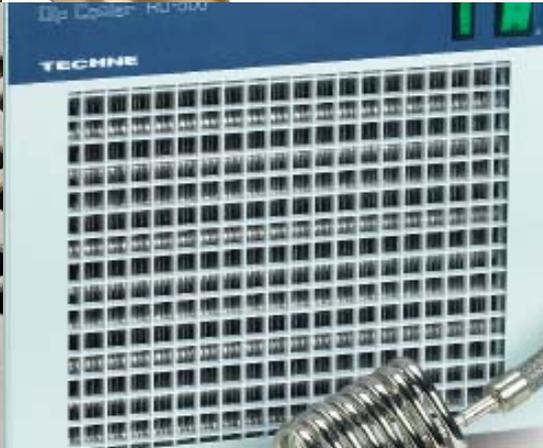




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## Calibration & Industrial Range of Temperature Products





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# Introducing the Calibration Range...



## Dri-Block Temperature Calibrators

The Tecal Series of Dri-Block Calibrators are used as portable temperature calibrators in a wide variety of industries for checking the calibration of thermocouples, RTDs and liquid filled sensors. The checking of temperature is vital in numerous industrial processes – engines, machines, boilers, pumps, storage rooms, air conditioners, compressors used in power stations, chemical plants, refineries, offshore platforms, ships, steel works and instrument companies are all typical application areas.

## Liquid Calibration Baths

A comprehensive range of temperature controlled water baths are available from Techne. Twenty different water bath combinations allow the use of accurate temperatures from  $-40^{\circ}\text{C}$  up to  $250^{\circ}\text{C}$ , ensuring a solution for most calibration, quality control and testing applications.



## Fluidized Temperature Baths

With more than 50 years experience in the field of temperature control, Techne has established itself as a world leader in the design and manufacture of equipment used for both laboratory and on-site temperature calibration, providing the calibration engineer with a precise dynamic stable temperature source.

Exceptional temperature stability and uniformity also make Techne fluidized baths the ideal choice for critical heat treatment procedures. Pioneers in the development of fluidized bath technology, Techne has a wide range of products capable of covering the temperature range  $-100^{\circ}\text{C}$  to  $700^{\circ}\text{C}$ .

Techne fluidized baths are used in materials and component quality control, instrument calibration laboratories and thermal processing production departments. They provide rapid heat transfer and precise temperature control to calibrate and maintain temperature sensitive instruments efficiently and safely.



## Temperature Measurement

The Model 4500 Series Ultra-High Accuracy Thermometer is a hand held thermometer that takes metrology-level temperature measurement to the laboratory, the production floor and the field.

The Tecal AccuTemp offers secondary standard precision with its two PRT/RTD inputs which accept ITS90 probe coefficient entry for accurate probe readout and linearization.

Step up to the Tecal AccuTemp II, which offers 2 channels for reading PRT/RTDs and Thermocouples. The unit can be expanded to read up to 10 sensors with plug and play input cards and advanced data analysis (including mean, min, max and standard deviation as well as a 4000 point data logger), which makes the unit a good choice for advanced temperature profiling and analysis.





# Tecal Portable Dri-Block® Calibrators





## UCal 400+ Portable Dri-Block Calibrator

Calibrate your temperature sensors and systems with our economically priced portable unit!

### Key Features

- Wide temperature range
- Built in program for thermal switch testing
- Maximum temperature of 430°C/806°F
- Fast heat up and cool down
- 10 insert formats available
- Independent over-temperature protection
- Only 9 lbs with included multi-well insert and NIST cert

The UCAL400+ Calibrator provides a safe, dry and constant temperature source, and can be used either on a bench top or as a portable field unit. The unit covers the temperature range from 5°C above ambient up to 430°C using a machined aluminum insert block as the heat transfer medium. The temperature control circuit is built into the unit. Even though the unit heats up rapidly, highly efficient insulation ensures that the case remains cool enough to handle even at maximum operating temperatures. This calibrator has been designed to comply with all relevant Radio Frequency interference and electrical safety regulations.

### Technical Specifications

Temperature Range	5°C/9°F above ambient to 430°C/806°F
Cooling Rate	400°C to 100°C - 21 min
Heating Rate	20°C to 400°C - 12 min
Over-Temp Cutout	Approx. 450°C
Specification at:	Stability after 15 minutes
200°C	+/- 0.03°C (Accuracy +/-0.3°C)
400 °C	+/- 0.05°C (Accuracy +/-0.5°C)
Well Uniformity	0.015°C @ 200°C/ 0.025°C @ 400°C
Display Resolution	0.1°
Fan Cooling	Automatic
Weight	9 lbs
Insert Immersion	4.5"
Dimensions (W x D x H)	20.3 x 20.3 x 22.2 cm
Power	120/240V, 900W

\*The UCAL400+ includes one multi-well insert (1/8", 3/16", 1/4", 5/16" & 3/8" well sizes), power cable, insert extractor, NIST traceable calibration certificate and instruction manual.

### Accessories

7032718	Carrying case
7032722	Insert extractor
7002705	120V mains cable
7002712	Instruction manual

### Ordering Information

Product Code	Model	Net Weight (lbs)
3028900	UCAL400+, 120V, 50/60Hz, 900W	9.0
3028950	UCAL400+, 240V, 50/60Hz, 900W	9.0
7032533	Insert 5 x 1/4" probes	1.1
7032534	Insert 3/8" + 5/16" + 1/4" + 3/16" + 1/8" probe	1.1
7032535	Insert 2 x 3/8" + 2 x 1/4" probes	1.1
7032536	Insert 2 x 1/2" + 2 x 1/4" probes	1.1
7032537	Insert 1 x 1/4" probes	1.1
7032538	Insert blank	1.1
7032574	Insert 1 x 9/16" + 1 x 1/4" probe	1.1
7032575	Insert 1 x 5/8" + 1 x 1/4" probe	1.1
7032576	Insert 1 x 11/16" + 1 x 1/4" probe	1.1
7032577	Insert 1 x 3/4" + 1 x 1/4" probe	1.1



UCal 400+



## Tecal "Field" Range of Dri-Block Calibrators

Techne has developed a range of lightweight dry-block thermal calibrators that operate from 45°C below ambient up to 650°C, for convenient field use. The three models in the Tecal F range incorporate the precision control system used on Techne's Tecal 'H' models to provide excellent reliability and accuracy, with a number of improvements such as an enhanced display resolution of 0.01°C and faster heating and cooling rates. All models offer RS-232 communications and can be used with a wide range of inserts to suit different probe sizes. Automatic fan cooling is standard, with accelerated cooling probes also available.

### Tecal 140F

#### Technical Specifications

Low temperature Portable Field Temperature Calibrator	
Minimum temperature	45°C below ambient (typically -20°C in ambient of 25°C)
Maximum temperature	140°C
Temperature accuracy	±0.3°C
Temperature uniformity	±0.2°C
Temperature stability	±0.05°C (after 10 mins)
Display resolution	0.01°C or 0.1°F
Set point resolution	0.1°C or 0.1°F
Heating rate, 20°C to 100°C	5 minutes
Cooling rate, 100°C to 0°C	9 minutes
Large well	Ø3.8 x 11.4 cm inserts
Fan cooling	Automatic
Dimensions (W x D x H)	20.7 x 28.9 x 27.3 cm
Weight	24 lbs

~Includes one 7032534 insert and calibration certificate.



140F

### Tecal 425F

#### Technical Specifications

Medium temperature Portable Field Temperature Calibrator	
Minimum temperature	20°C above ambient
Maximum temperature	425°C
Temperature accuracy	±0.3°C
Temperature uniformity	±0.2°C
Temperature stability after 10 minutes	±0.03°C at 200°C; ±0.05°C at 425°C
Display resolution	0.01°C or 0.1°F
Set point resolution	0.1°C or 0.1°F
Heating rate, 20°C to 400°C	12 minutes
Cooling rate, 400°C to 100°C	21 minutes
Large well	Ø3.8 x 11.4 cm inserts.
Fan cooling	Automatic
Dimensions (W x D x H)	17 x 25.5 x 27 cm
Weight	14 lbs

~Includes one 7032534 insert and calibration certificate.



425F

#### Options (140F & 425F)

- 10 inserts with variety of well sizes (see page 6 for full range of inserts available)
- Software and cable
- Carry case
- Cooling probe for rapid cooling of block (for 425F)

## Tecal 650F

### Technical Specifications

High temperature Portable Field Temperature Calibrator	
Minimum temperature	25°C above ambient
Maximum temperature	650°C
Temperature accuracy	±0.4°C
Temperature uniformity	±1°C
Temperature stability	±0.09°C (after 10 mins)
Display resolution	0.01°C or 0.1°F
Set point resolution	0.1°C or 0.1°F
Heating rate, 20°C to 600°C	24 minutes
Cooling rate, 600°C to 200°C	21 minutes
Large well	Ø38 x 152 cm inserts
Fan cooling	Automatic
Dimensions (W x D x H)	17 x 30 x 27.8 cm
Weight	21 lbs

-Includes one 7032540 insert and calibration certificate.

### Options

- 10 inserts with variety of well sizes (see page 6 for full range of inserts available)
- Software and cable
- Cooling probe for rapid cooling of block
- Carry case

### Tecal "F" Ordering Information

Product Code	Model	Voltage	Hz	Watts	Net Weight (lbs)
FDB140FR	Tecal 140F with RS-232	230V	50/60	400	24
FDB140FS	Tecal 140F with RS-232	120V	50/60	400	24
FDB425FR	Tecal 425F with RS-232	230V	50/60	900	14
FDB425FS	Tecal 425F with RS-232	120V	50/60	900	14
FDB650FR	Tecal 650F with RS-232	230V	50/60	1100	21
FDB650FS	Tecal 650F with RS-232	120V	50/60	1100	21

Accessories	
Product Code	Model
FSC140F	Soft carry case for 140F
7032819	Soft carry case for 425F & 650F
7002590	RS232 cable*
7032395	Cooling probe for 425, 650 and 700X**

\*Download TechneWorks software at no charge from our website ([www.techneusa.com](http://www.techneusa.com))

\*\*The Cooling probe can be used to rapidly cool the insert - chilled water passes through the probe that fits inserts (3/8" OD).



650F



## Tecal H Range Dri-Block Calibrator

This range of temperature calibrators is ideal for advanced temperature calibration work where programmability, switch testing and ramp/dwell functionality from the unit's display and user interface are required.

Each Tecal H model is shipped with one insert, soft-sided carrying case, calibration certificate and TechneWorks software with cable.

H Version: Set required Temperature and Calibrate; also programmable for switch test and ramp rate.

The H models have:

- 4 line by 20 character LCD and 8 button keypad for entering programs and viewing data.
- The ability to create, use and store programs and test results internally.
- Programming of set temperature, ramp rate, hold time, "pause on switch changeover" operation and hold until pause pressed.
- A switch test input for monitoring hydraulic thermostats.



140H

## Tecal 140H

Using advanced peltier technology and state-of-the-art mechanical and electrical components, the Tecal 140H can rapidly cover the complete temperature range where speed is of the essence without loss of accuracy or stability. The heater block, with a defined measuring zone of 5 cm from the bottom of the block, allows for different length/active area sensors. Although the quoted accuracy and stability is  $\pm 0.3^{\circ}\text{C}$  &  $\pm 0.05^{\circ}\text{C}$  respectively, one can often achieve an accuracy of  $\pm 0.1^{\circ}\text{C}$  and a stability of  $\pm 0.02^{\circ}\text{C}$  with high class RTDs and thermocouples.

### Technical Specifications

Minimum temperature	45°C below ambient <sup>1</sup>
Maximum temperature	140°C
Temperature accuracy in measuring zone.	$\pm 0.3^{\circ}\text{C}$
Temperature uniformity in measuring zone	$\pm 0.2^{\circ}\text{C}^2$
Measuring zone	0 to 5 cm from base of well
Temperature stability after 10min	$\pm 0.05^{\circ}\text{C}$
Display resolution	0.1°C
Heating rate, 20°C to 100°C	5 minutes
Cooling rate, 100°C to 0°C	9 minutes
Programmable ramp rate, °C/min	0.1 to 10, on H version
Switch test	on H version
Comms port, 9 way D type	Full bi-directional RS-232
Weight	32 lbs
Dimensions (W x D x H)	19 x 42.6 x 28.5 cm

<sup>1</sup> In a maximum ambient temperature of 20°C and when using the CH-5 Chiller a temperature of -40°C can be achieved.

