output at reduced temperatures. The FT63 is suitable for lower flow rates, but the FT64 is recommended for higher flows.

Mixing Tanks

Armfield can offer a range of mixing tanks with low speed agitators, optional heated jackets and optional high shear mixing. Standard sizes are 50L and 100L.

Please contact us with your specific requirements.

Feed and holding tanks

Armfield also offer a range of feed and holding tanks.

Please contact us with your specific requirements.

FT174X in a typical R&D configuration - with a selection of options and accessories including: Homogeniser Assembly (FT174-91), Sterile Filler (FT83-174), Feed/ Holding Tank and Recirculating Chiller (FT63).

Some typical configuration examples

1. Entry Level System, 12-40lph

FT174X Base unit +

FT174-25 (1 off)	Tubular heat exchanger (preheat)
FT174-26 (2 off)	Tubular heat exchanger (main heat and cooling)

2. Aseptic indirect system with controlled preheat and homogenisation, 20-55 lph

FT174X Base unit +

FT174-91	Homogeniser
FT174-25 (1 off)	Tubular heat exchanger
FT174-26 (2 off)	Tubular heat exchanger
FT174-45	Sterilisation Subsystem (indirect heating)
FT174-46	Controllable Preheat
FT83-174	Filler

3. Aseptic direct injection system with controlled preheat, 20-60 lph

FT174X Base unit +

FT174-26 (2 off)	Tubular heat exchanger (preheat and cooling)
FT174-48	Direct Injection Heat Exchanger
FT174-43	Additional cooling stage
FT174-55	Sterile Vacuum System
FT174-46	Controllable Preheat (optional)
FT83-174	Filler

4. Combined Direct and Indirect R&D Research System

FT174X Base unit +

FT174-25	Tubular heat exchanger (preheat)
FT174-26	Tubular Heat Exchanger (main heat)
FT174-48	Direct Injection Heat Exchanger
FT174-26	Tubular Heat Exchanger (cooling)
FT174-43	Additional cooling stage
FT174-49	Vacuum Evaporator
FT174-65	Variable Holding Tube
FT174-46	Controlled preheat

Other Configurations

The above configurations are just a few examples of the many configurations available with the modular FT174X system.

Requirements

Mains Water : 5L/minute at 2 bar (10L/min if FT174-49 or FT174-55 are fitted)

Electricity: 6A 230V 50/60Hz Hz single phase (16A if FT174-49 or FT174-55 are fitted, if the FT174-91 Homogeniser option is fitted, total power requirement is 30A, 230v, single phase or 16A, 400v, three phase) Consult Armfield for other options

Compressed Air: 7 bar

Steam: 6 bar, estimated consumption 15 Kg/hr

Note: Armfield can supply a steam boiler if required, order code UOP10.

Shipping specification

Volume: $4m^3$

Gross weight: 567kg

Overall dimensions

Height: 1.50m

Width: 1.95m

Depth: 0.80m

Note: **The FT174X shown in this data sheet is configured with a selection of the options[1] & accessories[2] available and represents one of many configurations made possible by the flexibility of this versatile modular system.*

[1] *options to be defined at time of order*

[2] *accessories can be added at any time*

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.

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Head Office:

Armfield Limited
Bridge House, West Street,
Ringwood, Hampshire.
BH24 1DY England

Telephone: +44 1425 478781
Fax: +44 1425 470916
E-mail: sales@armfield.co.uk

U.S. Office:

Armfield Inc.
436 West Commodore Blvd (#2)
Jackson, NJ 08527
Telephone: (732) 928 3332
Fax: (732) 928 3542
E-mail: info@armfieldinc.com

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