

Introduction to the Isocal-6 Calibration System

What is Isocal-6?

Isocal-6 is a range of calibration systems that can calibrate all types of thermometer and share common features.

What is special about the Isocal-6 range?

Previously temperature calibration baths were specified by type, e.g. A Dry Block Bath, A Liquid Bath etc.

With the Isocal-6 different accessories are added to the Isocal-6 to allow it to be used in many different modes providing a solution for all temperature sensor calibration requirements.

What are these different modes?

The Isocal-6 includes a removable insert as standard for use as a Dry Block Calibrator, with optional accessories the Isocal-6 can perform as:

A Stirred Liquid Bath**A Stirred Ice Bath 0°C Reference** *(Not the Calisto)***A Blackbody Source for IR thermometers****A Calibrator for Surface Sensors****An ITS-90 Fixed Point Apparatus****What if only one option is required?**

One of the advantages is that you need only purchase the desired option but other accessories can be added at any time.

What temperature range is covered?

Different models cover the temperature range from below -40°C to 250°C, above this maximum temperature it is not practical to use a stirred liquid bath. For higher temperatures see the other Dry Block Calibrators that go to 1200°C, many with accessories for Surface Sensor and Blackbody use.

What Performance can be achieved?

This varies on the way it is used, for an ITS-90 fixed point apparatus uncertainties of better than 0.001°C can be achieved - see the uncertainty graphs for other modes of operation.

International Support?

Isotech have a global network of authorised agents and distributors providing both before and after sales support.

Made to last?

All Isotech products are engineered for long life. If you have ever tried to get inside the dashboard of a motor car you will appreciate that cheapness goes with inaccessibility for repair and maintenance. Isotech's products are designed for long life, easy repair, accessibility and maintenance.

The ISOCAL-6 is currently subject to a patent application (reference 9900158.8).

The ISOCAL-6[®] is the only calibration system in the World (patent application 9900158.8) to offer you six calibration baths in a single simple product.