<sup>2</sup> At 100°C



See page 6 for full range of inserts available.

### Ordering Information

Product Code	Model	Voltage	Hz	Watts	Net Weight (lbs)
3026600	TECAL 140H	230V	50/60	400	31
3026000	TECAL 140H	120V	50/60	400	31
<b>Accessories</b>					
7032784	Hard carry case for Tecal				

# tecal portable dri-block® calibrators

## Tecal 425H

These calibrators use large aluminum heater blocks to give fast heating and cooling rates which provide high accuracy, uniformity and stability up to 425°C.

### Technical Specifications

Minimum temperature	20°C above ambient
Maximum temperature	425°C
Temperature accuracy in measuring zone	±0.3°C
Temperature uniformity in measuring zone	±0.2°C (at 300°C)
Measuring zone	0 to 5cm from base of well
Temperature stability after 10min	±0.05°C
Display resolution	0.1°C
Heating rate, 20°C to 400°C ( 230/120v )	15 minutes
Cooling rate, 400°C to 100°C	25 minutes
Programmable ramp rate, °C/min	0.1 to 10, on H version
Switch test	on H version
Fan cooling	Automatic
Comms port, 9 way D type	Full bi-directional RS-232
Weight	21 lbs
Dimensions (W x D x H)	19 x 42.6 x 28.5 cm



425H

 See page 6 for full range of inserts available.

## Tecal 650H

For high operating temperatures up to 650°C, the 650 models have large aluminum-bronze blocks which accept large single or multi-hole inserts. These inserts can accommodate probes to a depth of 6", providing high stability and uniformity. All models are equipped with high-powered band heaters and two fans in order to rapidly heat and cool the temperature probe block to the required range of temperatures.

### Technical Specifications

Minimum temperature	25°C above ambient
Maximum temperature	650°C
Temperature accuracy in measuring zone.	±0.4°C
Temperature uniformity in measuring zone	±1°C (at 400°C)
Measuring zone	0 to 5 cm from base of well
Temperature stability after 10mins	±0.09°C
Display resolution	0.1°C
Heating rate, 20°C to 600°C	35 minutes
Cooling rate, 600°C to 200°C	30 minutes
Programmable ramp rate, °C/min	0.1 to 10
Switch test	Yes
Comms port, 9 way D type	Full bi-directional RS-232
Weight	28 lbs
Dimensions (W x D x H)	19 x 42.6 x 28.5 cm

Immersion Depth = 6"



650H

### Ordering Information

Product Code	Model	Voltage	Hz	Watts	Net Weight (lbs)
3026800	TECAL 425H	230V	50/60	700	21
3026200	TECAL 425H	120V	50/60	700	21
3027000	TECAL 650H	230V	50/60	1100	28
3026400	TECAL 650H	120V	50/60	1100	28

### Accessories

7032395	Cooling probe for 425, 650, 700X
7032784	Hard carry case for Tecal

The Cooling probe can be used to rapidly cool the insert – chilled water passes through the probe that fits inserts (3/8" OD).

# tecal portable dri-block® calibrators



## Ordering Information

### Tecal 140F / 140H / 425F / 425H / UCal 400+ Inserts (4.5" immersion depth)

Product Code	Description	Net weight (lbs)
7032533	Insert 5 x 1/4" probes aluminum	1.1
7032534*	Insert 3/8" + 5/16" + 1/4" + 3/16" + 1/8" probe aluminum	1.1
7032535	Insert 2 x 3/8" + 2 x 1/4" probes aluminum	1.1
7032536	Insert 2 x 1/2" + 2 x 1/4" probes aluminum	1.1
7032537	Insert 1/4" probe aluminum	1.1
7032538	Insert blank aluminum	1.1
7032574	Insert 9/16" & 1/4" probe aluminum	1.1
7032575	Insert 5/8" & 1/4" probe aluminum	1.1
7032576	Insert 11/16" & 1/4" probe aluminum	1.1
7032577	Insert 3/4" & 1/4" probe aluminum	1.1

\*Included with each Tecal 140F/H, 425 F/H and UCal 400+

### Tecal 650F / 650H Inserts (6" immersion depth)

Product Code	Description	Net weight (lbs)
7032539	Insert 5 x 1/4" probes aluminum bronze	2.4
7032540*	Insert 3/8" + 5/16" + 1/4" + 3/16" + 1/8" probes aluminum bronze	2.4
7032541	Insert 2 x 3/8" + 2 x 1/4" probes aluminum bronze	2.4
7032542	Insert 2 x 1/2" + 2 x 1/4" probes aluminum bronze	2.4
7032543	Insert 1 x 1/4" probe aluminum bronze	2.4
7032544	Insert blank aluminum bronze	3.3
7032570	Insert 9/16" & 1/4" probe aluminum bronze	2.4
7032571	Insert 5/8" & 1/4" probe aluminum bronze	2.4
7032572	Insert 3/4" & 1/4" probe aluminum bronze	2.4
7032573	Insert 11/16" & 1/4" probe aluminum bronze	2.4

\*Included with each Tecal 650F/H



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## Tecal 700X Precision Dri-Block Temperature Calibrator

The Tecal 700X offers precise temperature control stability up to 700°C. This unit gives market leading stability and accuracies up to and above the melting point of Aluminum at 660°C. For optimum performance, you can count on Techne thermal solutions.

- Economically priced
- Wide temperature range
- Switch test functions
- Large multi-hole fixed block with slim inserts to match most common size probes
- Solid block giving unrivalled temperature uniformity
- Rapid heating and cooling rates.
- New built USB connection to TechneWorks software package

The Tecal 700X Block calibrator utilizes a special heater block design, giving optimum temperature uniformity and rapid heating rates. The block has 6 fixed bores, in either metric or imperial sizes with a slim insert matching any of the bores. This block is designed to give unrivalled uniformity across the block but also to allow maximum flexibility between test probe sizes. The block design allows fast heat up and cool down rates, while minimizing the weight of the unit.

### Technical Specifications

Minimum temperature	Ambient + 25°C
Maximum temperature	700°C
Display accuracy	± 0.25°C at 660°C
Temperature uniformity	±0.04°C radial and ±0.4°C axial
Temperature stability	±0.03°C (@ 700°C) and ±0.005°C (@ 100°C)
Display resolution	0.01°C selectable °C or °F
Heating rate, amb to 700°C	25 minutes
Cooling rate, 700°C to 100°C	30 minutes
Slim insert blank size (Metric)	Ø1.5 x 15.6 cm long. Fixed block Ø1.5/1/.8/.6/.45/.3 cm
Slim insert blank size (Imperial)	Ø5/8" x 15.6 cm long.
Fixed block	Ø 5/8, 3/8, 5/16, 1/4, 3/16, 1/8"
Fan cooling	Automatic
Communication	USB
Dimensions (W x D x H)	19 x 42.6 x 28.4 cm
Weight	22 lbs

### Ordering Information

Product Code	Model
FDB700XS	Tecal 700X 230V with USB comms
FDB700XP	Tecal 700X 120V with USB comms

### Accessories

Product Code	Model
FSC700X	Soft Carry case 700X
FCAL700	Hard Carry case 700X
Insert blocks - Aluminum bronze Ø5/8" x 15.6" cm long	
FINS7375	Insert Block probe 3/8"
FINS7312	Insert Block probe 5/16"
FINS7250	Insert Block probe 1/4"
FINS7220	Insert Block probe 7/32"
FINS7187	Insert Block probe 3/16"
FINS7125	Insert Block probe 1/8"
FINS7BLI	Insert Block BLANK
FCALUSB	USB cable ip68 mini 'B' to std 'A' type



700X



## Tecal 1200S High Temperature Portable Calibration Furnace

Calibrate with confidence with the Tecal 1200S High Temperature Portable Calibration Furnace! When precise temperature control is essential for optimum performance, you can count on Techne thermal solutions.

### Key Features

- Economically priced
- Wide temperature range
- Simple to use
- Multi-hole insert block for accurate comparison calibration
- Rapid heating rates
- Software available
- Rugged case with carry handle
- NIST Traceable calibration certificate

The Tecal 1200S Calibration Furnace utilizes a special heater design for optimum temperature uniformity and rapid heating rates. The isothermal block assembly is machined from a special alloy giving excellent thermal conductivity which also resists high-temperature oxidation. This block is designed to optimize performance between sufficient mass for good stability/uniformity but a low enough mass to achieve rapid heating/cooling rates and stabilization periods.



1200S

### Technical Specifications

Minimum temperature	400°C
Maximum temperature	1200°C
Display accuracy	±3°C
Temperature uniformity	±0.2°C
Temperature stability	±0.2°C (at 1200°C after 20 mins)
Display resolution	0.1° to 999.9 then 1° to 1200°C Selectable °C or °F
Heating rate, 100°C to 1200°C	20 minutes
Cooling rate, 1200°C to 200°	140 minutes
Large insert size	Ø1.3" x 6.1"
Fan cooling	Automatic
Dimensions (W x D x H)	20 x 30 x 35 cm
Weight	22 lbs

### Ordering Information

FDB1200XS	Tecal 1200S 230V with RS-232
FDB1200XP	Tecal 1200S 120V with RS-232

### Accessories

FCAL1200	Hard Carry case 1200S
Insert blocks	Ø1.3" x 6.1" long
FINS1200C	Insert Block probe Ø1/8", Ø1/4", Ø3/16", Ø5/16", Ø3/8"
FINS1200D	Insert Block probe 2xØ3/16", 2xØ1/4", 2xØ3/8"
FINS1200E	Insert Block probe 6x Ø1/4"
Ceramic Top insulator*	
FCER1200C	Insulator C for block Ø1/8", Ø1/4", Ø3/16", Ø5/16", Ø3/8"
FCER1200D	Insulator D for block 2 x Ø3/16", 2 x Ø1/4", 2 x Ø3/8"
FCER1200E	Insulator E for block 6 x Ø1/4"
FCAL1200	Hard carry case 1200S
5030103	Traceable Calibration at 400, 600, 800, 1,000 & 1,200°C

\*Specify appropriate insulator for insert being ordered.

# tecal portable dri-block® calibrators



## TechneWorks

TechneWorks is an easy to use control software for many of our RS-232 compatible products. This software has been designed to supersede the existing Calsoft and Thermsoft software packages. It will allow customers to carry out all the tasks previously available on Calsoft and Thermsoft, plus many new options on one new package. It is fully compatible with all Techne RS-232 Calibration products including all current models and older discontinued models such as the TU-20C.

Compatible units are as follows:

Dri-Block Calibrators

- Tecal H, S and F models
- Tecal 1200S High temperature Furnace

Thermoregulators

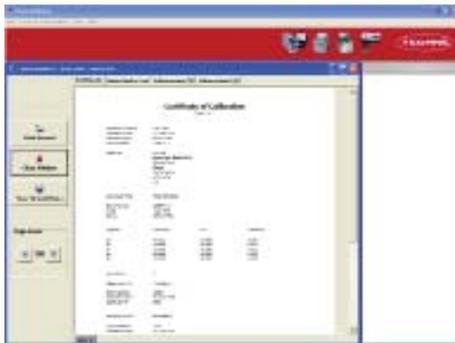
- TU-20D and TU-20HT (and TU-20C)

Precision Digital Thermometer

- Accu-Temp with RS-232 communication option

Fluidized Baths

- FB-08C and TC-8D with RS-232 communication option

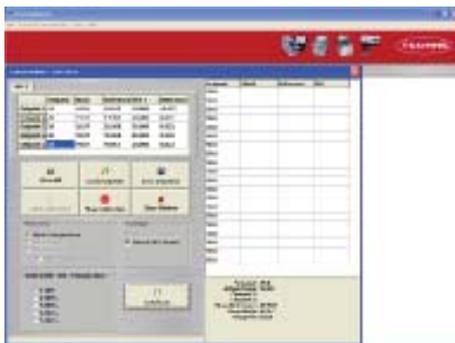


TechneWorks software allows connection to a range of Precision Thermometers, such as the Techne Accu-Temp, ASL model F250, Accu-Temp II and the Cropico 3000 series. TechneWorks software enables you to calibrate thermometers and sensors by comparison to one of the above listed thermometers using a Techne liquid bath or dry block as a temperature source. Alternatively, the bath or dry block calibrator display can be used as the reference. After data is collected, a calibration certificate can be printed.

