

The **FB-08** is an attractively finished rectangular bench standing unit. The controls for temperature and fluidising air flow are mounted on a recessed panel on the front of the unit, together with on-off switches for the power supply and the dust extractor and indicators for various functions.

- Temperature range
50°C to 700°C
- Temperature stability, as good
as $\pm 0.2^\circ\text{C}$
- Working volume diameter x depth 165
x 385mm
- PID temperature control
- Digital temperature indication
- Digital temperature set point



The inner container is well insulated and the outer case is vented so that it remains safe to touch even when the bath is operating at its maximum temperature.

The inner container is filled from the top with alumina. When fluidised this medium is heated by four immersion heaters close to the container wall; the control thermocouple is close to the heaters. The heater elements are protected (by a pressure switch operated by the fluidising air) from excessive surface temperatures if fluidisation is lost.

Clean dry air from an external source passes through two filters and two regulators, to reduce the pressure for the cyclone extraction system and for fluidisation.

The fluidising air passes through a flowmeter and then to a plenum chamber from which it is distributed evenly round the inner container.

Dust extraction is by means of ambient air drawn down past the probe plate and through a peripheral slot round the top of the inner container, then through a cyclone to the exhaust filter. Entrained medium, removed by the cyclone and discharged into a special jar accessible from the front of the unit, can be emptied back into the bath at regular intervals.

Sensor Calibration is simple and easy with the FB-08 series fluidised baths.

- Set the bath to the required calibration temperature
- Suspend the sensor to be tested in the bath (using the probe plate supplied) close to the centre of the working volume and allow the bath to stabilise for a short period.
- Calibration can now be carried out using either a certificated standard (Comparison method) or the readout from the FB-08 control unit (direct method).

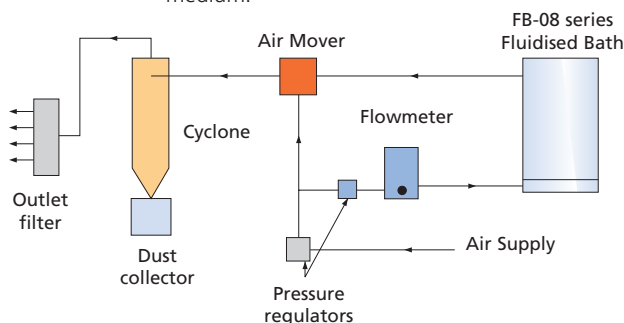
FB-08 series Fluidised baths

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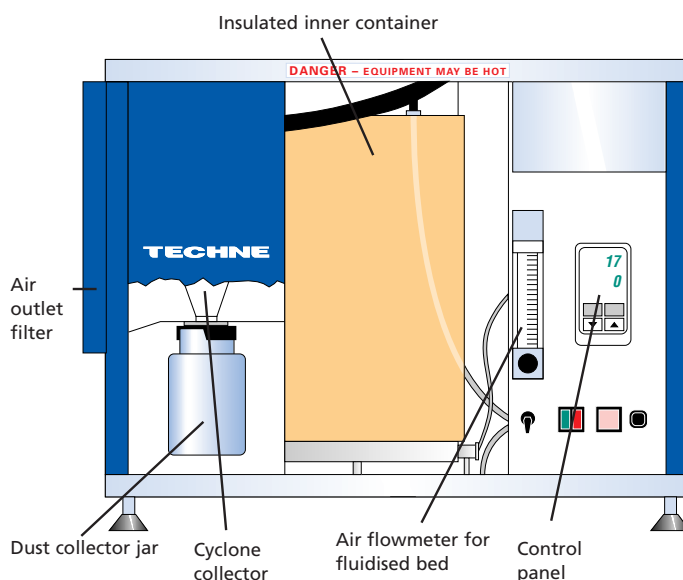
In operation, set the flow of fluidising air by means of a combined control valve and flowmeter. The setting will vary depending on the operating temperature; at higher temperatures a lower flow rate is required for good fluidisation.

Select the required operating temperature by depressing and releasing either the up or down button on the front panel of the control unit. The digital display will indicate the set point value for two seconds and then revert to bath temperature.

