THE QUEEN'S AWARDS FOR ENTERPRISE: INNOVATION 2017

ISOTECH

ISOTHERMAL TECHNOLOGY LTD

Issue 1.03: 26 May 2017

Choosing a Dry Block

Part One: Sensor Sizes

Part Two: Temperature Ranges and features

Part Three: Basic, Site or ADVANCED

Part Four: Calibration Options

Choosing a Dry Block

First Question: what size are the thermometers to be calibrated?

Choosing a Dry Block

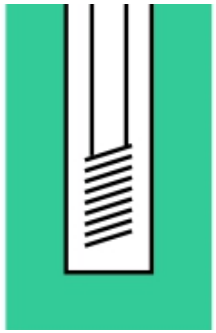
What size are the thermometers to be calibrated?

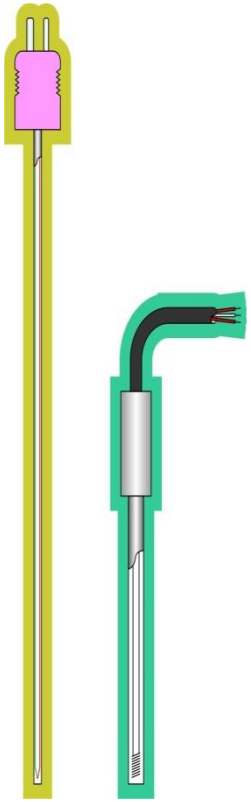
The Dry Block must have a block large enough and deep enough to suit the test thermometers

Choosing a Dry Block

What size are the thermometers to be calibrated?

PRT or RTDs and thermocouples are commonly calibrated in blocks 140 to 160mm deep

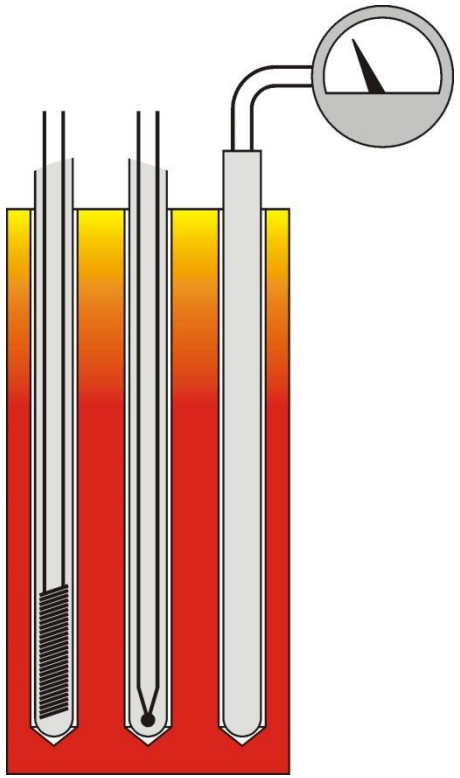




Choosing a Dry Block

What size are the thermometers to be calibrated?

But other sensors may demand greater depth



Choosing a Dry Block

Isotech have depths from 115mm to 300mm and diameters from 25 to 65mm

Choosing a Dry Block: Insert Size

Fast-Cal - 25mm x 148mm

Standard Thermometer Pockets:

2 x4.5mm, 1 x 6.5mm and 1 x 8mm

Others to special order

http://isotech.co.uk/fast

Fast response highly portable operation

Choosing a Dry Block: Insert Size

Isotech 4000 Range 35 x 160mm

Standard Thermometer Pockets:

2 x4.5mm, 2 x 6.5mm, 1 x 8mm and 9.5mm

Others Available

http://www.isotech.co.uk/4000

35mm Diameter for More Pockets – and more featured Dry Blocks

Choosing a Dry Block: Insert Size

Isotech 65mm Diameter Blocks

Room for many more thermometers or bigger thermometers – depth to 160mm

http://www.isotech.co.uk/4000

65mm Diameter for even more Pockets – and more featured Dry Blocks

Choosing a Dry Block: Insert Size

Isotech “Deep” Blocks

Depth to 300mm x 50mm diameter

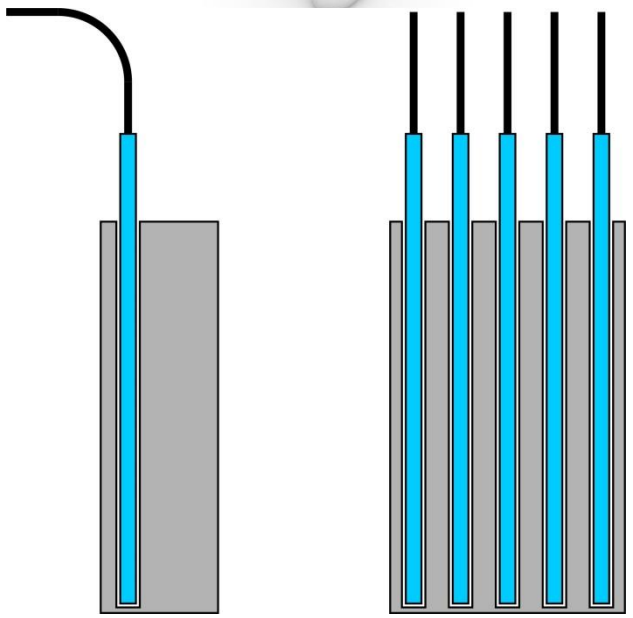
http://www.isotech.co.uk/deep

Greater Depth

Response Times

Smaller Blocks like Fast-Cal heat and cool much more quickly than large blocks

What is most important? Speed of response or ability to calibrate several sensors in one go?



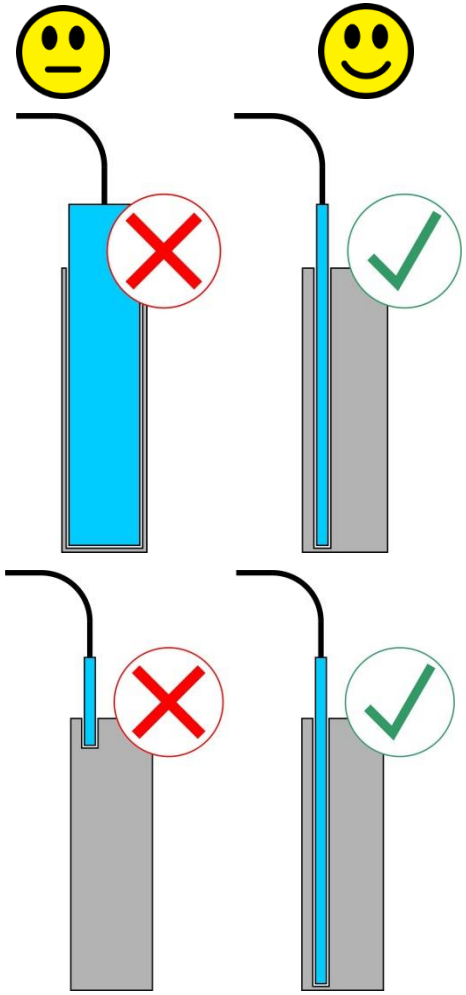
Top Tips

Adequate Thermal Volume

Keep probe or probes small compared to mass of block

Ensure Good Immersion Depth

Ensure sensors are sufficiently immersed

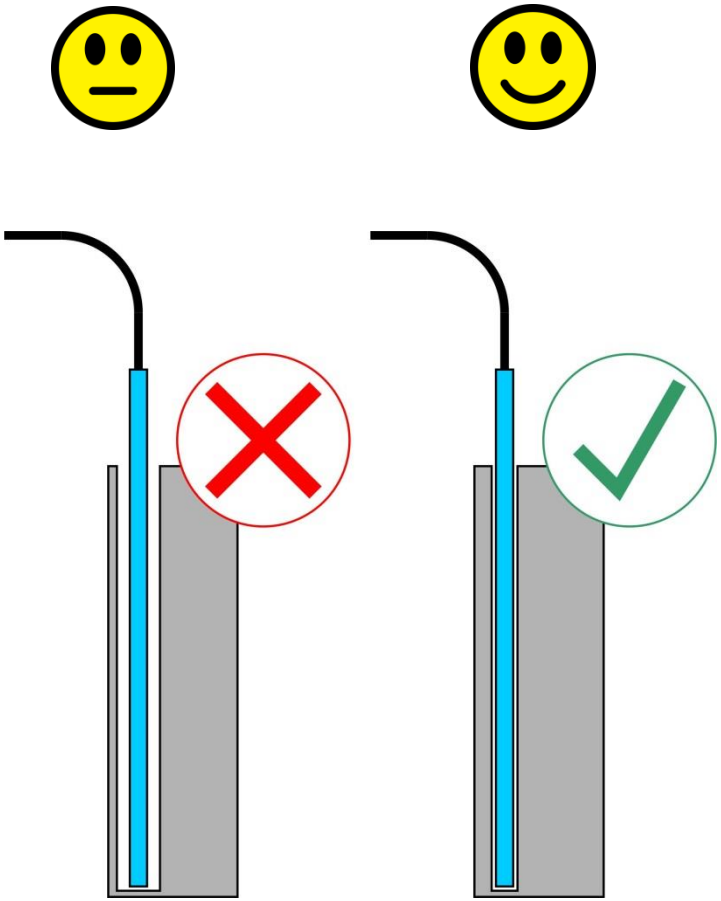


Top Tips

Hole Sizes

Generally make pockets 0.5mm larger than probe size

In Dry Blocks - avoid liquids or other transfer mediums



Learn More: Further Information

More Information About Depth

How Hot is Your Block

Considering depths of immersion and probe sensors in Dry Blocks.