### Software Features

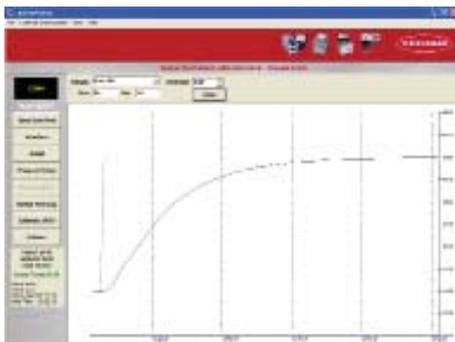
ALL MODELS

- Create, open and save programs with up to 20 set points.
- Specify either °C or °F.
- Specify ramp rates and hold times.
- Log data from the instrument while connected to the computer and export the data in an Excel spreadsheet.
- Open, save, view and print logged data.
- Perform a calibration where temperature of the probe is manually entered.
- Perform an automatic calibration routine where the temperature reference probes data is added automatically.
- Run a program in real time mode.
- Specify the logging interval from every 5 seconds to 60 seconds
- Free download from website

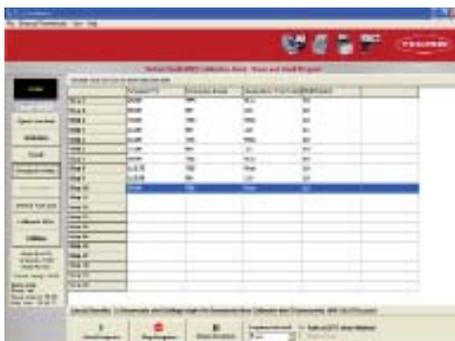


TECAL H MODELS ONLY has above features plus the following:

- Perform a calibration using the User Probe Interface
- Perform a calibration requiring a switch test
- Send programs to the calibrator
- Retrieve programs from the calibrator
- Retrieve test results from the calibrator
- Erase test results  
(downloadable free of charge from [www.techneusa.com](http://www.techneusa.com))
- Note: CD with software included with Tecal H and TU-20HT models



Utilities button is only available on enabled version.





## The CH-5 Chiller Unit

The CH-5 Chiller Unit is designed for use in conjunction with the TECAL 140H Calibrator to achieve calibration temperatures down to -40°C. Chilled water pumped through the heatsinks on the Tecal 140 units allow the Tecal to reach -40°C.

In normal ambient temperatures of up to 20°C the minimum temperature obtainable with the TECAL 140 models is 45°C below ambient; by artificially cooling the heatsink of the units with water from the chiller -40°C can be obtained.

The unit is designed to run on distilled or deionized water.

The CH-5 can also be used to pass cooling water through the cooling coil on the Calibration Baths (LCB) and Cooling Probe (7032395); minimum temperature +10°C.

### Technical Data

Temperature	
Working temperature range	4°C to 15°C
Cooling capacity	400W
Temperature control	Thermostat on/off
Electrical control	Manual
Dimensions (external)	
Length	43 cm
Width	23.5 cm
Height (including pump)	52.4 cm
Bath size:	
Length	30 cm
Width	14 cm
Bath depth	15 cm
Bath capacity	5 liters
Pump capacity	20 liters/minute
Pump head	6 meters with water
Net weight	58 lbs

### Ordering Information

Product Code	Model	Voltage	Hz	Watts	Shipping Weight (lbs)
2040400	CH-5	117	50/60	320	58



CH-5



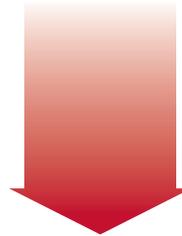
# Liquid Temperature Baths



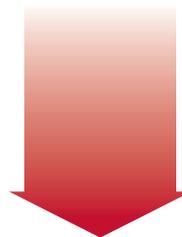
## Water Baths

A comprehensive range of general purpose water baths are available from Techne. Twenty different water bath combinations allow the use of accurate temperatures from  $-40^{\circ}\text{C}$  up to  $200^{\circ}\text{C}$ ; ensuring a solution for most laboratory applications. (See page 19 for our High Performance Liquid Calibration Baths).

First select the unheated stainless steel bath (see page 14) which has the appropriate volume for the application, for example B-26 which has a volume of 26 liters.



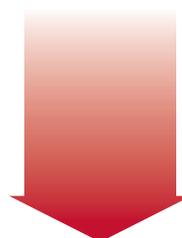
Then add a thermoregulator (see page 15-16) suitable for the required temperature range, for example the TE-10D Tempette is a digital thermoregulator for temperatures between  $-40^{\circ}\text{C}$  and  $120^{\circ}\text{C}$ .



Select any accessories that are required, for example, both gabled and flat lids are available for all bath sizes. Gabled lids particularly allow tall tubes to be accommodated.



If sub-ambient temperatures are required it is necessary to add a cooling mechanism to the bath. Techne recommends the use of a Dip or Flow Cooler for temperatures down to  $-35^{\circ}\text{C}$ . For example, the RU-200 can lower temperatures down to  $-20^{\circ}\text{C}$ . It is also possible to use the cooling coil with a water supply for temperatures from  $5^{\circ}\text{C}$  above the water temperature to ambient.



To assemble the complete system shown opposite the following products are required:



Product Code	Description
1023300	B-26 stainless steel bath, 26 liter capacity
1016200	TE-10D, digital thermoregulator, 117V
7012549	Flat lid for 18 or 26 liter bath
1070500	RU-200 dip cooler, 117V

All specifications are affected by, but not limited to, the size of the bath, the volume of the item(s) being submersed in the bath and the ambient of the test area. Please contact Techne for assistance.

## Unheated Baths

Designed to be used with a clip-on Tempette or Tempunit thermoregulator, these baths are equipped with carrying handles for added safety. All baths have stoved enameled steel outer cases and are supplied with bridge mounting plate to hold the thermoregulator.

Polypropylene spheres can be used to create a ball blanket so as to reduce evaporation and heat loss, while providing instant access to the bath.

### Four bath capacities – 8, 12, 18 and 26 liters

- Stainless steel construction
- Seam-free and corrosion resistant stainless steel inner for easy cleaning
- Rugged splash-proof case
- Integrated carrying handle
- All models come with a standard 3 year warranty

### 48 liter

- 48 liters capacity
- Welded construction
- All submerged parts are made from stainless steel
- Rugged splash-proof case

#### Technical Specifications

Capacity liters		8	12	18	26	48
Dimensions (cm)	Length	26.5	35.4	53	53	59.4
	Width	32.5	32.5	32.5	32.5	36.5
	Height	17.2	17.2	17.2	22.2	29.8
Internal Dimensions (cm)	Length	24	32.9	50.5	50.5	55.9
	Width	30	30	30	30	33
	Height	15	15	15	20	27.4
Top of bath to liquid level max depth (cm)		6.5	6.5	6.5	6.5	6.5
Working length to thermoregulator (cm)		11.5	20.5	38	38	43
Working depth						
- max/min (cm)		13/10	13/10	13/10	18/15	25.5/22.4
Working capacity						
- max/min (liters)		8.0/6.0	11.6/8.4	18.0/13.2	26.0/20.5	48.5/42.5

#### Ordering Information

Product Code	Description
1023000	B-8 stainless steel bath, 8 liter capacity
1023100	B-12 stainless steel bath, 12 liter capacity
1023200	B-18 stainless steel bath, 18 liter capacity
1023300	B-26 stainless steel bath, 26 liter capacity
1023400	B-48 stainless steel bath, 48 liter capacity



B-8



B-12



B-18



B-48

Stability  
 $\pm 0.01^{\circ}\text{C}$



TE-10A

Stability  
 $\pm 0.01^{\circ}\text{C}$



TE-10D

Techne<sup>®</sup> invented the "Clip On" thermoregulator in 1948 and now offers four "Clip On" units. Thermoregulators are designed to be used with the Techne<sup>®</sup> unheated water baths or any other suitable laboratory vessels. They will heat, circulate and safely control the temperature of the liquid in the bath within precise limits.

All specifications are affected by, but not limited to, the size of the bath, the volume of the item(s) being submerged in the bath and the ambient of the test area. Please contact Techne for assistance.

## TE-10A Tempette

- Temperature range of  $-20^{\circ}\text{C}^*$  to  $95^{\circ}\text{C}$
- Excellent temperature stability:  $\pm 0.01^{\circ}\text{C}$  at  $40^{\circ}\text{C}$
- Simple to use analog control
- Suitable for most routine laboratory applications
- User adjustable over-temperature cut-out for unbeatable safety

## TE-10D Tempette

- Temperature range of  $-40^{\circ}\text{C}^*$  to  $120^{\circ}\text{C}$
- Excellent temperature stability:  $\pm 0.01^{\circ}\text{C}$  at  $40^{\circ}\text{C}$
- 4 digit setting with a bright LED digital temperature display
- Suitable for most routine laboratory applications
- User adjustable over-temperature cut-out
- Low liquid level cut-out as standard

### Technical Specifications

Specifications to DIN 12876	TE-10A	TE-10D
Temperature range*	$-20^{\circ}\text{C}$ to $+95^{\circ}\text{C}$	$-40^{\circ}\text{C}$ to $+120^{\circ}\text{C}$
Temperature selection	Analog	Digital
Temperature stability using water @ $40^{\circ}\text{C}$	$\pm 0.01^{\circ}\text{C}$	$\pm 0.01^{\circ}\text{C}$
Method of control	Proportional	PID
Temperature sensor	Thermistor	PRT
Adjustable over-temperature cut-out	Yes	Yes
Low liquid level cut-out	Yes	Yes
Heating/Pumping		
Nominal heater power at 120V (W)	1000	1000
Nominal heater power at 240V (W)	1000	1000
Pump capacity liters/minute	10	10
Pump capacity (mbar)	145	145
Dimensions		
Extension below base (cm)	14.5	14.5
Dimensions L x W x H (cm)	23.7 x 12.4 x 26	23.7 x 12.4 x 26

\* Refrigeration or cooling coil required for near or below ambient operation.  
(See Flow and Dip Coolers and the cooling coil).

## Cooling coil

Connects to the mains water supply; the water being circulated through the coil should be at least  $5^{\circ}\text{C}$  cooler than the set of the bath temperature. (Fits to any TE or TU unit).