Sensors for calibration should be suspended as close as possible to the centre of the working volume. Nothing should be put into the bath which obstructs more than one third of the cross-sectional area of the fluidised medium.



Air flow diagram for FB-08 series fluidised baths.



Particle collection system for the FB-08.

Model FB-08 standard controller Eurotherm 2208L

The Eurotherm controller includes 3 term (PID) control functions, digital set and readout of the bath temperature. Power is switched via a solid state relay.

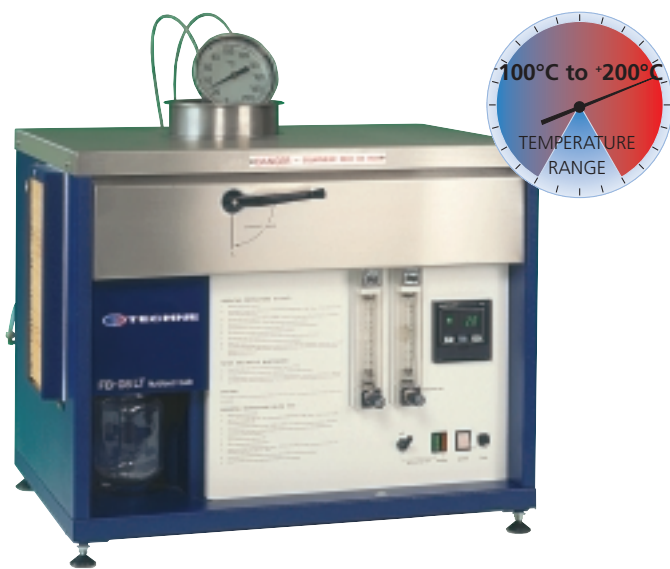
This controller has dual 4 digit display which normally shows the process variable and the setpoint. Individual indicators show manual mode, setpoint rate limit selected and output status. A feature is the ability to 'hide' parameters to allow operators access only to the information required.



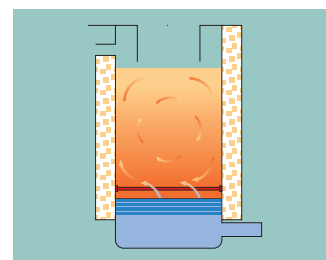
TECHNICAL DATA

	FB-08
Temperature range °C	50 to 700
Temperature stability °C	
Short term @ 50°C	±0.2
Short term @ 600°C	±0.3
Long term @ 50°C	±0.5
Long term @ 600°C	±0.5
Display resolution °C	1
Type of Control	3 term (PID)
Sensor type	K Chromel/alumel thermocouple
Heat up time, minutes	
20°C to 700°C	105
Cooling time, minutes	
700°C to 200°C	165
Air pressure, kPa (psi)	420 (60)
Maximum flow, litres/minute	127
Weight of medium, kg	16
Overall size LxWxH, mm	770x515x600
Working volume	
Diameter x Depth, mm	165x385

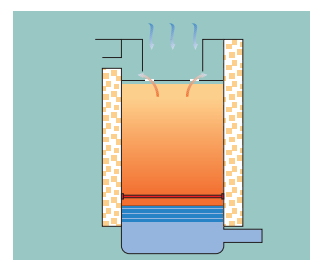
FB-08LT Fluidised bath is a rectangular bench standing unit. It incorporates a cylindrical fluidised bath, three term digital set point controller, digital temperature indicator and two flowmeters for regulating fluidised air and liquid nitrogen (LN2) supply respectively.



- Temperature range -100°C to 200°C
- Control stability, as good as $\pm 0.2^{\circ}\text{C}$
- Working volume diameter x depth 165 x 385mm
- Built in air dryer
- Digital temperature indication
- Digital temperature set point



Circulation of aluminum oxide promotes temperature uniformity.



Airborne particles created by the fluidised bed are drawn in to a peripheral extraction ring connected to a cyclone collector.

This model is specially designed for low temperature operation down to -100°C but is also capable of operating up to $+200^{\circ}\text{C}$. The unit includes all of the special features listed for Model FB-08 fluidised bath.

