

Stirred Ice / Water Bath

813

- 350mm Immersion Depth
- 8L Capacity
- 0°C created by stirred ice/water mixture

The most used temperature for calibration is 0°C.

The normal way of creating 0°C is via a mixture of ice and water in a Dewar Flask.

However, this can give errors of up to 4°C because water is densest at 4°C and so as the ice melts the temperatures at the bottom of the flask can rise to 4°C.

In the design of the ice flask offered by Isothermal Technology Ltd., these problems have been eliminated by stirring the water/ice mixture and segregating the ice from the water in the measuring zone.

This stirred ice/water bath is designed and built according to National Laboratory recommendations.

Using demineralised water, accuracies of $\pm 0.005K$ are obtainable. Typically the bath will last for 4 hours before recharging with ice.

The ice is contained around and below the compartment where up to 4 probes can be placed for calibration or referencing purposes.

An option permits a water triple point cell to be maintained within the stirred ice bath.



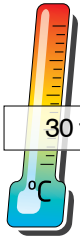
Model	813
Accuracy using Demineralised water	0°C $\pm 0.005K$
Capacity	8 litres (approx.)
Depth of immersion	350 mm
Accuracy using comparison techniques	$\pm 0.001^\circ C$
Power	50W, 108-130 or 208-240VAC, 50/60Hz
Dimensions	Height 580 mm Width 420 mm (including handle) Depth 250 mm Weight 15 kgs

Options

- 814/01b Copper Equalising Block
- 814/02 Mercury Thermometer Support Kit
- 814-06-02 Small Water Triple Point Cell Kit

How to Order

- 813 Stirred Ice Bath
- Please specify voltage required



30 to 200°C

Large Volume Calibration Bath

Model 820

- Large volume for calibration of a number of sensors,
- Wide temperature range 30°C to 200°C
- Good comparison accuracy $\pm 0.01^\circ\text{C}$

If you have a large number of sensors to calibrate then this economically priced stirred liquid bath is the solution.

The 820 bath has been introduced to provide a liquid calibration bath with a large volume. This is to allow the bath to be used with many temperature probes simultaneously immersed in the bath or with accessories. It may also be used to maintain standard resistors at a constant temperature.

The liquid in the bath is heated to the set temperature and circulated by a propeller system.

The Aquarium is of robust construction and the liquid is contained in a stainless steel insulated enclosure which has a calibration volume 185mm long x 140mm wide x 300mm deep.

Refer to 'Liquid Selection Guide' on page 73 for information on liquids and important Health and Safety Information.



Model	820
Temp Range	30°C – 200°C
Volume	185 x 140 x 300mm (15 litres)
Absolute Stability	$\pm 0.003^\circ\text{C}$ (Direct in water, 50°C) $\pm 0.020^\circ\text{C}$ (Direct in VH Oil, 200°C)
Uniformity	0.005°C - between corners at 100mm depth
Heating time	50°C to 200°C < 145 minutes (VH Oil)
Communications	Includes Serial Interface, PC Cable and Software
Dimensions	240mm wide 378mm deep 645mm high overall
Weight	17kg
Safety	Compliant to CE Regulations
Power	1kW 108-130 or 208-240V, 50/60Hz

Accessories	
820/01	Standard Resistor Holder
820/02	Standard Aluminium Equalising Block
820/02S	Special Drilling Equalising Block
915/07	Medium Viscosity Oil 40°C to 180°C
915/08	High Viscosity Oil 150°C to 250°C
915/09	VH Temperature Oil 50°C to 288°C
932-19-72	Standard Resistor Oil

How to Order 820 Large Volume Liquid Calibration Bath
Please specify voltage required

Refer to Evaluation Report for Full Details

Liquid Selection Guide

When selecting a liquid for a calibration bath a number of factors need to be taken into account, temperature range, health and safety considerations, cost and operating life. For a specific fluid its properties such as boiling point, viscosity, specific heat and expansion coefficient need to be considered.

If calibrating over a limited range, say from 5°C to 90°C then water may be used with is ideal in many ways - low cost, safe and readily available.

For many labs though there will be a requirement to calibrate over much wider ranges.

For low temperature calibration alcohol or a mixture of alcohol and water can be used. Methanol is commonly chosen as it is easily obtained and relatively low cost. Methanol is both toxic and flammable and must be used with care.