### Ordering information

Product Code	Description
1016100	TE-10A, analog thermoregulator, $-20^{\circ}\text{C}$ to $95^{\circ}\text{C}$ , (supplied with clamp), 120V
1016600	TE-10A, analog thermoregulator, $-20^{\circ}\text{C}$ to $95^{\circ}\text{C}$ , (supplied with clamp), 240V
1016200	TE-10D, digital thermoregulator, $-40^{\circ}\text{C}$ to $120^{\circ}\text{C}$ , (supplied with clamp), 120V
1016700	TE-10D, digital thermoregulator, $-40^{\circ}\text{C}$ to $120^{\circ}\text{C}$ ,



## TU-20D Tempunit®

- A wider temperature range of -40°C\* to 200°C
- Excellent temperature stability:  $\pm 0.005^\circ\text{C}$  at 40°C
- 4 digit setting with a bright LED digital temperature display
- This unit incorporates an RS232 connection
- User adjustable over-temperature cut-out
- Low liquid level cut-out as standard

## TU-20HT Tempunit®

- This sophisticated Tempunit® covers a wide temperature range of -40°C\* to 250°C
- Excellent temperature stability:  $\pm 0.005^\circ\text{C}$  at 40°C
- 4 digit setting with a bright LED digital temperature display
- RS232 connection supplied with TechneWorks software package and connecting lead as standard
- User adjustable over-temperature cut-out with an audible alarm fitted
- Low liquid level cut-out as standard



TU-20D

### Technical Specifications

Specifications to DIN 12876	TU-20D	TU-20HT
Temperature range *	-40°C to +200°C	-40°C to +250°C
Temperature selection	Digital	Digital
Temperature stability using water @ 40°C	$\pm 0.005^\circ\text{C}$	$\pm 0.005^\circ\text{C}$
Method of control	PID	PID
Temperature sensor	PRT	PRT
Adjustable over-temperature cut-out	Yes	Yes
Low liquid level cut-out	Yes	Yes
PC Interface	Yes RS232	Yes RS232
Heating/Pumping		
Pump capacity liters/minute	10	N/A internal circulation only
Pump capacity (mbar)	145	-
Nominal heater power at 120V (W)	1500	1500
Nominal heater power at 240V (W)	1800	1800
Cooling coil	Option	Option
Extension below base (cm)	14.5	14.5
Dimensions L x W x H (cm)	23.7 x 12.4 x 26	23.7 x 12.4 x 26
TechneWorks software package	TechneWorks#	TechneWorks#

\* Refrigeration or cooling coil required for near or below ambient operation. (See Techne Flow and Dip Coolers and the cooling coil). The TU-20HT can only be used with the Dip Coolers.

# See page 10 for details

### Ordering Information

Product Code	Description
1016300	TU-20D, advanced thermoregulator with RS232, -40°C to 200°C, (supplied with clamp), 120V
1016800	TU-20D, advanced thermoregulator with RS232, -40°C to 200°C, (supplied with clamp), 240V
1017600	TU-20HT, advanced high temperature thermoregulator with RS232 and TechneWorks software, -40°C to +250°C, (supplied with clamp), 120V
1017650	TU-20HT, advanced high temperature thermoregulator with RS232 and TechneWorks software, -40°C to +250°C, (supplied with clamp), 240V



TU-20HT



## Dip and Flow Coolers

Techne Dip and Flow Coolers work in conjunction with a Techne thermoregulator (see pages 15 and 16). The bath liquid flows through the Flow Coolers, which continually extracts heat from the bath fluid by means of the heat exchanger. The cooling head of the Techne Dip Cooler fits neatly and unobtrusively into the corner of the bath and can be secured with a specially designed mounting bracket (supplied).

Techne Dip and Flow Coolers are designed for use when operating temperatures down to -35°C are required.

- Four models
- Compact refrigeration units for achieving temperatures down to -20°C or -35°C\*
- Cooling head of the Dip Cooler fits neatly into the corner of a Techne liquid bath (RU Series Dip Coolers)
- Designed for use with Techne liquid baths



RU-200 and FC-500 models

### Technical Specifications

Cooling (at 20°C ambient)	FC-200	FC-500	RU-200	RU-500
Minimum achievable temperature	-20 °C	-35 °C	-20 °C	-35 °C
Cooling capacity: 20°C (Watts)	140W	210W	145W	240W
Cooling capacity: 0°C (Watts)	140W	210W	145W	240W
Cooling capacity: -10°C (Watts)	110W	200W	110W	230W
Internal capacity (ml)	200ml	200ml	-	-
Nominal dimensions (excluding handles/coil)				
Overall (cm) - width	23.5	37	23.5	37
length	42	43	42	43
height	30	32.5	30	32.5
Coil dimensions (cm)				
length	-	-	8.5	8.5
diameter	-	-	7.5	7.5
Hose length to coil (cm)	-	-	12.5	12.5
Shipping weight (lbs)	41.8	41.8	41.8	41.8

\*At an ambient of 20°C, using a mixture of 40% water, 40% antifreeze and 20% ethanol.



### Ordering Information

Model#	Product Code	Description
<b>Flow Coolers</b>		
FC-200	1070700	FC-200 Flow Cooler, -20°C, 120V
FC-200	1070750	FC-200 Flow Cooler, -20°C, 240V
FC-500	1070800	FC-500 Flow Cooler, -35°C, 120V
FC-500	1070850	FC-500 Flow Cooler, -35°C, 240V
<b>Dip Coolers</b>		
RU-200	1070500	RU-200 Dip Cooler, -20°C, 120V
RU-200	1070550	RU-200 Dip Cooler, -20°C, 240V
RU-500	1070600	RU-500 Dip Cooler, -35°C, 120V
RU-500	1070650	RU-500 Dip Cooler, -35°C, 240V



FC-200

## Model RB-5A Refrigerated Bath

The RB-5A is a complete refrigerated circulating system for open or closed applications for temperature ranges from -20°C to 100°C. It is supplied with a lid and bridging plate and has a bath capacity of 7 liters.

- Circulating bath with built in refrigeration
- By combining the RB-5A with one of our thermoregulators, four different choices are available to match your specifications and budget. For optimum bath performance, Techne recommends its bath liquids. (See page 21)

### Technical Specifications

Cooling (at 20°C ambient)	
Minimum achievable temperature <sup>1</sup>	-20°C
Cooling capacity at 20°C	145W
Cooling capacity at 0°C	145W
Cooling capacity at -10°C	110W
Dimensions	
Overall Size - L x W x H (cm) <sup>2</sup>	43 x 25 x 56.6
Liquid surface to top of bath - max (cm)	6.5
Internal dimensions - L x W x H (cm)	19.2 x 15.1 x 20
Working length to thermoregulator (cm)	22.4
Working depth - max/min (cm)	18/13.5
Working capacity - max/min (liters)	7/5.5
Shipping weight lbs <sup>3</sup>	68

<sup>1</sup> Using a mixture of 50% of water and 50% antifreeze to achieve -20°C.  
Alternatively 40% water, 40% antifreeze, 20% alcohol to achieve -35°C.

<sup>2</sup> Overall size with controller

<sup>3</sup> Add thermoregulator and bath shipping weight to get shipping weight of complete bath system.

### Ordering Information

Product Code	Description
1071400	RB-5A bath, 120V, 7 liter capacity with built in refrigeration, -20°C to 100°C



RB-5A



## Precision Calibration Baths

The Techne liquid calibration bath (LCB) series offer compact, accurate and reliable liquid baths for temperature calibration of thermal sensors.



- 35°C to 250°C
- Two different capacities available: 7 or 12 liters
- Temperature stability;  $\pm 0.005^\circ\text{C}$  depending on choice of control unit
- Fully insulated bath for excellent heat retention
- Analog or digital temperature selection, depending on choice of control unit
- Includes cover, lid bridging plate, and cooling coil

When temperature calibration is required the compact liquid baths offers excellent stability over the entire temperature range. The LCBs can be also be used for external circulation to maintain temperatures of samples in viscometers, photometers, refractometers, fermenters and other reaction vessels.

All LCB systems offer exceptional thermal stability from -35°C to 250°C. The baths are fully insulated on all sides and base and are fitted with a cooling coil for connection to a cold water supply for use at temperatures around ambient. The minimum temperature achievable is -35°C when a Flow Cooler is added to the system.\* For the full specifications of the thermoregulators (see pages 15 and 16).

Each bath is supplied complete with lid, drain tap, carry handles , a cooling coil and hole with bung to position a certified sensor.

The TechneWorks software package is available for the TU-20 thermoregulators free of charge from [www.techneusa.com](http://www.techneusa.com) (see page 10 for details).



### Technical Specifications

	7 liter	12 liter
Working depth L x W x H (cm)	17.5	30
Dimensions L x W x H (cm)	35.1 x 26 x 23.3	35.1 x 26 x 35.8
Thermoregulator L x W x H (cm)	23.7 x 12.4 x 26	23.7 x 12.4 x 26
Bath opening (cm)	14 x 14	14 x 14

### Ordering Information

Product Code	Description
3022300	LCB insulated liquid calibration bath with cooling coil, 7 liter capacity
3022400	LCB insulated liquid calibration bath with cooling coil, 12 liter capacity

\*LCB baths fitted with a TU-20HT thermoregulator are not suitable for use with a Flow Cooler.

Liquid Calibration Bath	LCB-7/12	LCB-7/12
Thermoregulator	TU-20D	TU-20HT
Bath Capacity	7 / 12 liters	7 / 12 liters
Operating temperature range <sup>1</sup>	-35 to 200°C	Ambient +10 to 250
Working temperature range <sup>2</sup>	25 to 200°C	30 to 250
Stability at -35°C (short term*)	+/-0.015	N/A
Stability at 0°C (short term*)	+/-0.020	N/A
Stability at 50°C (short term*)	+/-0.005	+/-0.005
Stability at 100°C (short term*)	+/-0.015	+/-0.015
Stability at 200°C (short term*)	+/-0.024	+/-0.024
Stability at 250°C (short term*)	N/A	+/-0.040
Uniformity °C (full range**)	0.008	0.008
Accuracy °C (full range)	+/-0.5	+/-0.5

1) With an FC-500 flow cooler;

2) Ambient of 20°C

\*Stability is over a 15 minute period.

\*\*Two SPRT's 3" apart in the working area of bath

## RCB-80 Ultra Low Temperature Liquid Bath

The RCB-80 is a mechanically-refrigerated bench top circulating bath that provides precise temperature control for a wide variety of applications and eliminates the cost and potential hazards associated with using dry ice or liquid nitrogen.

It offers a 4 liter bath capacity with an ultimate low temperature of -80°C. A built in magnetic stirrer, with variable speed control, provides excellent temperature uniformity and stability. A custom-fitted phenolic cover is standard with every unit when a probe holder is not ordered.

### Features:

- 80°C ultimate low temperature
- 4 liter bath size
- Space-saving bench top design
- Built in magnetic stirrer
- RS-232 interface
- Low profile for easy bath access
- With optional probe holder is excellent for temperature sensor calibration
- Includes lid\* and 2 gallons of bath fluid for -80 to 30°C operating range

\*The lid becomes part of the probe holder when it is ordered

### Applications:

- Temperature sensor calibration
- Biological slide freezing
- Tissue freezing
- Pour-point determinations
- Charpy impact testing
- ASTM plastic and metal tests
- Viscosity studies
- Circulation source of controlled temperature liquids
- Controlled-temperature reactions

### Technical Specifications

Heat Removal (Watts/BTUs) @	+20°C	240/815
	0°C	220/750
	-20°C	170/580
	-40°C	150/510
	-60°C	110/375
Temperature Range°C		-80°C to 100°C
Stability @	-40°C	+/-0.02
	-80°C	+/-0.04
Bath Volume		4 liters
Cool down time to -80°C		90 minutes
Chamber Dimensions		
Diameter x depth (cm)		16.5 x 18.5
Display resolution		0.1 standard
Overall Dimensions		
W x D x H (cm)		48 x 61 x 33
Weight		86 lbs
Electrical		230V/50Hz/5A
		120V/60Hz/5A
Warranty		1 year parts and labor



RCB-80  
Ultra low temperature liquid bath



RCB-80 Probe Holder

## RCB-80 Probe Holder

The RCB-80 Probe holder contains five tubes for sensors with diameters (3/8" max) specified by the customer.

### Ordering Information

Model Number	Voltage	Product Code
RCB-80 Unit	120V, 60Hz	1040500
Probe Holder		7012747



## Heat Transfer Fluids

### Benefits and features

- Low viscosity
- Improves bath uniformity and stability
- Enhanced heat-up and cool down rates
- Lower cost than glycol and silicone oil type fluids
- Safe and non-toxic
- Convenient 18 liter (5 US gallon) containers

## High Temperature Heat Transfer Fluid

This high temperature fluid offers industry a practically non-toxic, versatile bath fluid that has proven to be cost effective and thermally stable at temperatures up to +315°C. This fluid has demonstrated excellent performance over a wide range of temperature without compromising economics or system integrity. Unlike the less stable mineral oil based fluid, our high temperature fluid provides the user with the confidence and reliability without the premium price of other fluids. Recommended temperature range +60 to +250°C.