1 Metal Block Bath

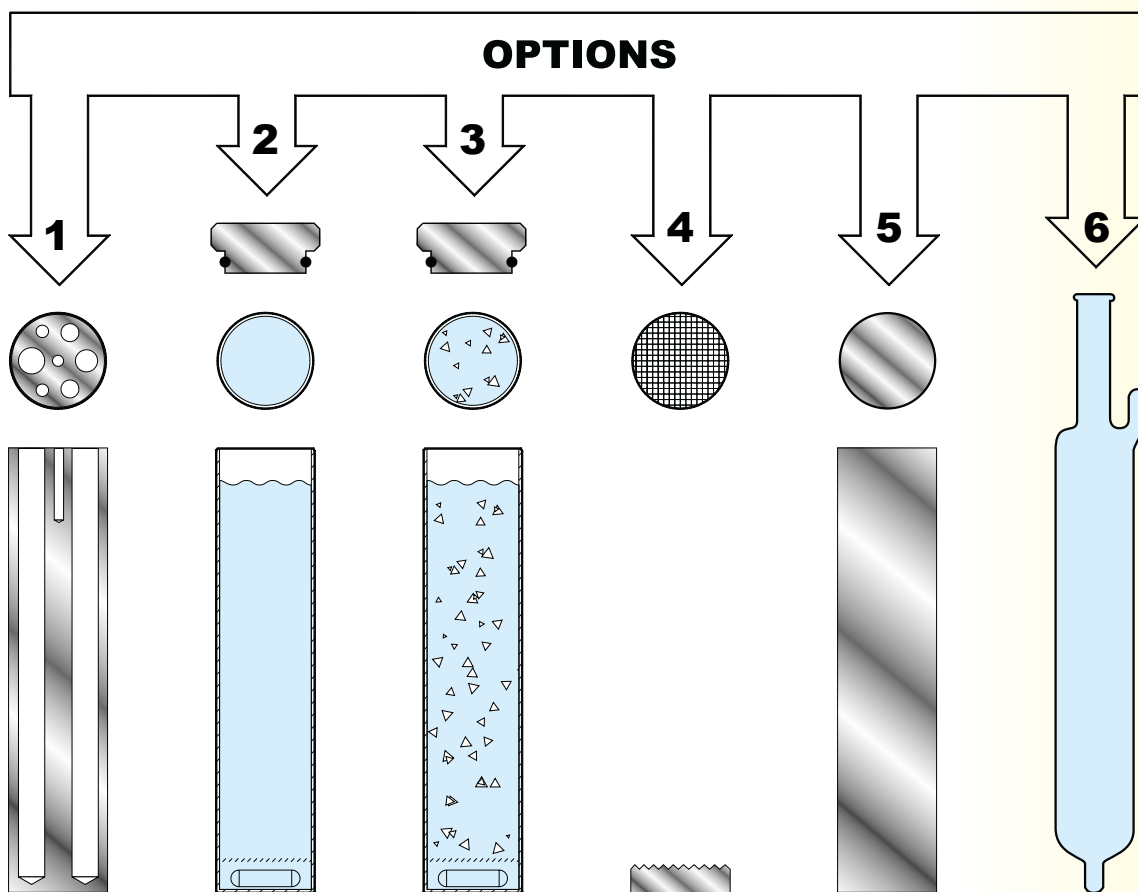
2 Stirred Liquid Bath

3 Stirred Ice/Water Bath

4 Black Body Source

5 Surface Sensor Calibrator

6 ITS-90 Fixed Point Apparatus



This schematic shows the six options available for the ISOCAL-6[®] range of calibration baths.

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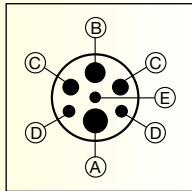


AS A METAL BLOCK BATH . . .

The massive 35mm diameter by 160mm deep insert can be pre-drilled for you to accommodate a variety of sensor sizes and will give better than 0.1°C accuracy by comparison. The standard drilled metal block insert is shown below.

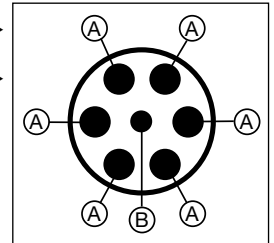
METAL
BLOCK
BATH

▼ Europa^{PLUS}, Venus^{PLUS} 2140, Calisto^{PLUS} 2250



- A. 9.50mm diameter hole, 157mm deep
- B. 8.00mm diameter hole, 157mm deep
- C. 6.40mm diameter hole, 157mm deep
- D. 4.50mm diameter hole, 157mm deep
- E. M4 tapped hole for extraction tool

Oceanus-6^{PLUS}



- A. 8.00mm diameter hole, 250mm deep
- B. M4 tapped hole for extraction tool

CONTACT ISOTECH FOR A FREE EVALUATION REPORT

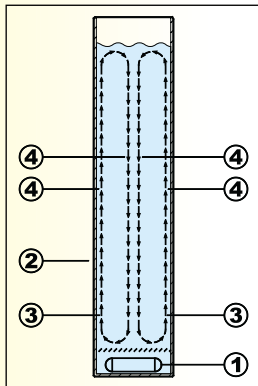


AS A STIRRED LIQUID BATH . . .

Just slide out the metal block insert and replace it with the sealed container of liquid. Take off the lid and you have a high quality liquid bath of the same dimensions as above.

The exciting part about the liquid bath is that it has a variable stirring action so that, like our larger liquid baths, the stirring action can be optimised for the viscosity of the liquid being used to give near perfect isothermal conditions (typically $\pm 0.005^\circ\text{C}$). The liquid circulation pattern is shown in the diagram below.

STIRRED
LIQUID
BATH



The magnetic stirrer (1) at the base of the container spins and imparts a centrifugal force on the surrounding liquid.

The liquid moves under this force to the sides of the container (2) and is replaced by liquid from above (3). This combined action causes the flow pattern indicated (4).

The liquid bath option is ideal for odd shaped sensors, fixed immersion liquid in glass thermometers and some total immersion liquid in glass thermometers.

CONTACT ISOTECH FOR A FREE ARTICLE EXPLAINING IMMERSION EFFECTS



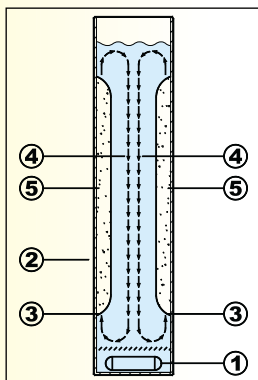
AS A STIRRED ICE / WATER BATH (0°C) . . .

If the liquid is water and the bath set to -4°C ice crystals will form in the water, creating the perfect stirred ice/water bath for the verification of standard thermometers.