READ NOW

Industrial Measurements with Very Short Immersion

The challenge of measuring with short immersion; including surface temperatures.

READ NOW

Temperature Calibration; Depths of Immersion

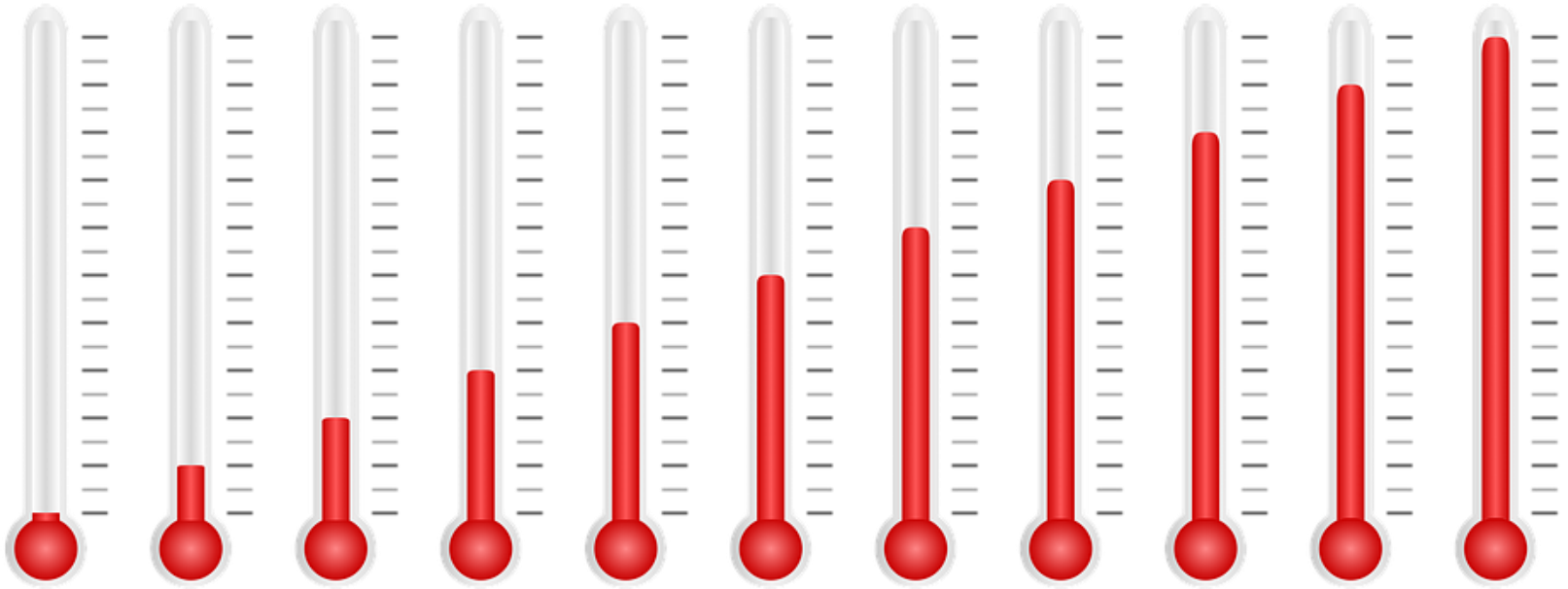
Of all the sources of errors and uncertainties in thermal calibration by far the largest source of error and least understood effect is that of immersion of unit under test, and the reference standard.

READ NOW

http://bit.ly/2j14lWg

Choosing a Dry Block

Part Two temperature range; and multifunctional calibrators



Choosing a Dry Block

What temperature range needs to be covered?

Dry Blocks can go as low as -100°C and as high as 1200°C

There are four general categories

Choosing a Dry Block

Cryogenic Blocks

Isotech Model 525

-100°C to 40°C

Uses a Free Piston Stirling Cooler

Choosing a Dry Block

Isotech Model 525

Pros

Operation to -100°C

Good for on site validation and calibration at low temperatures

Cons

Higher cost and less portable than our other ranges

http://bit.ly/2kiyKip

Choosing a Dry Block

“Peltier Blocks”

