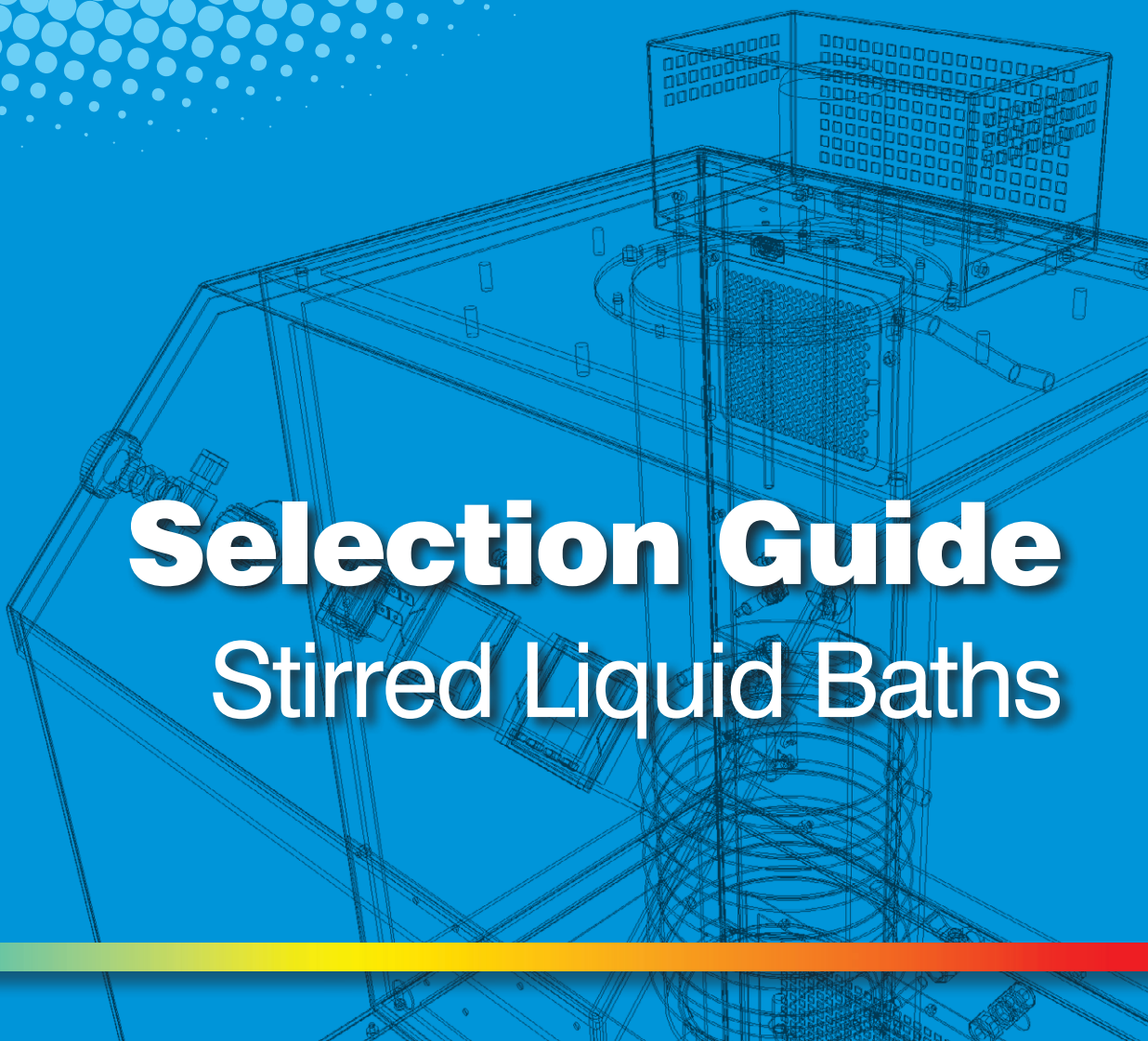
ISOTECH

The Source for Calibration Professionals



Selection Guide

Stirred Liquid Baths

How to Select a Stirred Liquid Bath

Use this guide to avoid make costly mistakes when selecting stirred liquid baths

One: **Depth**

Depth matters, the “Supplementary Information for the ITS-90” published by BIPM advises that for metal sheath thermometers, “Immerse the thermometer from 15 to 20cm between -50°C and 50°C and from 20 to 27cm at 200°C and above” (BIPM,p.93, 1990).