Your standard thermometer will have been calibrated. You need to check regularly that your standard thermometer has not drifted outside its calibration values. The usual way to do this is to regularly check and log the Ice / Water (0°C) value. This option is ideal for re-checking your standards.

You can also set the ISOCAL-6 to 100.1°C and boil the water to give a second fixed temperature.

STIRRED
ICE/WATER
BATH



The magnetic stirrer (1) at the base of the container spins and imparts a centrifugal force on the surrounding liquid.

The liquid moves under this force to the sides of the container (2) and is replaced by liquid from above (3). This combined action causes the flow pattern indicated (4).

As the water flows past the ice mantle (5) it is brought to 0°C before coming in contact with the thermometers being calibrated.

CONTACT ISOTECH FOR ARTICLES ON CALIBRATION METHODS

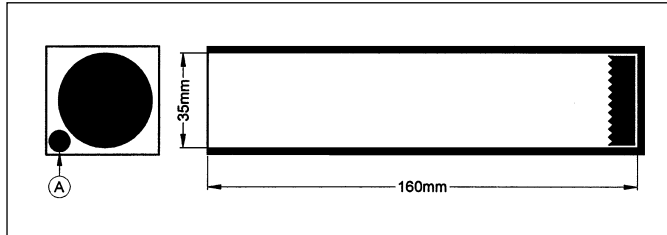
VENUS
MODELS
ONLY



BLACK BODY

AS A BLACK BODY BATH . . .

The well of the ISOCAL-6 is black anodised and by inserting a black matrix into the bottom of the well a black body source with emissivity above 0.995 is created for the calibration of Radiation Pyrometers.



The standard thermometer is placed in the calibration hole provided (A) and the temperature is set by the controller.

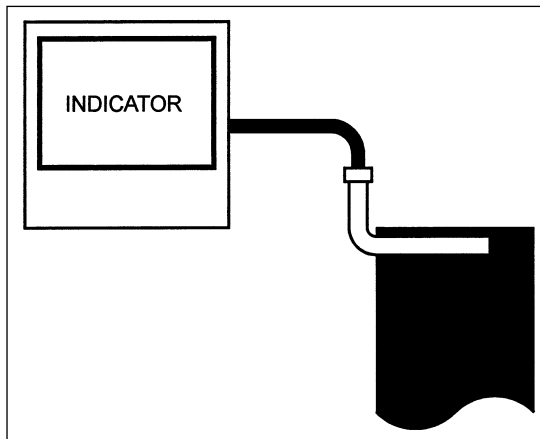
Once stabilised, radiation pyrometers can be aligned with the cavity and calibrated.



SURFACE SENSOR

AS A SURFACE SENSOR CALIBRATOR . . .

To calibrate surface temperature sensors a special insert is used in which a platinum resistance thermometer (PRT) is located just below the surface to measure the temperature of the top face.



The surface probe to be calibrated is placed on the top face above the platinum resistance thermometer and their temperatures are compared.

Inserts of other materials can be used which are more representative to the surface the probe is normally used with.

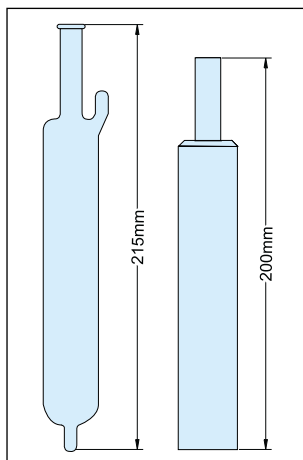
VISIT OUR WEBSITE [HTTP://WWW.ISOTECH.CO.UK](http://www.isotech.co.uk)
FOR MORE INFORMATION



ITS-90 FIXED

AS AN ITS-90 FIXED POINT APPARATUS . . .

Fixed Point Calibration - The most accurate temperatures are the Fixed Points of ITS-90 and of these the Fixed Points of the Water Triple Point and the Gallium Melting Point have the smallest uncertainties.



This option enables you to upgrade your ISOCAL-6 to a full ITS-90 apparatus for the realisation of fixed point - again for the re-checking of your standard thermometers - to an accuracy of $\pm 0.001^{\circ}\text{C}$.

Model

Venus 2140

Calisto 2250

Cells Available

Water Triple Point Cell
Gallium Melt Point Cell

Gallium Melt Point Cell
Indium Melt Point Cell