Models covering -45°C to 140°

http://isotech.co.uk/fast

http://www.isotech.co.uk/4000

http://www.isotech.co.uk/deep

Choosing a Dry Block

Peltier Blocks

Pros

Fast

Portable

Good Value

Multi Purpose

Cons

Minimum Temperature -45°C

Choosing a Dry Block

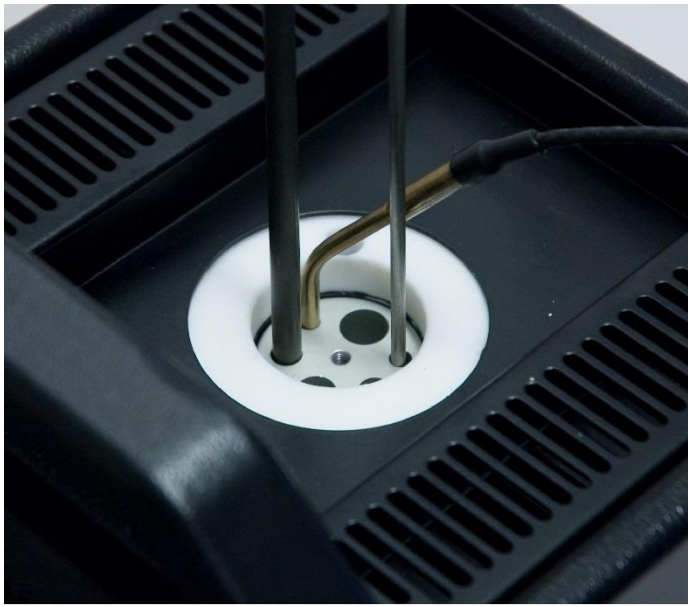
Isotech Isocal-6 Models

http://www.isotech.co.uk/4000

ISOCAL 6 options… What are they?

The ISOCAL-6 models can be used as Dry Blocks but also as

- Liquid Baths
- A Stirred Ice Bath
- Blackbody Sources
- Surface Sensor Calibrators
- ITS-90 Fixed Points



1: Dry Block Operation

YouTube Video

ISOCAL 6 options… What are they?

2. Stirred liquid bath operation
   - Awkward shaped sensors
   - Improved accuracies
   - Use with reference probe

YouTube Video

ISOCAL 6 options… What are they?

3. Stirred Ice bath

   Simple, but effective 0°C ice bath

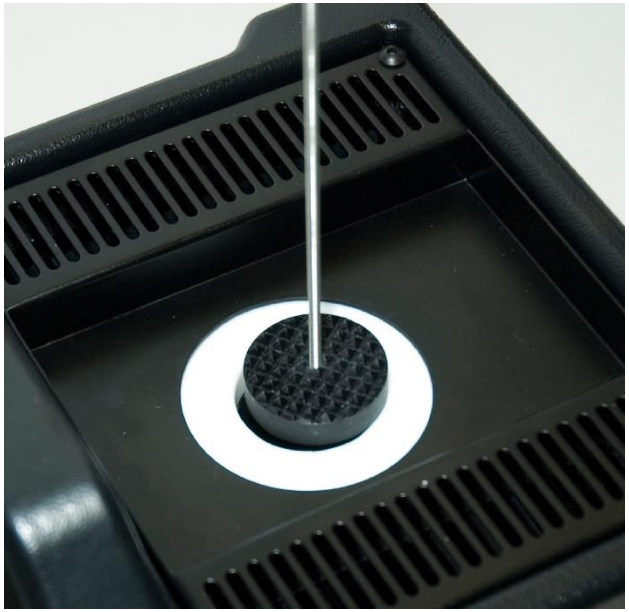
   Check for drift in thermometers

YouTube Video

ISOCAL 6 options… What are they?

4. Blackbody Source

   Test and check low cost IR thermometers

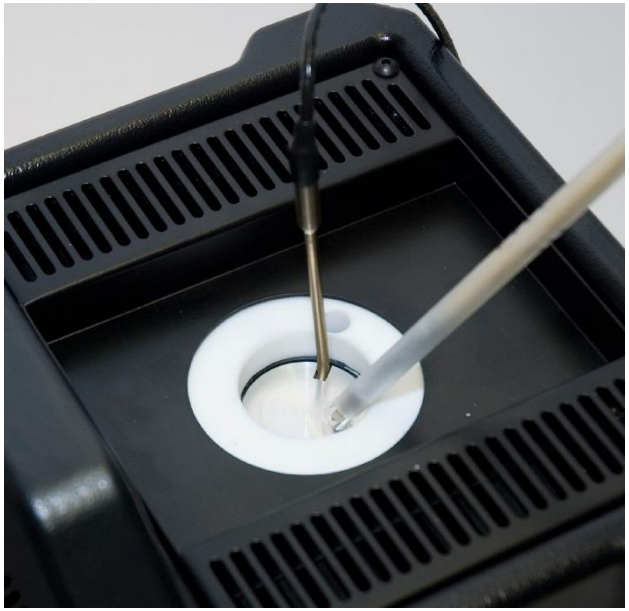


YouTube Video

ISOCAL 6 options… What are they?