Ensure you select a bath that can offer suitable immersion for low uncertainty calibration of platinum resistance thermometers

Isotech laboratory baths offer immersion from 300mm with adequate depth to avoid significant stem conduction / immersion error.

Two: **Homogeneity**

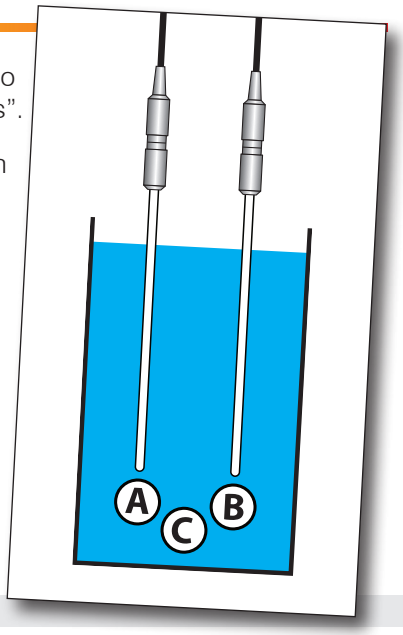
With comparison calibration a thermometer with known characteristics is compared to the thermometer we want to calibrate, relying on the “Zeroth Law of Thermodynamics”.

If the temperature in the bath is not homogenous (uniform) there will be differences in temperature between the thermometers.

Isotech laboratory baths use sophisticated designs to avoid poor temperature distribution from simple square tanks.

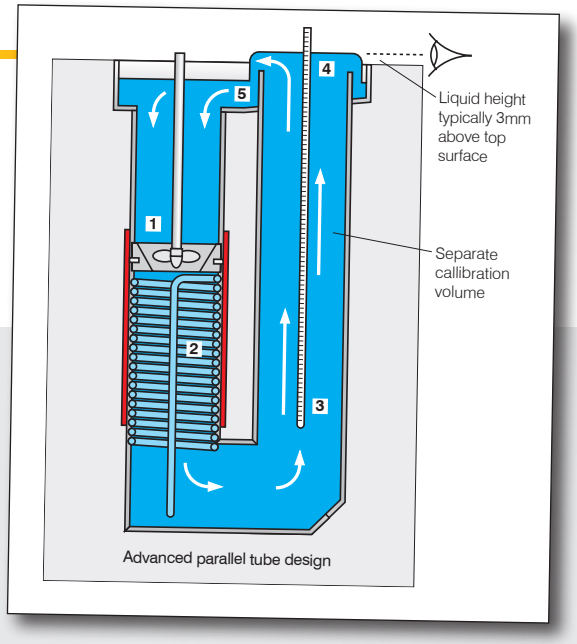
Advanced parallel tube designs allow the heating and cooling to take place in a chamber separate from the calibration volume. The geometry and flow ensure the best uniformity and lowest calibration uncertainties.

In addition to the best design to ensure the best homogeneity we use sophisticated temperature control techniques. As well as PID control we use power feedback to stabilise against supply voltage variation and advanced digital filtering ensures high integrity of measurement correcting for drift and rejecting noise.