This fluid is not for long term (more than a few hours) continuous use above 100°C as excessive oxidation will occur. As with most high temperature fluids, a fume hood is recommended for operating temperatures above 150°C.

### Technical Information

#### Typical Properties – High Temperature bath fluid Catalog #7012603

Appearance	Clear, light brown, oily liquid
Boiling point	>330°C/626°F
Composition	Synthetic organic hydrocarbon based liquid
Fire point	210°C/410°F
Flash point	180°C/356°F
Auto ignition temperature	330°C/626°F
Specific heat	~0.50 Btu/ (lb) (°F) @ 50°C (122°F)
Viscosity	12cP @ 50°C
Minimum pumpability limit	0°C/32°F
Odor	Bland
Volumetric Expansion from 0°C to 300°C	30.5%
Thermal conductivity at 20°C/68°F	0.135 W/m.K (0.078 Btu/ft. hr. °F)
Recommended use range	60°C to 250°C (122°F to 482°F)

Techn high temperature bath fluid or its vapor, like many other heat transfer fluids, may ignite if released into the environment and exposed to hot surfaces, sparks, open flames, or other source of ignition.

## Low Temperature Heat Transfer Fluid

The low temperature heat transfer fluid is engineered to offer non-toxic and low odor qualities at an affordable price. This fluid will satisfy the expectations of the most demanding modern day customer by providing an environmentally sound and thermally effective heat transfer fluid with a flash point of 61°C (141°F) or greater. The fluid offers a low viscosity rating and unequalled heat transfer characteristics through its entire operating temperature range. Recommended temperature range: -40°C to 125°C. A fume hood is recommended for open baths being operated at temperatures above +50°C.

### Technical Information

#### Typical Properties – Low Temperature Bath Fluid (Catalog #7012602)

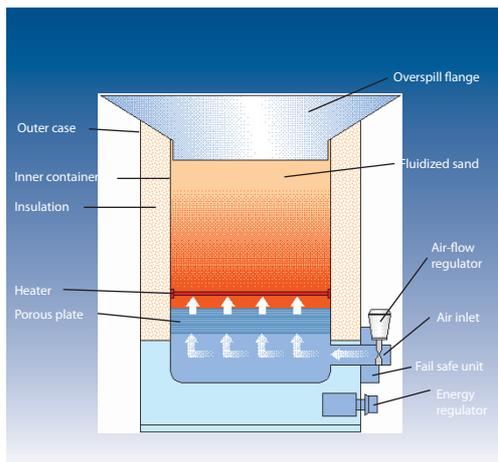
Appearance	Transparent, clear
Boiling point	>191°C / >376°F
Composition	Aliphatic hydrocarbon blend
Fire point	72°C / 162°F
Flash point (Closed cup)	>61°C / >141°F
Flash point (Open cup)	68.8°C / 156°F
Auto ignition temperature	>337°C / >640°F
Critical temperature (estimated)	394°C / 741°F
Critical pressure (estimated)	27bar / 26.7 atm
Average molecular weight	150
Dielectric constant	2.1-2.2
Thermal conductivity at 0°C/68°F	0.1126 W/m.K (0.0668 Btu/(hr)(ft2) (°F/ft)
Recommended temp. range open system	-52°C to 58°C (-60°F to 135°F)
Recommended temp. range closed system	-73°C to 177°C (-100°F to 350°F)

Techn low temperature bath fluid or its vapor, like many other heat transfer fluids, may ignite if released into the environment and exposed to hot surfaces, sparks, open flames, or other source of ignition.



# Fluidized Temperature Baths

# fluidized temperature baths



## Fluidized Sand Baths

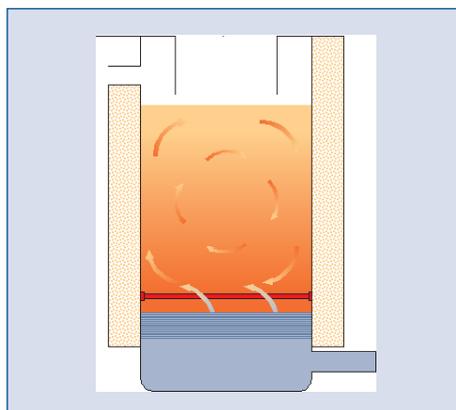
With more than 50 years of experience in the field of temperature control, Techne has established itself as a world leader in the design and manufacture of equipment used for both laboratory and on-site temperature calibration, providing the calibration engineer with a precise dynamic stable temperature source.

Exceptional temperature stability and uniformity make Techne fluidized baths the ideal choice for critical heat treatment procedures. Pioneers in the development of fluidized bath technology, Techne has a wide range of products capable of covering the temperature range  $-100^{\circ}\text{C}$  to  $700^{\circ}\text{C}$ .

Techne Fluidized Baths, for laboratory, industrial, process, quality control and instrument shop use, provide rapid heat transfer and precise temperature control, enabling you to calibrate and maintain temperature sensitive instruments efficiently, economically, and safely. Techne Fluidized Baths offer outstanding advantages of being dry, inert and non-corrosive, as well as being non-abrasive to anything placed in them.

Aluminum oxide particles serve as the heat transfer medium and have no effect on shape or size of immersed objects. This medium consists of a loosely-packed mass of solid particles which are agitated by a vertical flow of gas. In the fluidized state, the aluminum oxide particles become mobile and the bath as a whole displays many of the properties of a liquid. Visually when fluidized the aluminum oxide looks like liquid boiling vigorously or molten lava bubbling. The bed of levitated particles presents a very large surface area through which heat is transferred to immersed objects. Typical heat transfer rates are 60 to 120 Btu-hr-sq ft- $^{\circ}\text{F}$ . (To the left you can see the cutaway diagrams of a fluidized bath.)

Fluidized solids have no melting or boiling point, thus solidification which occurs in cooling salt baths and fumes from hot oil baths are eliminated. Heat transfer characteristics between the fluidized bed and the solid interface are similar to those of an agitated liquid - the key to fluidized bath calibration efficiency.



Circulation of aluminum oxide promotes temperature uniformity.

Applications include:

### Aerospace

- Jet engine sensors particularly irregularly shaped sensors, which cannot be calibrated with Dri-Block or liquid baths.
- Wiring looms from battery and engine sensors on transport aircraft.

### Fuel cells systems

- Heat source for a heating coil used to generate superheated steam, which is a safer alternative to electric ovens and oil baths.

### Engineering

- Heat treatment of metals used in stress analysis testing.
- Heating of reactor vessels containing plastics samples.

### Mining

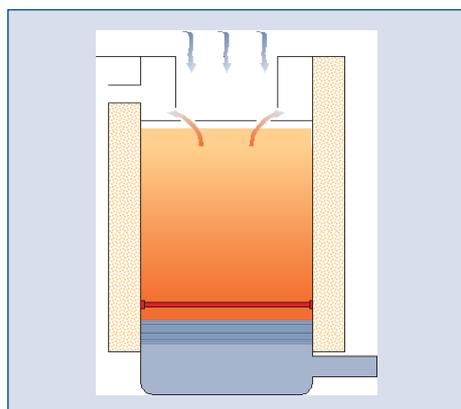
- Used to heat a reactor vessel with mineral samples when investigation oil and petroleum generation.

### Petrochemical

- Used to test heavy ship oil in reactor vessels.

### Shape setting

- Used by leading manufacturers to shape-set nitinol stents and platinum/tungsten coils.



Airborne particles created by the fluidized bed are drawn in to a peripheral extraction ring connected to a cyclone collector in the FB-08.



## Laboratory Range

### SBS-4

This compact fluidized bath has a working depth of 14cm, with a 17.7cm diameter. It's wide operating range of 50 to 600°C makes it a popular choice for a variety of heat source applications.



SBS-4

### SBL-2D

This extra depth fluidized bath has an increased working depth of 35cm, as well as a larger diameter. Four 1kW heaters give a heat up time from ambient to 600°C of approximately 100 minutes.



SBL-2D

### TC-8D

Designed to improve the temperature stability and temperature setting accuracies, the TC-8D is compatible with all of the SB series of fluidized baths.

The TC-8D is a self contained unit and is supplied complete with a chromel/alumel Type K thermocouple which fits into the sheath supplied with the SB baths. The unit has a digital set point of bath temperature on a LED display with PID control.

#### Technical Information

	SBS-4	SBL-2D	TC-8D
Temperature range °C	50 to 600	50 to 600	0 to 800
Temperature stability °C, @ 50°C	±0.3	±1	±0.3
Air pressure, psi	10	10	-
Air flow, maximum SCFM	-	5	-
Weight of medium, lbs supplied with unit	20	100	-
Overall size, cm			
Diameter (excluding tap)	33.5	38.5	Width 16.5
Height	46.2	69.5	Depth 24
			Height 14
Working volume, cm	-		
Diameter	17.7	22.8	-
Depth	14	35	-

#### Ordering Information

Model Number	Product Code	Voltage	Hz	Watts	Shipping weight, lbs
SBS-4	3010500	117V	50/60	1500	52
SBS-4	3010600	240V	50/60	1500	52
SBL-2D	3010900	240V	50/60	4000	148
SBL-2D	3011400	208V	50/60	4000	148
TC-8D	3012000	120/240V	50/60	-	8



TC-8D

## FB-08 Range

The FB-08 Series are precision fluidized baths, with exceptional temperature stability and uniformity, which make them the ideal choice for critical temperature sensor calibration and heat treatment processes. Models FB-08 and FB-08C Fluidized (Sand) Baths have become the market standard for carrying out shape setting (heat treatment processing) of metals including Nitinol and platinum for medical device manufacturing. These units are suitable for many other applications, including thermal testing of sensitive components such as semiconductor devices, wire products, delicate transducers and may also be used as a constant temperature environment for chemical reactions. Because the fluidized bed is a fine, dry powder, it does not have surface tension effects of liquid baths and will not wet any immersed components. The electrical insulating properties of the alumina used in the FB-08 Series are not affected by fluidization making it possible to conduct electrical measurements on objects such as printed circuit boards.

Major benefits of the FB-08 Fluidized Bath Series include:

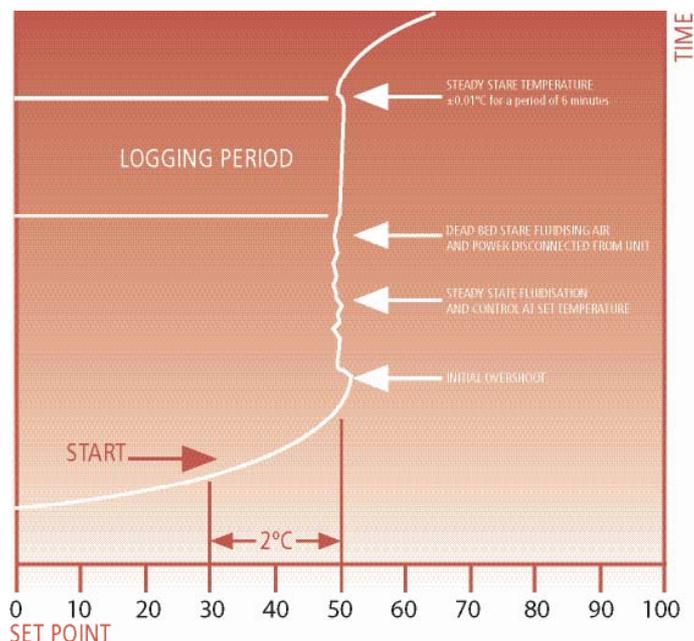
- Fluidized Bath of choice for critical processes requiring the highest stability and uniformity at temperatures up to 700°C/1292°F
- Temperature stability as good as  $\pm 0.01^\circ\text{C}$  using the dead bed method\*
- Non-abrasive to any devices or parts put into the bath, including those highly polished
- More efficient than ovens (heat loss when door is opened) and salt baths. Fast recovery time after the bath is quenched.
- Safer and cleaner alternative to conventional liquid systems and volatile salt baths



FB-08

## \*FB-08 Dead Bed Mode of Operation

The dead bed mode of operation is entered by shutting off air and power to the unit. The system reaches a state of thermal equilibrium after the bath media collapses and stability is better than  $\pm 0.01^\circ\text{C}$  for a period of 3 to 6 minutes. This allows for precise comparison calibration of temperature sensors in the bath.