5. Surface sensor kit

   Save on the cost of additional equipment for surface sensor calibration



YouTube Video

ISOCAL 6 options… What are they?

6. ITS- 90 Fixed points
   - 17724 Mercury slim cell
     - Europa
   - B8 Water Triple point cell
     - Venus/Europa/Hyperion
   - 17401 Gallium slim cell
     - Venus/Europa/Hyperion

YouTube Video

Choosing a Dry Block

Higher Temperatures

Models covering 30°C to 700°C

http://isotech.co.uk/fast http://www.isotech.co.uk/4000 http://www.isotech.co.uk/deep

Choosing a Dry Block

Higher Temperature Blocks

Pros

Fast

Portable

Best Value

Multi Purpose

Cons

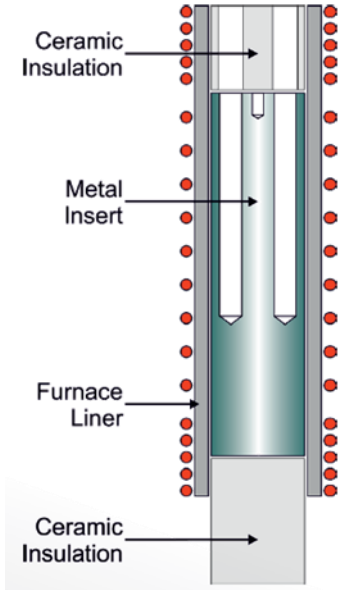
Minimum Temperature 30°C

Slow Around Ambient Temperatures

Choosing a Dry Block

Highest Temperature: 150 to 1200°C

Thermocouple Calibration Furnace



http://www.isotech.co.uk/4000

Choosing a Dry Block

Portable Thermocouple Calibration Furnace

Pros

High Temperature Thermocouple C

Portable

Cons

Minimum temperature 150C

To Span Wider Ranges…

May Need More than One Heat Source

E.g. 0°C to 650°C – need two dry blocks

But is 0°C really needed?

If it is… how about an ice flask for 0°C and then a 650°C Dry Block

Choosing a Dry Block

Part Three… ADVANCED, Site or Basic?

Choosing a Dry Block: Basic Models

“BASIC Models”

http://isotech.co.uk/fast http://www.isotech.co.uk/4000 http://www.isotech.co.uk/deep

Choosing a Dry Block: Basic Models

BASIC version

Heat source with digital display of set and nominal block temperature

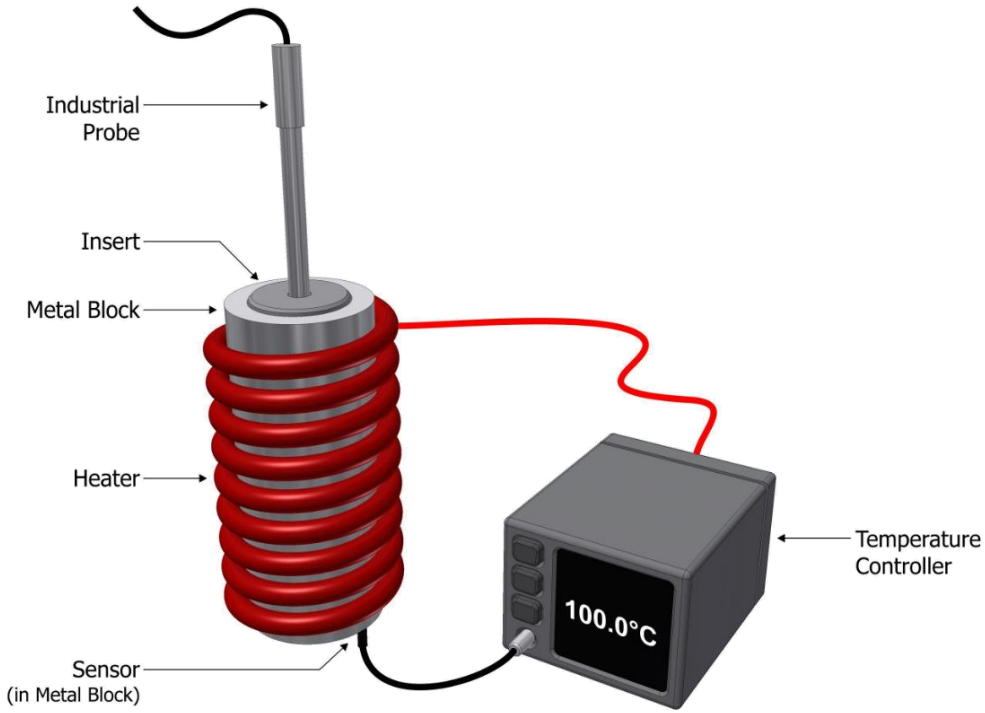
Most Models Have

- Field changeable units °C - °F – K
- Autotune feature
- Setpoint ramp feature
- PC Serial interface

