

# ITS-90 Isothermal Towers

## ISO Tower

- High accuracy
- Fast to temperature
- Simple to use

The most accurately defined temperatures are those defining points (fixed points) of ITS-90.

The leading Primary Laboratories use large fixed point cells in deep calibration furnaces that utilise Heat Pipes to eliminate temperature gradients. This combination of cell and furnace gives the smallest of uncertainties.

In Isothermal Towers the fixed point cell and heat pipe (or heat siphon) have been combined (patent applied for) to produce the ideal realisations for calibrating standard thermometers.

Thermometers can only be calibrated accurately if they are immersed sufficiently.

In Isothermal Towers a heated block (Immersion Compensator, patent applied for) sits on top the heat siphon/cell to fully compensate for the immersion characteristics of the unit under test.

The Isothermal Towers performance has been fully evaluated against the most detailed and demanding requirements ever written: CCT/2000-13.

All Isothermal Towers; Indium, Tin, Zinc and Aluminium meet all the requirements of CCT/2000-13 allowing laboratories to realise the smallest uncertainties, at a fraction of the cost of conventional Metrology Furnaces with Primary Standard Cells

You can purchase three Isothermal Towers; Tin, Zinc and Aluminium for a similar price as one conventional cell and heat pipe apparatus!



Isothermal Towers are simple to use, and very robust. Operation is risk free, as a combined apparatus there is no need to handle a fragile cell. No need for specialist training courses. Isothermal Towers remove the mystery from fixed point calibration.

Easily set to provide a melt or freeze of 24 hours or more, lending themselves for automatic calibration and providing your lab with an all day long plateau.



### Perfect Audit Item

As an audit item, an accreditation authority can send the device to laboratories for intercomparison.

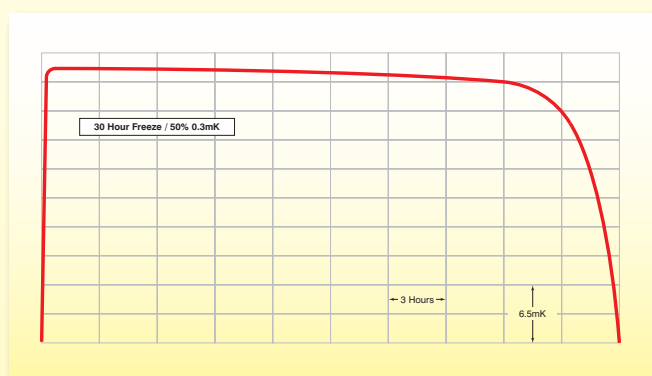
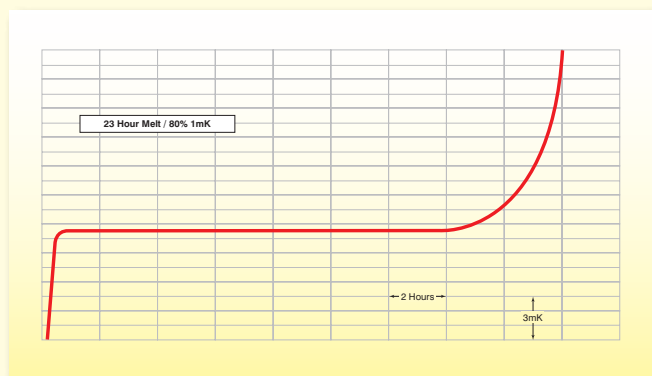
Because the cell, apparatus and immersion compensator are a single entity, the performance is unambiguous unlike existing systems where cell and apparatus are often separated during intercomparison. Accreditation authorities love them.

### Available to Hire

Additionally Isothermal Towers are available to hire from Isotech and a growing number of Isotech Distributors to allow laboratories to audit themselves by intercomparing their cells and standard thermometers to a UKAS calibrated Isothermal Tower.

### Transportable

ITS-90 Isothermal Towers are transportable by carrier; there are no fragile glass parts!