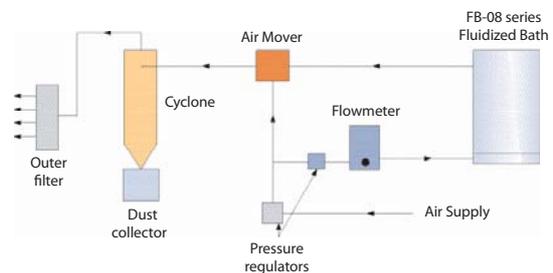
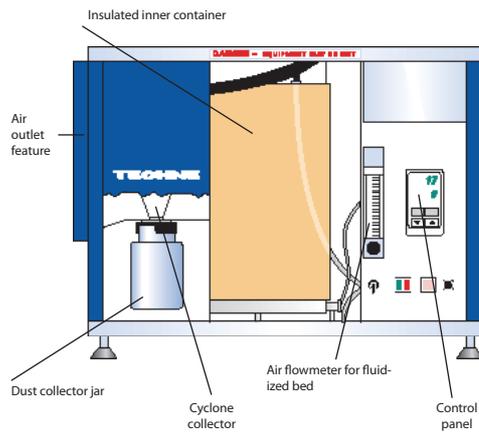


## FB-08

The standard FB-08 offers a wide operating range of 50 to 700°C (122-1292°F), PID temperature control and a built-in dust extraction and collection system. Fluidizing air is manually controlled in the standard FB-08, whereby the FB-08C includes automatic fluidizing air control and RS232 interface for remote user control via a PC. Both the FB-08 and FB-08C are shipped with a single probe plate, ring and one charge of fluidizing media (alumina). The probe holder, available as an accessory, is used to enhance the thermal conditions (control stability and uniformity) of the temperature zone within the bath. It is manufactured, by special order, to suit sensors under test.

Sensor calibration or precision heat treatment is simple and precise with the FB-08 series fluidized baths:

- Set the bath to the required temperature and air flow level (on standard units).
- Suspend the sensor to be tested in the bath (using the probe plate supplied or basket) in the working area and allow the bath to stabilize.
- Calibration or heat treatment can now be carried out using either a certificated standard (comparison method) or the readout from the FB-08 control unit (direct method).



## FB-08C

The FB-08C has been designed to allow calibration of thermal sensors with minimum supervision. Working in conjunction with a supervisory computer, via an RS232 interface, programs are created by the operator, allowing for the control of set temperature, incremental temperature steps and dwell times. The automatic fluidizing air control will adjust the air flow rate to suit the set temperatures of the bath. Where an ultra stable temperature condition is required, a "dead bed" state can be programmed into the system.

### Technical Specifications

	FB-08/FB-08C
Temperature range °C	50 to 700
Temperature stability °C	
Dead Bed	±0.010
Short term (30 minutes) @ 50°C	±0.2
Short term (30 minutes) @ 600°C	±0.3
Long term (4 hours) @ 50°C	±0.5
Long term (4 hours) @ 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, liters/minute	127
Weight of medium, lbs	35
Overall size L x W x H, cm	77 x 51.5 x 60
Working volume Diameter x Depth, cm	16.5 x 38.5

### Ordering Information

Model Number	Product Code	Voltage	Hz	Watts	Shipping weight, lbs
FB-08	3021400	240	50/60	3000	225 (including alumina)
FB-08C	3022100	240	50/60	3000	255 (including alumina)

# fluidized temperature baths

## Accessories for Fluidized Baths

Air Pressure Regulator



Air Pressure Regulator/Filter (all baths)

Used in conjunction with air from a factory airline to regulate the supply pressure and quality of air to the fluidized bed. The unit removes oil and moisture from the supply air and is fitted with an automatic drain system.

### Ordering Information

Product Code	Voltage	Hz	Watts	Shipping weight, lbs
6035915	240	50	-	7

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 designed to allow free flow of the fluidizing media around the exterior of the holder without creating dead areas. This thermal mass surrounds the sensors to be calibrated and assures constant uniformity, reducing short term temperature fluctuations and improves calibration accuracy. Custom probe holders can be supplied to suit specific diameters and lengths of probes being calibrated and the quantity of probes can be selected up to a maximum of eight per probe holder when ordering.

### Ordering Information

Product Code	Shipping weight, lbs
6037759 (Basket/Probe Plate)	5
7031993 (Probe Carrier/ Holder)	12

Basket/Probe Plate



Probe Carrier/Holder



Overspill Flanges (SB series only)

Fits into the top of the inner container of the fluidized bath, giving a wider area across the top of the bath opening. Any aluminum that escapes from the fluidized bed is held on the flange and directed back into the bath. The flange is manufactured from aluminum with an anodized finish. (Supplied as standard with each unit).

Baskets (SB series only)

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

### Ordering Information

Product Code	Shipping weight, lbs
6031133 (Overspill flange SBL)	5
6031116 (Overspill flange SBS)	4
6037805 (Basket SBL-2D)	10
6037807 (Basket SBS4)	5

Overspill Flange



Baskets



Bath Media

Aluminum oxide particles serve as the heat transfer medium in Techne Fluidized Baths and have no effect on shape or size of immersed objects. Fluidized aluminum oxide has no melting or boiling point, thus solidification which occurs in cooling salt baths and fumes from hot oil baths are eliminated. Heat transfer characteristics between the fluidized bed and the solid interface are similar to those of an agitated liquid - the key to fluidized bath efficiency.

### Ordering Information

Model Number	Product Code	Shipping weight, lbs
7030794	Alumina, 35 lbs, FB-08 Series only	36
7030462	Aluminum oxide 120, 20 lbs, SB Series	21
7030463	Aluminum oxide 120, 34 lbs, SB series	36
7030464	Aluminum oxide 120, 100 lbs, SB series	102



# Temperature Measurement



## 4500 High Accuracy Smart Probe Thermometer

Model 4500 Series Ultra-High Accuracy Thermometers take metrology-level temperature measurement to the laboratory, the production floor and the field.

Ultra-high system accuracy ( $\pm 0.015^{\circ}\text{C}$ ) is achieved because the thermometer and probe function as if they were calibrated together as a system, even though they can be purchased separately. The 4500 System uses coefficients stored in each probe with the Steinhart-Hart algorithm to calculate the exact temperature reading every time you plug in a probe to take a measurement.

The 4500 series thermometers accept a wide range of plug-in probes equipped with proprietary Smart Probe system. The probes utilize super stable thermistors capable of providing high resolution, fast response and ultra high accuracy.



4500 High Accuracy Smart Probe

### System Features

- High system accuracy
- NIST traceable calibration included
- Interchangeable temperature probes
- Hand-held flexibility
- Hold reading button
- $^{\circ}\text{C}/^{\circ}\text{F}$  display
- Auto shut off
- Three decimal place mode
- Delta T
- Function keys
- Min/Max reading
- RS-232 serial port

### Applications

- Calibrate/verify your PCR Thermal Cycler
- Reference thermometer for your liquid bath
- Clinical laboratory quality control
- Chemical & petroleum regulatory/safety
- Metrology
- Thermal cycler plate uniformity
- Autoclave integrity

### Technical Specifications

Resolution:	0.01 $^{\circ}\text{C}$ or 0.001 $^{\circ}\text{C}$ selectable 0.001 $^{\circ}\text{C}$ when using serial output
Display:	LCD 4 1/2 digit 0.6" high. Function icons.
Maximum Meter Range:	-40 to +150 $^{\circ}\text{C}$ (-40 to +299 $^{\circ}\text{F}$ )
Power:	9 volt Alkaline battery or external 12 VDC. Battery life 25 hours, typical; 15 with RS-232.
Reading Rate:	2 per second (update every 524 milliseconds)
Over Range Indication	Displays LO or HI
Operating conditions	Temperature 0 $^{\circ}\text{C}$ to 45 $^{\circ}\text{C}$ Humidity 0 to 85%

## Smart Probes

Stainless Steel Tube Probes for waterbaths, block calibrators & other general purpose use. Designed for use with the 4500 Thermometer; simply plug & play into the 4500 Thermometer.

### Technical Specifications

Sheath Size:	0.156"(5/32")dia. x 12.0"L
Temperature Range:	-40 $^{\circ}\text{C}$ to +150 $^{\circ}\text{C}$
Accuracy*: 0 to 100 $^{\circ}\text{C}$	$\pm 0.025^{\circ}\text{C}$
	-25 to 125 $^{\circ}\text{C}$ $\pm 0.05^{\circ}\text{C}$
	-40 to 150 $^{\circ}\text{C}$ $\pm 0.15^{\circ}\text{C}$

\*(accuracy specification includes 4500 thermometer)

### Ordering Information

Product Code	Model Number
7012743	4500 High Accuracy Thermometer (excludes probe)
7002746	4500 5/32" Probe 1*
7002744	4500 0.2ml Probe 2*
7002745	4500 0.5ml Probe 3*

1\* Temperature range: -40 $^{\circ}\text{C}$  to 150 $^{\circ}\text{C}$ , general purpose

2\* Temperature range: 0 $^{\circ}\text{C}$  to 100 $^{\circ}\text{C}$ , thermal cyclers

3\* Temperature range: 0 $^{\circ}\text{C}$  to 100 $^{\circ}\text{C}$ , thermal cyclers



## Accu-Temp Precision RTD Thermometer

The Tecal Accu-Temp RTD thermometer is an excellent choice for use as a laboratory grade reference thermometer.

It offers the flexibility of one or two RTD input channels, along with direct temperature readout in degrees °F, °C and ohms. Combine the Tecal Accu-Temp with one of our PRT's for a high accuracy temperature measurement system.

- User programmable linearization (ITS90)
- Accepts either 10, 25.5 or 100 ohm platinum RTD's
- Direct readout in °C, °F, and ohms
- Temperature accuracy of  $\pm 0.015^{\circ}\text{C}$  up to  $500^{\circ}\text{C}$
- Temperature and ohm meter resolution of 0.001
- Wide temperature range  $-200$  to  $+660^{\circ}\text{C}$
- Accepts probe alphas of either 0.00385 or 0.003925
- Single or dual RTD input channels
- Switchable 230 or 120V operation
- Includes NIST traceable calibration certificate



Accu-Temp Precision RTD Thermometer

### Technical Specifications

Temperature accuracy of thermometer					
	-100°C	0°C	200°C	400°C	500°C
+/-	0.005(0.009°F)	0.005(0.009°F)	0.007(0.013°F)	0.011(0.020°F)	0.013(0.023°F)
	Ohmmeter uncertainty		+/-0.002 ohms or 15 ppm		

Dimensions (h x w x d)	22 x 29.5 x 9 cm
Weight	8.8 lbs (12 lbs shipping)
Option	RS-232 interface



Accu-Temp Precision RTD Thermometer and PRT probe

### Ordering Information

Product Code	Model	Voltage
7002618	Accu-Temp RTD Thermometer	230/120V Dual Channel
7002797	Accu-Temp RTD Thermometer	230/120V Single Channel
7032893	RS-232 Interface & Cable	n/a



See page 33 and 34 for RTD probes for use with the Accu-Temp and Accu-Temp II



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Tecal Accu-Temp II

## Tecal Accu-Temp II Laboratory Grade Reference Thermometer

The Tecal Accu-Temp II is a high accuracy multi purpose digital thermometer for both platinum resistance thermometers and thermocouples. Dual Channel input allows a probe on Channel B to be calibrated against a standard on Channel A - directly compare any combination of PRT and Thermocouple. The Tecal Accu-Temp II supports 13 thermocouple types: B, E, J, K, N, R, S, T, D, C, I, U, Au/Pt and both 3 and 4 wire 100 ohm Platinum resistance thermometers and RTDs.