Using a Basic Calibrator

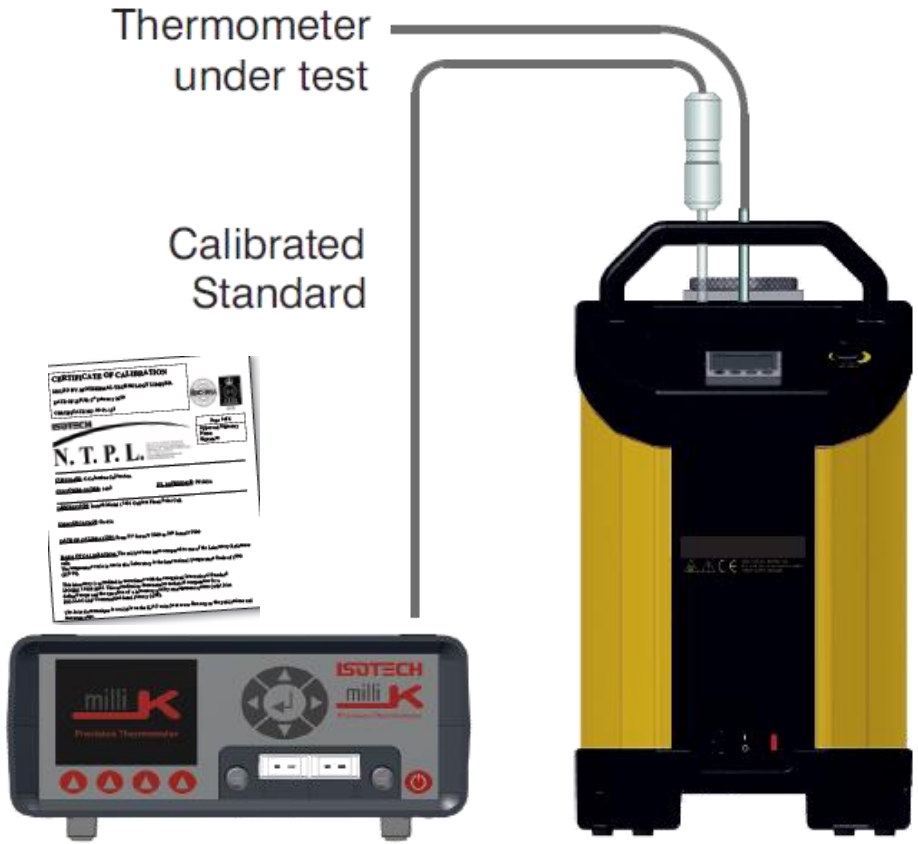
The thermometer under test is compared to the dry block controller value

Useful for moderate temperature ranges and quick testing



Using a Basic Calibrator

Can be used with an external indicator for better performance



Choosing a Dry Block: Site Models

“Site Models”

http://isotech.co.uk/fast http://www.isotech.co.uk/4000 http://www.isotech.co.uk/deep