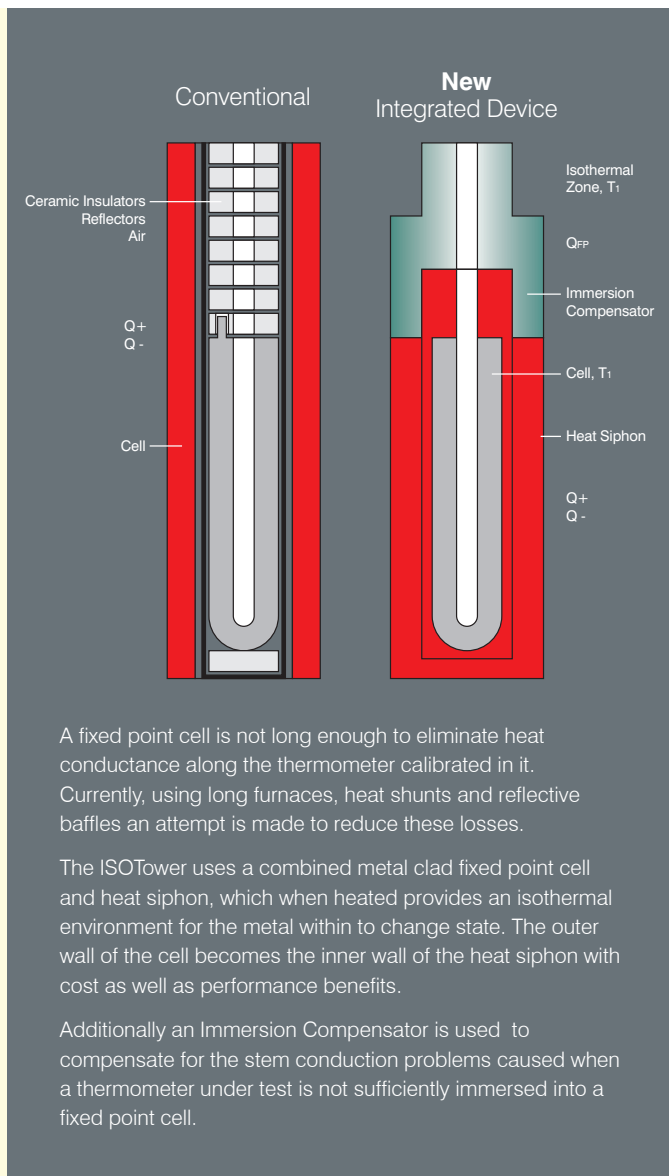


- Isothermal Towers include a traceable calibration certificate.

This includes a graph of one freeze, one melt plateau and a certificate of purity for the metal inside the siphonic cell.

As an option, UKAS calibration is available to one of two services, see table over for the uncertainties.

Full data available at [www.isotech.co.uk/isotower](http://www.isotech.co.uk/isotower)



A fixed point cell is not long enough to eliminate heat conductance along the thermometer calibrated in it. Currently, using long furnaces, heat shunts and reflective baffles an attempt is made to reduce these losses.

The ISOTower uses a combined metal clad fixed point cell and heat siphon, which when heated provides an isothermal environment for the metal within to change state. The outer wall of the cell becomes the inner wall of the heat siphon with cost as well as performance benefits.

Additionally an Immersion Compensator is used to compensate for the stem conduction problems caused when a thermometer under test is not sufficiently immersed into a fixed point cell.

## Benefits of the ISOTower over a conventional Quartz Cell and Apparatus

### ISOTower

- Robust - no glass parts
- Easily Transported
- Integrated Device - known immersion characteristics
- Uniquely integrated cell, apparatus and correction for thermometer stem conduction
- Simple and safe to use with increased confidence in results

### Conventional Quartz Cell and Apparatus

- Fragile and Risk of Breakage
- Difficult and expensive to Transport
- Cell certified separate from apparatus, stem conduction unknown