- Accuracy of RTD and PRT measurement  $\pm 0.010$  °C
- Accuracy of T/C measurement, better than  $\pm 0.1$  °C
- 0.001 resolution for RTDs/PRTs and thermocouples
- 2 measuring inputs
- 13 thermocouples: B, E, J, K, N, R, S, T, D, C, I, U, Au/Pt
- T/C CJC internal or external
- Input of RTD coefficients: Calendar Van Dusen & ITS90
- Probe self-heat check
- Automatic current reversal for RTDs/PRTs
- Suitable for 3 and 4 wire RTDs/PRTs
- Units °C, °F, K, mV, ohms
- Math functions max/min, std. deviation & mean
- Data logging 4000 values
- Expandable by plugging in optional 4 input RTD or thermocouple scanner cards to 1 of 2 rear panel slots available.
- RS232 talk/listen - included
- Rechargeable sealed lead acid battery: 8 hrs operation continuous

The powerful math function enables statistical analysis of the captured data, mean, max, min, peak and standard deviation. The Tecal Accu-Temp II can be expanded by adding either a 4 input Thermocouple or 4 input PRT card into one of the two available slots in the rear of the unit. Ultimately, two cards of the same type could be added to allow the measurement of up to 10 sensors of the same type or one PRT as a reference and nine thermocouples. Each unit includes an RS232 cable, NIST traceable calibration, instruction manual and mains cable. Combine the Tecal Accu-Temp II with one of Techne's secondary standard PRTs, a Techne Dri-Block calibrator, liquid calibration bath and TechneWorks software to create a thermometer and sensor calibration system with high overall accuracy.

### Thermocouple Accuracy

Type	Range °C	Resolution °C, °F or K	Display Resolution mV	Uncertainty @20 °C °C $5 \pm$ ° 1 year	Uncertainty @20 °C °C $5 \pm$ ° 60 days	Temperature Coefficient /°C
B	+250 to +1820	0.001	1.0	$\pm(0.025\% \text{ Rdg} + 0.006\% \text{ FS})^*$	$\pm(0.02\% \text{ Rdg} + 0.006\% \text{ FS})^*$	7 ppm Rdg + 6 ppm FS
C	0 to +2315	0.001	1.0	$\pm(0.075\% \text{ Rdg} + 0.005\% \text{ FS})$	$\pm(0.05\% \text{ Rdg} + 0.005\% \text{ FS})$	7 ppm Rdg + 6 ppm FS
D	0 to +2315	0.001	1.0	$\pm(0.75\% \text{ Rdg} + 0.005\% \text{ FS})$	$\pm(0.05\% \text{ Rdg} + 0.005\% \text{ FS})$	7 ppm Rdg + 6 ppm FS
E	-200 to +1000	0.001	1.0	$\pm(0.026\% \text{ Rdg} + 0.004\% \text{ FS})$	$\pm(0.01\% \text{ Rdg} + 0.004\% \text{ FS})$	7 ppm Rdg + 6 ppm FS
J	-210 to +1200	0.001	1.0	$\pm(0.03\% \text{ Rdg} + 0.005\% \text{ FS})$	$\pm(0.008\% \text{ Rdg} + 0.005\% \text{ FS})$	7 ppm Rdg + 6 ppm FS
K	-200 to +1372	0.001	1.0	$\pm(0.035\% \text{ Rdg} + 0.006\% \text{ FS})$	$\pm(0.01\% \text{ Rdg} + 0.006\% \text{ FS})$	7 ppm Rdg + 6 ppm FS
N	-200 to +1300	0.001	1.0	$\pm(0.035\% \text{ Rdg} + 0.005\% \text{ FS})$	$\pm(0.01\% \text{ Rdg} + 0.005\% \text{ FS})$	7 ppm Rdg + 6 ppm FS
R	-50 to +1768	0.001	1.0	$\pm(0.02\% \text{ Rdg} + 0.015\% \text{ FS})$	$\pm(0.005\% \text{ Rdg} + 0.015\% \text{ FS})$	7 ppm Rdg + 6 ppm FS
S	-50 to +1768	0.001	1.0	$\pm(0.02\% \text{ Rdg} + 0.015\% \text{ FS})$	$\pm(0.005\% \text{ Rdg} + 0.015\% \text{ FS})$	7 ppm Rdg + 6 ppm FS
T	-200 to +400	0.001	1.0	$\pm(0.025\% \text{ Rdg} + 0.015\% \text{ FS})$	$\pm(0.005\% \text{ Rdg} + 0.015\% \text{ FS})$	7 ppm Rdg + 6 ppm FS
U	-200 to +600	0.001	1.0	$\pm(0.025\% \text{ Rdg} + 0.015\% \text{ FS})$	$\pm(0.005\% \text{ Rdg} + 0.015\% \text{ FS})$	7 ppm Rdg + 6 ppm FS
L	-200 to +600	0.001	1.0	$\pm(0.03\% \text{ Rdg} + 0.005\% \text{ FS})$	$\pm(0.008\% \text{ Rdg} + 0.005\% \text{ FS})$	7 ppm Rdg + 6 ppm FS
Au/Pt	0 to +1000	0.001	1.0	$\pm(0.02\% \text{ Rdg} + 0.015\% \text{ FS})$	$\pm(0.005\% \text{ Rdg} + 0.015\% \text{ FS})$	7 ppm Rdg + 6 ppm FS

### RTD & PRT Accuracy

Type	Range °C	Resistance	Current	Resolution	Resistance °C, °F or K	Accuracy Typically @20°C $\pm$
Pt100	-200 to 660	18 to 340Ω	0.5mA	0.001	0.001Ω	0.010
Pt100	660 to +800	340 to 450Ω	0.5mA	0.001	0.001Ω	0.020



## Technical Specifications

### Display

LCD Graphics Panel, 240 x 64 Dot, with LED backlight contrast control via Keyboard.

### Inputs

Thermocouples via 4mm sockets in copper block on 19mm pitch adaptor plug for direct connection of thermocouple wire. Reference Junction Compensation - Automatic with external Pt100 probe. PRT's via 6-pin Lemo socket, also used for external RJ measurement.

### Calibration

Digital, security code protected.

### Working Temperature

0 to 40°C rel humidity.  
80% max non condensing.

### Storage Temperature

-20 to +50°C.

### Mains Supply

100/120/220/240 Volts + 10% - 13% 47 to 63Hz max. 40VA.

### Dimensions

21.9 x 11 x 31.5 cm

### Weight

12 lbs approx

### Data Logging

The Tecal Accutemp II Thermometer comes complete with a data logging function, enabling up to 4000 single channel (2000 dual channel) readings to be stored together with a date and time stamp. The stored values can be recalled to the instrument display and scrolled through using the front panel keyboard, alternatively these values can be downloaded to a PC file or printer.

### Battery

Sealed lead acid, rechargeable cell giving approximately 8 hours continuous operation. Internal battery charger.

### Maths

Displays max/min values Peak to Peak, mean & standard deviation.

### Analog Output - optional

This is a factory fitted option comprising of a single BNC socket fitted to the rear panel. The function is as per the main value display and is scaled 1mV°C. A 12 bit D/A is used and the resolution is 0.5°C.

### Expansion cards - optional

There are two expansion slots in the rear panel which will accept a 4 Input thermocouple or RTD plug and play card giving a total of 8 additional channels.

### IEEE-488 optional

Conforms to the ANSI-IEEE Std 488.1-1987. The interface performs the following functions: SH1, AH1, T5, TEO, L3, LEO, SR1, RL1, RL1, PPO, DC1, DT1, C0, E2. The interface can also be set to a talk only mode to permit stand alone printer output.

## Ordering Information

Product Code	Model	Voltage	Shipping Weight (lbs)
3024400	Tecal Accu-Temp II thermometer	120 & 240 switchable	12
7032840	4 input Thermocouple scanner card	N/A	2
7032841	4 input RTD scanner card	N/A	2
7032842	Front panel RTD Lemo connector	N/A	0.22



See page 40 and 41 for RTD probes for use with the Accu-Temp and Accu-Temp II

## RTD Probes

The Techne model WSP425 and SSP660 PRTs are an excellent choice for use as reference sensors in all types of systems, including dry block calibrators, liquid calibration baths, ovens, reactors and other applications where temperature needs to be accurately measured.

Our PRTs offer proven and reliable performance for critical temperature measurements. They can be used with our Tecal Accu-Temp indicator or any comparable unit. Both models include a carrying case and ITS-90 calibration (NIST traceable) certificate with coefficients and resistance vs. temperature table. The SSP660 has excellent performance, specifications and wide temperature range at an affordable price, while the WSP425 is designed for measurements within a narrower temperature range.

The model WSP425 has a calibrated operating range of -50 to +425°C, and the model SSP660 from -80 to +660°C.

## 425°C Working Standard PRT

The model WSP425 PRT is a great choice when lower temperature range is required.

The sheath is of stainless steel construction with a strain free wire wound .3924 alpha sensing element.

The WSP425 PRT can be used as a working standard in calibration baths, furnaces, fluidized baths, dry block calibrators or for any other temperature calibration work.

Combine it with our model Tecal Accu-Temp RTD indicator for a system with high overall accuracy. The WSP425 PRT includes a NIST traceable ITS-90 calibration with coefficients and R vs T table.

### Technical Specifications

Resistance at 0° C:	100 ohms
Temperature range:	-200 to 425°C
Calibrated temperature range:	-50 to 425°C
Temperature coefficient:	0.003924 Ω / Ω / ° C minimum
Stability:	Meets IEC stability specifications after 250 hours exposure to extremes of temperature range. Typical drift is less than 0.05°C (0.02Ω) at 0°C.
Repeatability:	Meets IEC requirements. Typical shift less than 0.05°C (0.02Ω) at 0°C after ten cycles over range.
Dimensions:	0.25" dia. x 12" L, custom sizes available
Tolerance at 0° C:	± 0.06%, IEC DIN class A
Lead wires:	4 wire Teflon insulated, stranded 22 AGW copper x 6" Long

### Calibration

Each WSP425 PRT includes an ITS-90 NIST traceable calibration with a+, b+, a- and b- coefficients and R vs T table. A padded carrying case is also included.

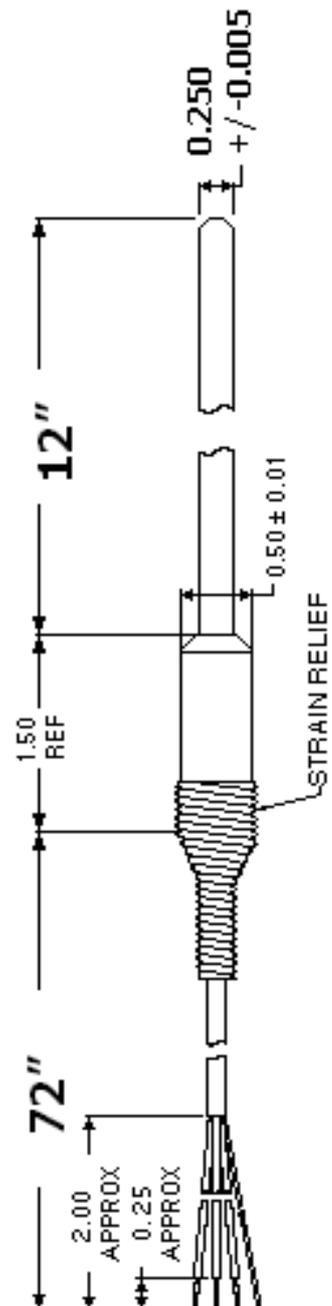
### Calibrated uncertainty (K=2)

-50°C ±0.040°C
-20°C ±0.035°C
0°C ±0.030°C
230°C ±0.035°C
420°C ±0.050°C

(Calibrations down to -196°C available upon request.)

### Ordering Information

7002617 425°C Working Std 1/4" PRT with carrying case





## 660°C Secondary Standard PRT

Model SSP660 PRTs are assembled using our special wire wound RTD elements and assembled into inconel sheaths. The SSP660 PRT has the accuracy and long-term stability specifications you would find in much higher priced secondary standard PRTs.