Choosing a Dry Block: Site Models

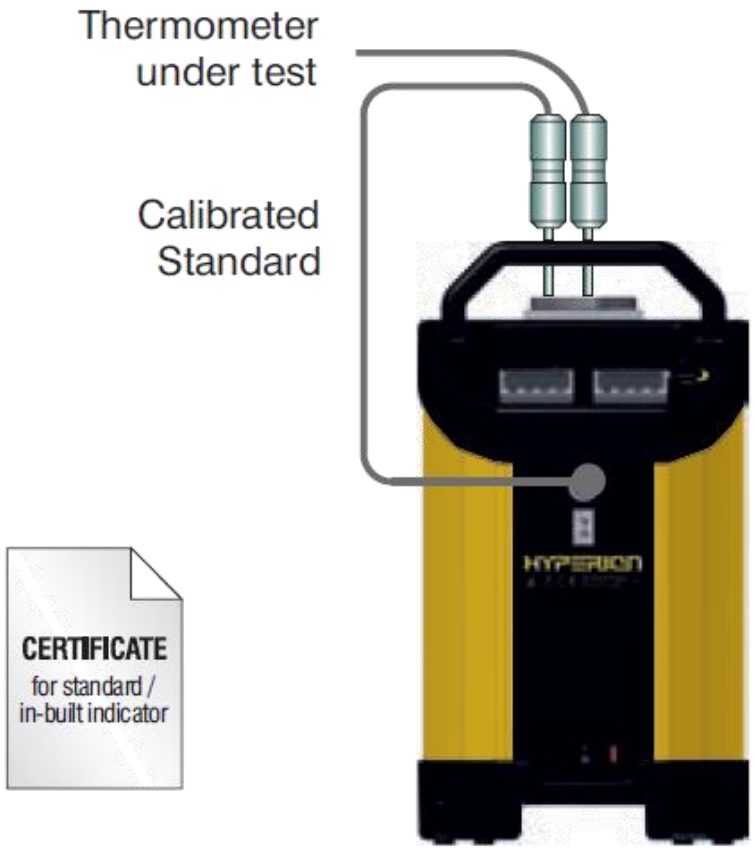
The Site model

All the features of the BASIC version

with the addition of an independent indicator to use as the reference channel

Supports single “Switch” testing with reversible polarity

Using the Site (S) Model



Choosing a Dry Block: ADVANCED Models

“ADVANCED Models”

http://www.isotech.co.uk/4000

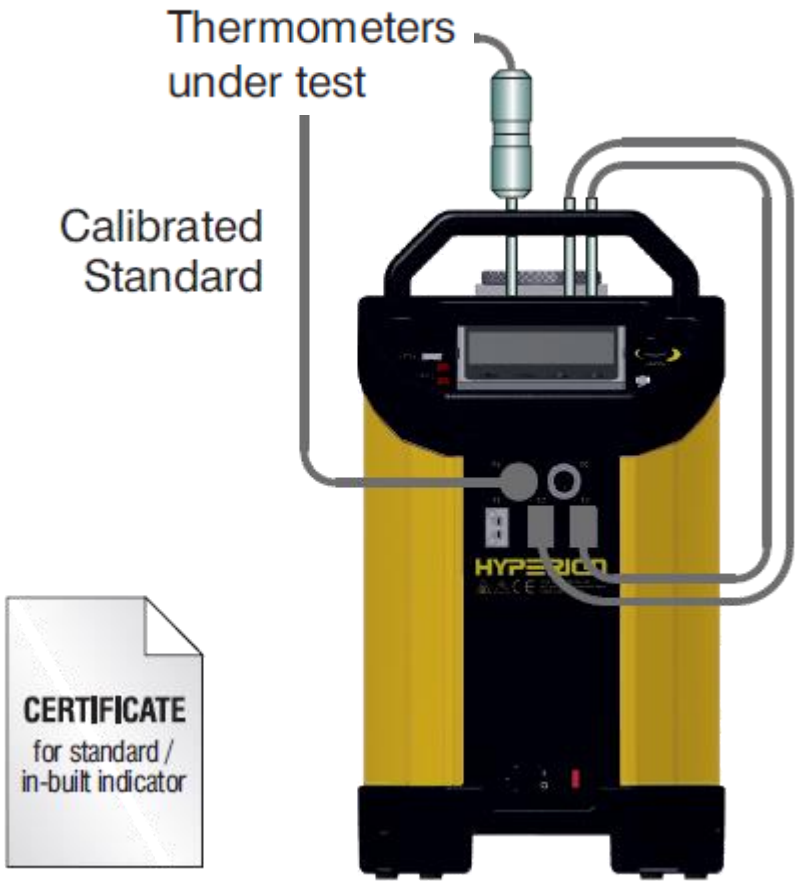
Choosing a Dry Block: ADVANCED Models

ADVANCED version

- Now up to three input channels
  - Datalogging, Ethernet, Automatic temperature stepping, Offset Elimination and many more features

Using the ADVANCED Model

Isotech ADVANCED – has inputs for test thermometers in addition to the reference probe



