# Isotech Metrology Furnace Updates

2020 Updates

Issue – 01.1









#### INTRODUCING ISOTECH

A world leader in temperature metrology Celebrating 40 years in business 1980 - 2020 Holds Queen's Award for Enterprise in the Innovation Category





Isotech Furnaces In use in the world's leading National Metrology Institutes since 1990

156.5985°C

-38,8344°C

Isotech Furnaces and Fixed-Point Cells are used as Primary Standards across the world

High Purity Metals: The Best Cells

#### Isothermal Furnaces: The Best Furnaces

• Long Plateaus - Low Uncertainties

**Long Plateau -** Plateau lengths at the silver point of over 70 hours (3 days) have been achieved using our furnaces





#### **CONFIDENCE IN ISOTECH**

Isotech are accredited to calibrate ITS-90 Fixed Point Cells to the Lowest of Uncertainties



#### UKAS Schedule

Full Details: <u>https://bit.ly/ISO-UCT</u>



Fixed point cells		
See Note 6		
TP Argon	- 189.3442 °C	0.80 mK
TP Mercury	- 38.8344 °C	0.20 mK
TP Water	0.01 °C	0.070 mK
MP Gallium	29.7646 °C	0.070 mK
FP Indium	156.5985 °C	0.65 mK
FP Tin	231.928 °C	0.60 mK
FP Zinc	419.527 °C	0.90 mK
FP Aluminium	660.323 °C	1.1 mK
FP Silver	961.78 °C	2.0 mK

#### 2020 UPDATES – FURNACE IMPROVMENTS

**Isotech Furnaces Evolve** 

Isotech furnaces have been further developed from their launch in 1990

We introduce new features arising from both experience and changes in technology

#### Isotech Furnaces Evolve

In 2006 we added DUAL Furnaces – the worlds only fixed point furnace to include a second furnace for heat treating SPRTs



#### LATEST TECHNOLOGY

Our first furnaces had thumb wheel setpoint entry, that was updated to high resolution digital devices – all have delivered world leading stability

In 2016 we added new features to make the Isotech Furnaces the most advanced – featuring dynamic optimisation, temperature programmers, high resolution colour displays and Ethernet interfaces



# 2020 Updates

From our own ongoing experience and customer feedback, 2020 sees updates to the Isotech Furnace Range to deliver the same proven performance and advanced features but with a number of convenience upgrades to make your life easier



## 1: Repositioned Controllers

Now that Isotech furnaces have more features, it makes sense to move the controller position to make operation easier than ever











![](_page_10_Picture_3.jpeg)

![](_page_10_Picture_4.jpeg)

# Advanced Controller Features

The furnaces feature crystal clear colour displays.

Designed by Metrologists for Metrologists

## Advanced Controller Features

Dynamic Optimisation automatically adjusts both the control parameters and calibration data at each fixed-point temperature

The furnaces include a program option to set the melt and freeze temperatures automatically

Control data is continually logged and can be exported to a USB Drive

The furnaces all have an Ethernet connection for remote monitoring and control

![](_page_11_Picture_5.jpeg)

![](_page_12_Picture_0.jpeg)

#### 2:Thermometer Stand Included

Metrologists realise how important it is to safely support SPRTs

Especially so at high temperatures

Our 2020 update includes a fully adjustable support to safely hold your SPRTs

![](_page_12_Picture_5.jpeg)

### 3: Adjustable Accessories

![](_page_13_Picture_1.jpeg)

Our furnaces now feature and include "Accessory Pods" and "Cable Tidies"

Designed by Metrologists for Metrologists

# 3: Accessory Pods

Avoid the clutter on top of furnaces

Each furnace includes two Accessory Pods - they can be simply attached at a number of mounting points on either side of the furnace

![](_page_14_Picture_3.jpeg)

# 3: Cable Tidies

Safely Secure SPRT Leads

Each furnace also includes two Cable Tidies- again they can be simply attached at a number of mounting points on either side of the furnace

Tidy SPRT cables to reduce the hazard of a cable getting pulled or caught

Designed by Metrologists for Metrologists

![](_page_15_Picture_5.jpeg)

Isothermal Environments for Long Plateaus Safe Convenient Operation Four Decades of Proven Experience

![](_page_16_Picture_2.jpeg)

Heatpipes operating from 150°C to 1100°C to suit Indium to Copper Cells

'Dual' combined Annealing and Fixed Point Furnaces

Ethernet Built in

Temperature Programmer

![](_page_17_Picture_5.jpeg)

## Isotech: Widest Range of Heatpipe Furnaces

Isotech Metrology Furnaces have been in use in world leading National Measurement Institutes

Widest range of heat pipes covering Indium (156°C) to Copper (1084°C)

#### Why Heatpipes?

"A heatpipe is a self-contained structure which achieves very high thermal conductance by means of two-phase fluid flow with capillary circulation"

![](_page_18_Figure_6.jpeg)

## Dual Furnaces

*The no compromise approach, for Fixed Points and to Maintain Thermometers* 

These furnaces also use heatpipes to provide an essentially gradient free environment to melt and freeze the ITS-90 fixed points

The second independent furnace is used to pre-warm and anneal the thermometers being calibrated

This concept of heatpipe and second furnace for pre and post conditioning the thermometers in a single apparatus was developed from a concept of Dr Marcarino of IMGC, Italy

![](_page_19_Picture_6.jpeg)

## Three Zone Furnaces

All heatpipes have a limited operating range, determined by the choice of fluid that flows inside the pipe

Furnaces without heatpipes can work over wider temperature ranges and require less financial investment

Isotech offer two models of Three Zone Furnaces, one from 50°C to 700°C and another from 200°C to 1200°C

These furnaces use top and bottom guard heaters to minimise gradients

![](_page_20_Picture_6.jpeg)

### Further Information

Isotech Metrology Furnaces

http://isotech.co.uk/primary

![](_page_21_Picture_3.jpeg)

![](_page_22_Picture_0.jpeg)

![](_page_22_Picture_1.jpeg)

![](_page_22_Picture_2.jpeg)

# **World Leader in Temperature Metrology**