The SSP660 PRT can be used as a secondary standard in calibration baths, furnaces, fluidized baths, dry block calibrators and other any other temperature calibration work requiring a high level of accuracy and repeatability.



SSP660 with case

### Technical Specifications

Resistance at 0° C:	100 ohms
Temperature range:	-200 to 660°C
Calibrated temperature range:	-196 to 660°C
Temperature coefficient:	0.003925 $\Omega / \Omega / ^\circ \text{C}$ minimum
Stability:	R0 typical drift < 0.01°C after 500 hours at 660° C
Thermal shock:	R0 typical drift < 0.005° C after 100 times from 25 to 660°C
Dimensions:	0.25" dia. x 18" L inconel sheath as standard, custom sizes available
Tolerance at 0° C:	$\pm 0.06\%$ , IEC DIN class A
Lead wires:	4 wire Teflon insulated, stranded 22 AGW copper x 6" long

### Calibration

Each SSP660 includes an ITS-90 NIST traceable calibration with a+, b+, c+, a- and b- coefficients and R vs T table. A carrying case is also included.

### Calibrated uncertainty (K=2)

-80°C $\pm 0.040^\circ \text{C}$
-38°C $\pm 0.035^\circ \text{C}$
0°C $\pm 0.020^\circ \text{C}$
230°C $\pm 0.030^\circ \text{C}$
420°C $\pm 0.045^\circ \text{C}$
660°C $\pm 0.055^\circ \text{C}$

(Calibrations down to -196°C available upon request.)

### Accessories

7002795	660°C Secondary Std 1/4" PRT with carrying case
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# Industrial Fluidized Baths

## About

After years of demonstrated success, plastic manufacturers have come to depend on Techne fluidized baths for safe, efficient and cost effective cleaning of tooling, components, systems and parts (dies, breaker plates, nozzles, tools, tips, spinnerets, extruder screws, manifolds, etc.) Fluidized baths will remove almost all polymers, including plastic, paint, epoxy, rubber and adhesives, as well as other hydrocarbon-based products such as oils, fluids, grease, lubricants and coatings. Parts immersed into a fluidized bath are cleaned by the high temperature (up to 600°C/1112°F) environment within a bath media of fluidized aluminum oxide that instantly starts to degrade plastic to carbon, which then leaves the bath as CO<sub>2</sub>. This instant heating and minimized quenching results in shorter cleaning times than those of ovens, and when paired with the even and consistent heat of the bath, results in greatly reduced metal fatigue and tool damage.

## How They Work

A fluidized bath consists of a loosely packed mass of solid particles through which an upward flow of air is passed. In the fluidized state, the aluminum oxide particles become mobile and the bath as a whole, displays many of the properties of a liquid. However, since the bath is composed of tiny, inert aluminum oxide particles, freezing, boiling and evaporation are totally eliminated. Heaters on the outside wall of the bath inner container radiate heat into the aluminum oxide; Fluidization acts as the stirring mechanism to evenly distribute heat throughout the bath, resulting in excellent thermal stability and uniformity. These advantages make fluidized baths a cost effective and environmentally friendly safe alternative to oil, salt, ultrasonic and molten metal baths, ovens and furnaces.

## Details & Facts

The following pages give complete specifications on the seven models we offer in the Industrial Fluidized (IFB) bath product range. The basic differences are dimensions, capacity, heater power, air supply and power required. For burnoff applications, a gas fired AB-100 Afterburner is offered for incineration, to further reduce exhaust particulate and VOC's. To assist in cleaning the exhaust when PVC's and other halogenated polymers are burned off, the SR-100 Scrubber can be employed.

The baths can be fluidized with either compressed house air or an inert gas such as nitrogen or argon. It should be noted that fluidized baths and the action created in the aluminum oxide is not abrasive to items immersed for normal cleaning or heat treatment times. Typical cleaning times range from 30 minutes to 2 hours depending on bath temperature and amount of material to be cleaned. The specific heat of aluminum oxide is 0.21. Typical heat transfer rates for fluidized baths range between 60 to 120 Btu/hr/sq ft/deg F.

## Other Applications

The excellent thermal performance of Techne Industrial Fluidized Baths make them a good choice for basic heat treatment, test and calibration as well as reactive analysis. Some of these applications include tempering, shape setting, annealing, Nitriding, distillation, curing, exothermic and endothermic reactions, and thermal analysis of devices, components and materials.

## IFB-51 & IFB-52

Models IFB51 and IFB52 Industrial Fluidized Baths are our most popular units due to their economical price and smaller size. They offer a front panel mounted Rotameter for adjustment of the fluidizing air flow and are ready for use out of the box with the included charge of aluminum oxide.

## IFB-101 & IFB-111

Models IFB101 and IFB111 step up in diameter and depth from the IFB51 and 52. These baths also have a 3 phase voltage supply requirement to handle the large power capacity of the heaters. All larger baths on the following pages also run on 3 phase power.

## IFB-201

Model IFB201 offers a rectangular opening for oblong or non-typical parts cleaning and heat treatment.



IFB-51



IFB-101



IFB-201



## Technical Specifications

	IFB-51	IFB-52	IFB-101	IFB-111	IFB-201
Temperature range	50 to 600°C (122 to 1112°F) - all models				
Overall size (H x W x D), in.	27 x 24 x 21	41 x 24 x 21	36 x 31.3 x 24.6	36 x 31.3 x 24.6	36.6 x 45.5 x 26
Working volume (diam. x depth*)	9.5 x 13	9.5 x 26	12 x 13	12 x 39	19.7 x 15.5 x 8.7
Working size with basket (diam. x depth*)	8.4 x 13	8.4 x 26	11 x 13	11 x 39	-
Maximum work load (lbs)	25	50	35	80	40
Heat up time (20°C to 600°C, 230V) min	195	240	210	270	350
Cool down time (600°C to 200°C) min.	210	270	-	-	-
Display accuracy **	±10°C	±10°C	±20°C	±20°C	±20°C
Typical stability **	±1.0°C	±1.0°C	±5.0°C	±5.0°C	±5.0°C
Air requirements, PSI fixed at	30	30	25 - 150	25 - 150	25 - 150
Aluminum oxide required (lb.)	85	160	110	264	132
Aluminum oxide supplied (lb.)	100	200	134	300	154
Voltage supply required (50/60hz)	220 to 240V single phase (IFB51 & 52)		240v 1 Ph 380v 3 Ph 415v 3Ph	380v 3 Ph, 415v 3 Ph	220V 3 Ph, 380V 3Ph 415v 3Ph, 480V 3Ph
Power requirements	4kW	6kW	6kW	9kW	9kW
Unit weight (aluminum oxide excluded)	126	200	165	573	600
Shipping weight (skid & aluminum oxide)	226	400	350	925	800
Catalog number	3032700	3032900	3031000	3032000	3030400

\*2.5" below top of bath to 1" above porous plate

\*\*2 hours after setpoint is reached, 8" immersion depth IFB51 & 15" immersion depth IFB52

## IFB-121 & IFB-131

Models IFB121 and IFB131 are our largest capacity fluidized baths. Typical applications include cleaning large dies and breaker plates as well as long extruder screws and manifolds. A customer sourced hoist or lift would be used to retrieve the basket with parts from the unit.

### Technical Specifications

	IFB-121	IFB-131
Temperature range	50 to 600°C (122 to 1112°F) - both models	
Overall size (H x W x D), in.	52.6 x 44.3 x 33.5	72.2 x 44.3 x 33.5
Working volume (diam. x depth*)	17.7 x 27.6	17.7 x 47.2
Working size with basket (diam. x depth*)	16.7 x 27	16.7 x 47
Maximum work load (lbs)	130	200
Heat up time (20°C to 450°C) min	195	165
(20°C to 600°C) min	330	195
Display accuracy **	±20°C	±20°C
Typical stability **	±5.0°C	±5.0°C
Air requirements, PSI	25 to 150	25 to 150
Aluminum oxide required (lb.)	440	660
Aluminum oxide supplied (lb.)	500	700
Voltage supply required (50/60hz)	380V 3Ph, 415V 3Ph - both models	
Power requirements	12kW	18kW
Unit weight (aluminum oxide excluded)	498	728
Shipping weight (skid & aluminum oxide)	1050	1500
Catalog number	3032200	3032300



IFB-131

## Accessories

Model(s)	Description	Catalog #
IFB51	Parts basket for use without collar	7031103
IFB51	Parts basket for use with collar	7031102
IFB52	Parts basket for use without collar	7031658
IFB52	Parts basket for use with collar	7031659
IFB51 & 52	Retort lid	6036156
IFB51 & 52	Extraction Collar	6036157
IFB101	Retort lid*	6035967
IFB101	Parts basket	6036224
IFB111	Retort lid	6037998
IFB101, 111 & 201	Filter/Regulator	6035915
IFB51, 52, 101, 111 & 201	Extraction fan	7030772
IFB51, 52, 101, 111 & 201	Cyclone	7031154
IFB201	Parts basket (included with unit)	7032378

Model(s)	Description	Catalog #
IFB121	Parts basket	6036426
IFB131	Parts basket	6036427
IFB121 & 131	Retort lid	6036425
IFB121 & 131	Extraction fan	6035148
IFB121 & 131	Filter/regulator	6035915
IFB121 & 131	Cyclone	CN-500

\*included with bath for IFB-201

## AB100 Afterburner

Model AB100 is designed to reduce smoke emission from the exhaust gas flue of most all Techne fluidized bath cleaning systems. The Afterburner consists of a burner plate mounted within a thermally insulated combustion chamber. The input to the combustion chamber is designed to mate directly to a standard Techne extraction fan, while the output is suitable for connection to an exhaust stack.

The AB100 will not remove hydrogen chloride from exhaust gases. The SR100 fume scrubber should be placed before the afterburner whenever considerable quantities of HCL will be generated.

### Technical Specifications

	AB100
Overall size (H x W x D) in.	98.4 x 47.2 x 39.4"
Burner rating	3kW to 60kW; 10,000 BTU/hr to 200,000 BTU/hr
Fuel consumption range	
Natural gas	10 to 200 ft <sup>3</sup> /hr
Butane	3 to 60 ft <sup>3</sup> /hr
Propane	4.5 to 90 ft <sup>3</sup> /hr
Gas supply pressure	
Natural gas	6 to 10 inch WG
Butane	10 to 14 inch WG
Propane	10 to 14 inch WG
Voltage supply required	220/240V 1Ph 50/60Hz
Exhaust gas temperature	Typically 450°C/842°F
Outlet spigot	8.0"
Shipping weight (lbs)	125
Catalog number	FSAB1



AB100

## SR100 Scrubber

The Techne Venturi Fume Scrubber removes water soluble constituents in the effluent gasses from the Techne Industrial Fluidized Baths which would not be removed in the optional Afterburner. The unit is designed to reduce concentrations of Hydrogen Halides (Chloride and Fluoride) produced by the decomposition of Halogenated polymers such as PVC and PTFE.

The SR100 removes 95% of HCL in the exhaust gas so that as long as the scrubber is not overloaded by burning off too large a quantity of PVC the emerging gasses will contain a quantity of HCL low enough to be safely vented to the atmosphere.

It is recommended that a Techne Cyclone be fitted before the scrubber to avoid unnecessary loss of medium and loading of the scrubber with particulates.

### Technical Specifications

	SR100
Overall size (H x W x D) in.	73 x 17.7 x 17.7"
Scrubbing capacity	HCL from 8kg/hr of PVC
Make up water requirements	10 gallons/hr
Discharge limits HCL	0.2 grains/ft <sup>3</sup>
Air flow	2.8 to 7.0 m <sup>3</sup> /min
Exhaust gas temperature	Typically 450°C/842°F
Inlet spigot	4.0"
Outlet spigot	4.0"
Water inlet	1/2" BSP
Voltage supply required	220/240V 1Ph 50/60Hz
Shipping weight (lbs)	60
Catalog number	FSSR1



SR100

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