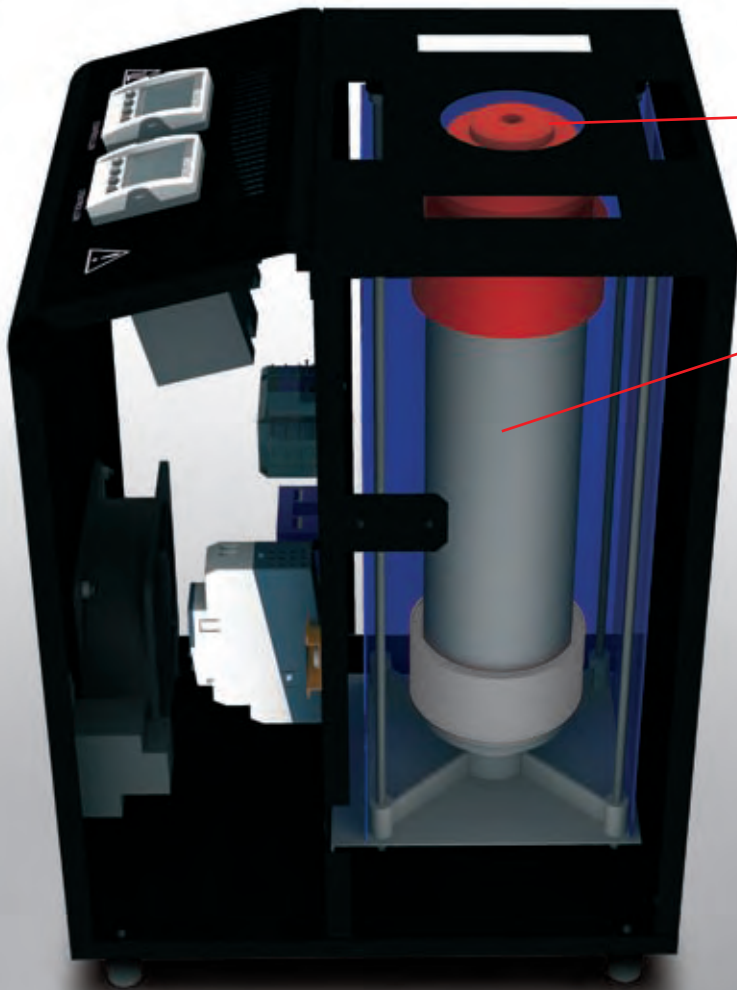
**Specification**

Model	490	491	492	493
ITS-90 Point	Indium	Tin	Zinc	Aluminium
Temperature	156.5985°C	231.928°C	419.527°C	660.323°C
Metal Purity	6N	6N	6N	6N
Plateau Duration	Up to 30 hrs			
UKAS Uncertainty: Premium Service*	±0.7mK	±0.8mK	±1mK	±2mK
UKAS Uncertainty: Standard Service*	±2mK	±2mK	±2mK	±6mK
Heating Time	2 hrs	2 hrs	2 hrs	2 hrs
Pocket Diameter	8 mm			
Total Immersion Depth	290 mm			
Depth of metal surface to bottom of reentrant tube	180 mm			
PC Interface	Supplied with PC Cable and Software			
Power	900 Watts			
Voltage	110 Vac or 230 Vac 50/60Hz			
Dimensions	H 430 mm x W 310 mm x D 300 mm			
Weight	15kg			

\* UKAS Calibration is Optional, Uncertainties apply to whole system

**Patented**

ISOTowers are unique to Isotech and protected by two patents - the first relates to the immersion compensator and the second to the Siphonic Cell with the integration of a heat pipe and fixed point cell.



■ **Immersion Compensator**

Fully compensates for the immersion characteristics of the thermometer under test.

■ **Siphonic Cell**

*A combined Fixed Point Cell and Heat Pipe*

The outer wall of the fixed point cell is the inner wall of the heat pipe or siphon, thus integrating the cell and its apparatus, giving a guaranteed performance from the cell.



**Patented**

*The Siphonic Cell and Immersion Compensator are both patented*



## ISOTowers – International Acceptance and Intellectual Property Update

The innovative ITS-90 Isothermal Towers (ISOTowers) were first conceived in 2007 offering improvements to the fixed point calibration of thermometers. ISOTowers allow a robust, simple to use desktop cell apparatus to deliver the low uncertainties previously associated only with the Primary Laboratory.

ISOTowers combine the ITS-90 Fixed Point with a heat siphon forming a 'siphonic cell' and feature an 'Immersion Compensator' to compensate for stem conduction problems.

The resulting calibration solution is a desktop device, capable of the smallest of calibration uncertainties for SPRTs; rather than a large expensive furnace housing a fragile cell.



John Tavener says, "The ISOTower range is now proven to be the most innovative product range in decades and brings a no compromise user friendly fixed point calibration to a wide audience at an affordable price... the novelty of the ISOTower has been accepted by the Intellectual Property Office."

The patent applications around the siphonic cell and immersion compensator have now been granted. Adding to this excitement in the same week that the patents were awarded KlasmeierKalibrier- und Messtechnik (KK) achieved formal accreditation from DAkkS (the national accreditation body for Germany, formerly DKD). With uncertainties for the calibration of SPRTs:-

ISOTower	Temperature °C	Uncertainty °C k=2	Uncertainty mK k=2
ISOTower 491 Tin	231.928	0.003	3
ISOTower 492 Zinc	419.527	0.003	3
ISOTower 493 Aluminium	660.323	0.005	5

Commenting Peter Klasmeier says, "after the effort of gaining accreditation we can now benefit with very efficient calibration of SPRTs to the smallest of uncertainties."



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