The method of operation is similar to Model FB-08 except that it has provision for connection to a liquid nitrogen (LN2) supply and is fitted with an air drying system (compactly mounted on the back of the unit). An air dryer is necessary to avoid condensation of water when the fluidising air at ambient temperature is introduced into the cold fluidised bed. The LN2 supply is regulated by a flowmeter on the front of the unit (which actually controls the flow of nitrogen gas leaving the bath) and the gas is exhausted together with fluidising air (which has passed through the bed) to atmosphere. At low temperatures the top opening of the bed is completely closed, using the blanking plate provided, to avoid warm ambient air being drawn into the bed. The LN2 flows in a helical tube wrapped around the outside of the cylindrical stainless steel container holding the fluidised bed. Temperature is sensed by a platinum resistance thermometer and is indicated on a large digital display.

The entire system is completely self-contained. All that is required is a supply of liquid nitrogen and air, an electrical supply

and you have a dry, safe calibration bath working down to -100°C with considerable precision.

Sensors for calibration should be suspended as close as possible to the centre of the working volume. Nothing should be put into the bath which obstructs more than one third of the cross-sectional area of the fluidised medium.

TECHNICAL DATA

	FB-08LT
Temperature range $^{\circ}\text{C}$	-100 to $+200$
Temperature stability $^{\circ}\text{C}$	
@ 200°C	± 0.2
@ -100°C	± 0.5
Display resolution $^{\circ}\text{C}$	1
Type of Control	3 term (PID)
Sensor type	PT100
Heat up time, minutes	
20°C to 200°C	30
Cooling time, minutes	
200°C to -100°C	90
Air pressure, kPa (psi)	420 (60)
Maximum flow, litres/minute	170
Weight of medium, kg	16
LN2 consumption, maximum litres/hour	7
Overall size LxWxH, mm	770x615x600
Working volume	
Diameter x Depth, mm	165x385

Model FB-08LT standard controller Eurotherm 2204E

The Eurotherm is simple to operate and provides 3 term (PID) control functions.

Digital set and readout of the bath temperature. Power is switched via solid state relay. Parameters within the microprocessor are factory pre-set to obtain the optimum performance from the fluidised bath.



The FB-08C has been designed to allow for calibration of thermal sensors over the temperature range 50°C to 700°C with minimum supervision and works in conjunction with a supervisory computer via an RS232 (or optional IEEE488) interface. Basic control programmes are set by the operator allowing for the control of set temperature, incremental temperature steps, dwell times and control of dead bed state.

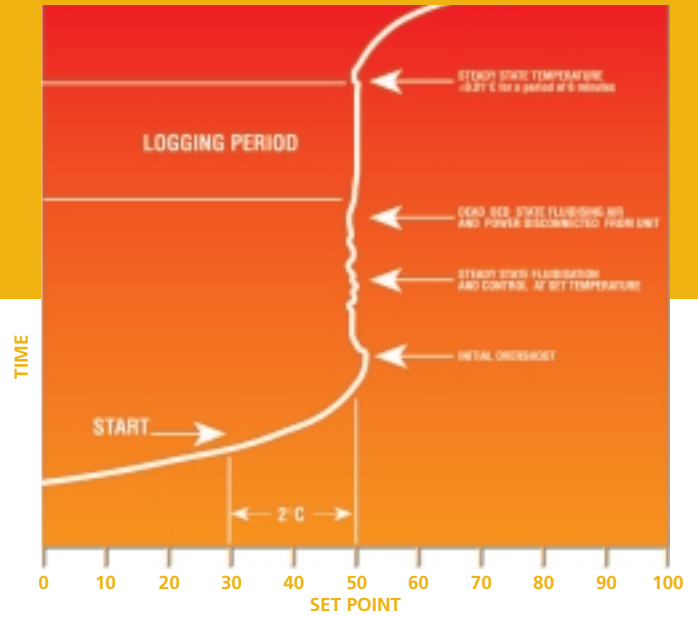


- Temperature range 50°C to 700°C
- Temperature stability, as good as $\pm 0.01^\circ\text{C}$
- Working volume diameter x depth 165 x 385mm
- PID temperature control
- Multiple set points and dwell times can be set by computer/programmable controller

To allow the operating temperature of the fluidised bath to be adjusted from a remote source while the bath is unsupervised, an automatic fluidising air control system is fitted which alters the air flow rate according to the temperature of the fluidising medium. This automatic air feature is controlled by electronics which switch five solenoid valves. These valves are opened and closed in various combinations, providing eighteen air flow rates corresponding to eighteen different temperatures throughout the operating range.