There are non toxic alternatives to Methanol, including Florinert™ from 3M™ and Halocarbon 0.8 from Halocarbon. The disadvantage is that these fluids are expensive compared to Methanol see www.3m.com and www.halocarbon.com for further information.

For high temperature calibration the choice is usually that of a silicone oil. Silicone oils can be used at low temperatures too but icing can be a problem, particularly if a bath is used for long periods at low temperatures.

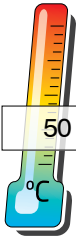
The practise at Isotech is to use one bath with a low temperature liquid, and a second with oil for higher temperatures and this is our recommendation. If an oil is used below the dew point water will condense into the open bath. If the bath is then used above 100°C the expansion of water present in the bath to steam can force the liquid from the bath creating a serious hazard. This is true for all open oil baths and the reason why Isotech do not recommend using an oil both below the dewpoint, and then above 100°C

Isotech Oils for Hydra, Orion and 915		Minimum Temperature	Maximum Temperature
915/07	Medium Silicon Oil	40°C	180°C
915/08	High Silicon Oil	150°C	250°C
915/09	Very High Silicon Oil	40°C	288°C
936-06-07	C10 Silicon Oil	-35°C	140°C
580-06-09	C20 Silicon Oil	20°C	200°C

■ Provision for adequate fume extraction needs to be made when using any open liquid bath.

The requirement will vary depending on the liquid used, and the temperature range.





50 to 700°C

Fluidized Calibration Bath

Model 875

- Wide Temperature Range, High Accuracy
- Safe, sealed no powder loss into laboratory
- Comparison Calibration or use with Fixed Points

The Isotech fluidized calibration bath out performs dangerous salt baths in all respects: wider temperature range, less hazardous and better uncertainties. The bath is the result of 20 years research and development into flow patterns, powder technology and filtration. Recent developments have enabled the baths facilities to be extended even further, it is now eminently suitable for Liquid in glass thermometer calibration. To achieve this the filter and exhaust system were re-designed to cope with the increased level of powder needed for Liquid In Glass thermometer calibration.

The result is a calibration system to National Standards. The performance is only matched by heat pipe technology. The profiles are so small that the bath has been used by National Laboratories for fixed points of Indium through Aluminum, with great success. In comparison mode 2 sigma uncertainties of $\pm 0.020^{\circ}\text{C}$ at 300°C and $\pm 0.035^{\circ}\text{C}$ at 660°C can be obtained.

This is the only product capable of covering a very wide temperature range without a change of thermal media. Like most fluidized bed baths, the 875 bath consists of a container of aluminum oxide powder with a porous base plate. Sufficient air is passed through the base plate to motivate the powder into a fluid like state so that it will flow, display buoyancy effects and have good heat transfer characteristics.



A disadvantage of many fluidized-bed baths is that good temperature stability and uniformity cannot be achieved in the fluidized medium itself. They are obtained by using large metal blocks or by inhibiting the fluidizing action in the powder around the work piece - either locally, or by completely collapsing the bed at the required temperature, this is not the case with the 875. A full evaluation report is available upon request.

Model	875
Temp Range	50°C - 700°C
Volume (875/02)	67mm diameter, 475mm deep
Absolute Stability: In Equalising Block (875/09a) 10 Minutes	$\pm 0.005^{\circ}\text{C}$ at 150°C $\pm 0.005^{\circ}\text{C}$ at 450°C $\pm 0.020^{\circ}\text{C}$ at 660°C
Vertical Uniformity	$\pm 0.005^{\circ}\text{C}$ at 350°C $\pm 0.005^{\circ}\text{C}$ at 420°C $\pm 0.026^{\circ}\text{C}$ at 660°C
Heating time	50°C to 700°C < 240 minutes
Compressed Air Supply	1 BAR, 30 litres/minute at 100°C (50 L max)
Communications	Includes Serial Interface, PC Cable and Software
Dimensions	580mm Wide, 640mm Deep, 1570mm High (880mm to Top Panel)
Weight	85kg (including 22Kg of Alumina Powder)
Safety	Compliant to CE Regulations
Power	3kW (3 x 1kW heaters), 208-240V, 50/60Hz
How to Order	Model 875 Fluidized Calibration Bath

Refer to Evaluation Report for Full Details