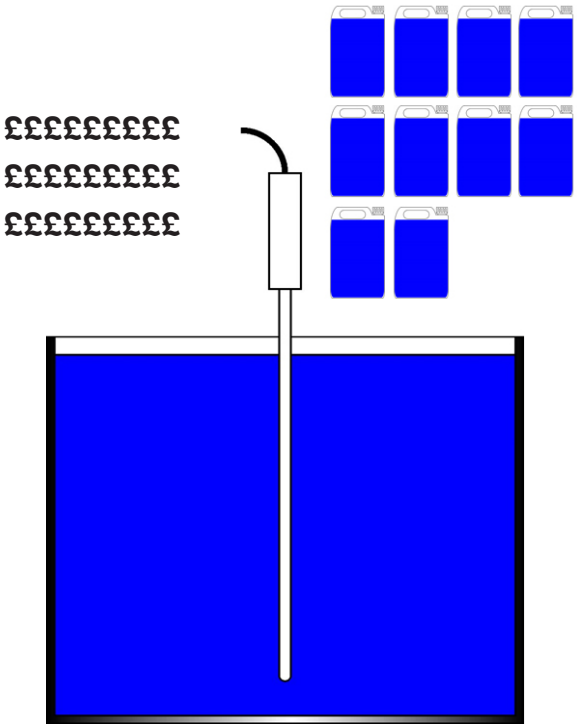
Three: **Cost of Ownership**

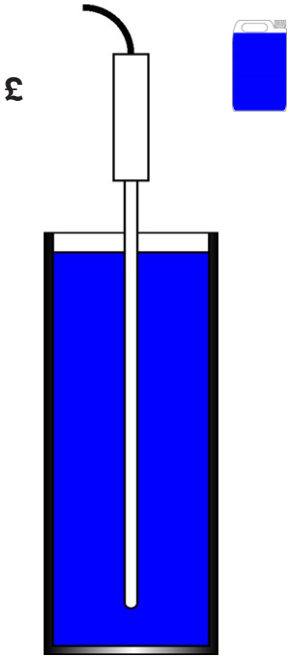
Stirred liquid baths most commonly use suitable oils to higher temperatures and alcohol or specialist fluids for low temperatures. These fluids can be costly and will require replacing from time to time. This is of course true for all stirred liquid calibration baths and the cost of both the initial and on-going requirement needs to be considered when selecting a bath.



http://www.isotech.co.uk

Isotech baths are purpose designed for thermometer calibration with cylindrical calibration volumes of good depth. Compared to other large rectangular designs Isotech baths require less fluid for the same depth and can offer significant initial and on-going cost savings.





Recommendations

Use a true thermometry bridge to compare the thermometer under test to the standard thermometer. This method gives the smallest uncertainties. Isotech can provide further advice and training. We have over 30 year's experience and operate a UKAS (ISO 17025) Laboratory.

Using our baths our CMC using stirred liquid baths is from 4 to 7mK, our full schedule is on the website.

Measured Quantity Instrument or Gauge	Range	Calibration and Measurement Capability (CMC) Expressed as an Expanded Uncertainty (k = 2)	Remarks
TEMPERATURE (cont'd)			
Platinum resistance thermometers			
Calibration by comparisons	- 80 °C to - 40 °C - 40 °C to + 50 °C 50 °C to 156 °C 156 °C to 300 °C	7.0 mK 4.0 mK 5.0 mK 6.5 mK	

Extract from UKAS Schedule

Isotech Laboratory Bath Selection Guide

Parallel Tube Liquid Bath - **Model 915**

- Best performance
- -65°C to 300°C
- Removable Chiller Probe

25 Years of proven use

Parallel Tube Liquid Bath - **Model 785**

- Best performance
- -80°C to 300°C.
- Integral Cooling
- 485mm Immersion

Updated 915 – recommended for new installations

Stirred Liquid Bath - **Model 796**

- Good Value
- -80°C to 300°C
- 470mm Immersion

Competitively Priced Laboratory Bath with extended immersion

Stirred Liquid Bath - **Model 798**

- -80°C to 300°C
- Good Value
- 300mm Immersion

Competitively Priced Laboratory Bath with standard immersion

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