Where an ultra stable temperature condition is required a "dead bed" state can be programmed into the control system. During this "dead bed" state the air and electrical supply to the fluidised bed are switched off. For a period of up to 6 minutes the fluidised bed becomes an isothermal mass without heat input and very low heat loss. Under these conditions the stability at the centre of the aluminium oxide is $\pm 0.01^\circ\text{C}$ over the range of the unit.

DEAD BED RECORDER TRACE



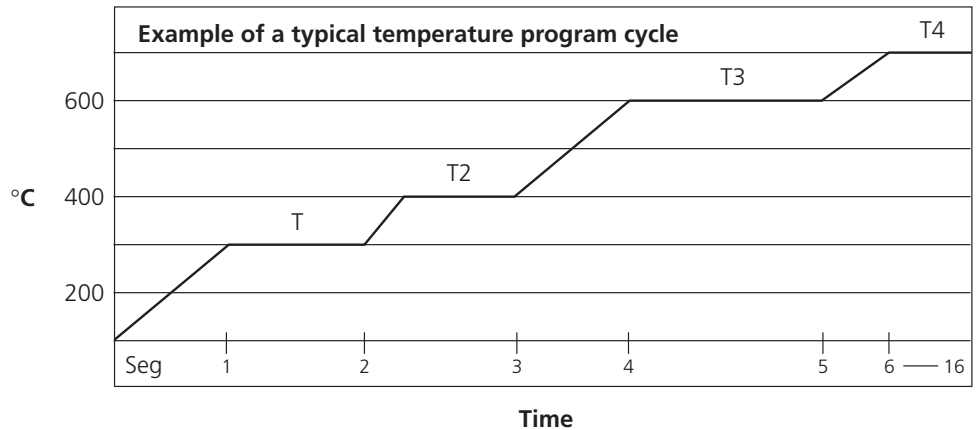
Key features

The air flow to the fluidised thermal mass is automatically adjusted in order to maintain ideal isothermal conditions throughout the temperature range of the unit.

Variable ramp rates of heating can be programmed with the built in Eurotherm 2408 controller or via a PC using an optional software package (please contact our sales office for information).

A probe holder is available as an accessory (see page 28) which is manufactured to special order to suit sensors under test that enhances the thermal conditions (control stability and uniformity) of the temperature zone within the baths.

Example of a typical temperature program cycle



TECHNICAL DATA

	FB-08C
Temperature range °C	50 to 700
Temperature stability °C	
Dead bed.....	±0.01
Short term @ 50°C	±0.2
Long term @ 50°C	±0.5
Short term @ 600°C	±0.3
Long term @ 600°C	±0.5
Display resolution °C	1
Type of Control	3 term (PID)
Sensor type	K Chromel/ alumel thermocouple
Heat up time, minutes	
20°C to 700°C.....	105
Cooling time, minutes	
700°C to 200°C.....	165
Air pressure, kPa (psi).....	420 (60)
Maximum flow, litres/minute	127
Weight of medium, kg	16
Overall size LxWxH, mm	870x515x600
Working volume	
Diameter x Depth, mm.....	165x385

Model FB-08C

standard controller Eurotherm 2408

The Eurotherm provides superb control by using a combination of a highly developed three term control strategy, supported by both self and adoptive algorithms with dual PIC.

The adaptive tune runs continuously in the background. It monitors the process and modifies the control if a disturbance takes process outside preset limits.

The programmer has one programme of 16 segments (4 and 20 program model are also available please contact our sales department).

High resolution ramping with assured soak periods provide a precise capability.



FOR ORDERING INFORMATION SEE PAGE 37

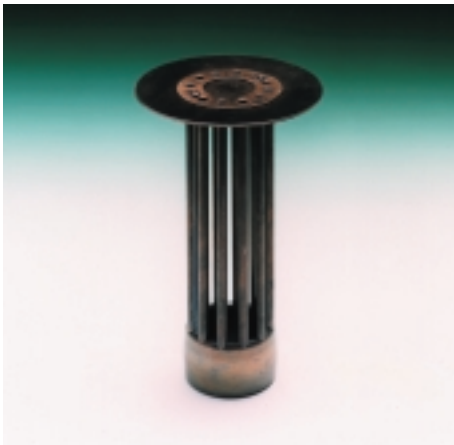
Accessories FB-08 and SBL range of fluidised baths



Basket/Probe Plate (FB-08 series only)

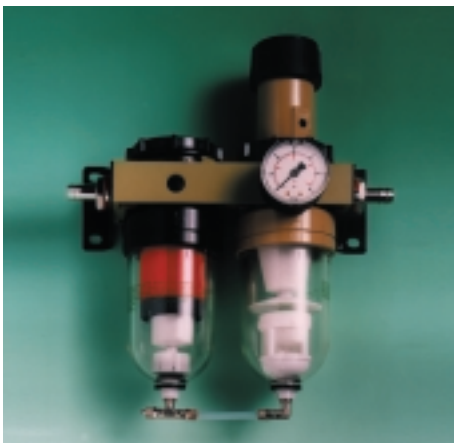
This combined Basket/Probe Plate accessory helps keep items being processed away from the heating elements of the bath and assists retrieval of items from the bath.

The probe plate can be drilled by the customer to suit probes being calibrated and acts as a locator for the sensors in the bath.



Probe Carrier/Holder (FB-08 series only)

This specially designed probe holder is shaped to allow free flow of the fluidising media around the exterior of the holder without creating dead areas. This thermal mass surrounds the sensors to be calibrated, assures constant uniformity, reducing short term temperature fluctuations and improving calibration accuracy. Specify diameter of probes to be calibrated and number of tubes (maximum of eight) per probe holder when ordering. Made to special order only.



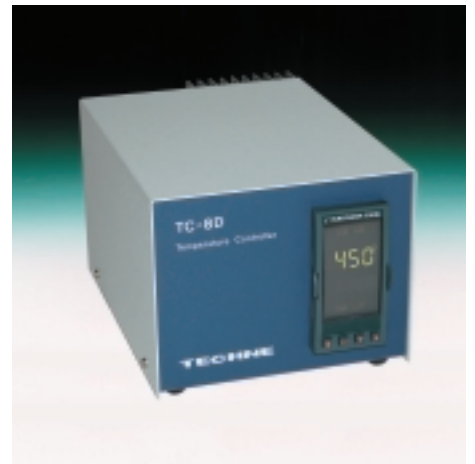
Air Pressure Regulator/Filter

Used in conjunction with air from a factory airline to regulate the supply of air to the fluidised bed as well as the removal of oil, water and solids from the supply air. Fitted with an auto drain system.



**Overspill Flanges
(SBL series only)**

Fits into the top of the inner container of the fluidised bath, having the effect of widening the top of the bath opening. Any excessive spillage from the fluidised bed is held on the flange and directed back into the bath. The flange is manufactured from aluminium with an anodized finish.
(Supplied as standard).



TC-8D PID Control Unit

Suitable for use with the SB Series of fluidised baths (see page 22 for full description.)



**Air Compressor
(SBL series)**

For use when a convenient airline is not available. The compressor offers an oil free air supply suitable for the SBL series of fluidised baths. Unit comes complete with inlet and outlet filters.

**Air Compressor
(FB-08 series – not shown)**

An oil free compressor suitable for the FB-08 series fluidised baths.



**Baskets
(SBL series only)**

Stainless steel baskets are available for each model bath to keep workpieces from touching the heater elements and to make retrieval easier.



Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.



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Please note - Product designs and specifications are subject to change without notice. The user is responsible for determining the suitability of this product.