Learn More: Further Information

http://bit.ly/2k8bGAi

Learn More: Further Information

http://bit.ly/2k8bGAi

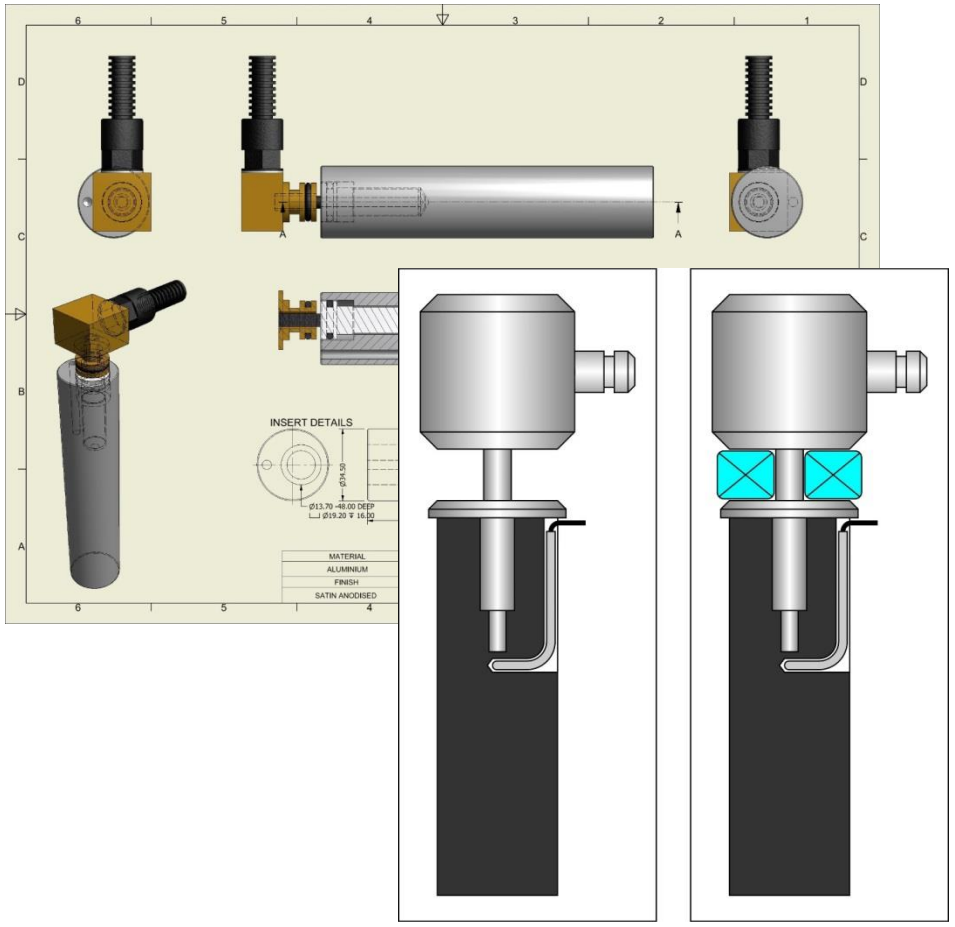
	Ø 65mm	Ø 65mm	Ø 35mm	Ø 35mm	Ø 35mm	Ø 65mm	Ø 35mm	Ø 33.5mm
	Isocal-6					Dry Block Calibrators		
	HYPERION	DRAGO	EUROPA	VENUS	CALISTO	GEMINI	JUPITER	PEGASUS
Specifications								
Metal Block Bath 	✓	✓	✓	✓	✓	✓	✓	✓
Stirred Liquid Bath 	✓	✓	✓	✓	✓			
Stirred Ice/Water Bath 	✓		✓	✓				
Blackbody Source 	✓	✓	✓	✓	✓	✓	✓	✓
Surface Sensor 	✓	✓	✓	✓	✓		✓	
ITS-90 Fixed Point 	✓	✓	✓	✓	✓			
Temperature Range (°C)								
1200°								150°C → 1200°C
1100°								
1000°								
900°								
800°								
700°								
600°						35°C → 700°C		
500°							35°C → 660°C	
400°								
300°								
200°								
100°		30°C → 250°C			30°C → 250°C			
0°	25°C → 140°C		45°C → 140°C	35°C → 140°C				
-100°								

Special Applications: Please Contact Us

Have probes that don't fit?

Need advice?

Contact Us



Choosing a Dry Block

Part Four Calibration Options

All Isotech Dry Blocks include a traceable calibration certificate.

Basic Models cover block temperature

When the Site or Advanced models are ordered with a reference probe this is included on the certificate

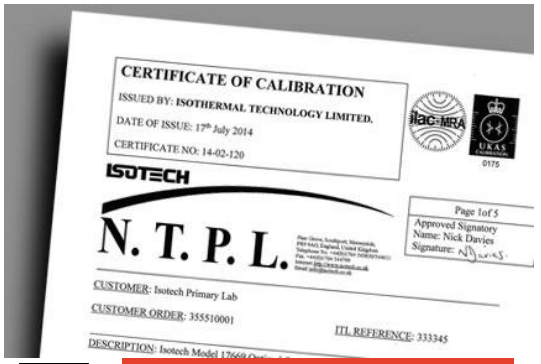
Choosing a Dry Block: Calibration Options

UKAS (ISO 17025) is available at extra cost

Our UKAS Certificates carry the ILAC-MRA logo and recognised in many countries

Best Practise – find out more

www.ukas.com



Choosing a Dry Block: Calibration Options

We offer three service (additional cost)

The following Calibration Options are Available		Code
BASIC, SITE and ADVANCED	5 point calibration for block temperature; includes reference probe values when ordered with Site or ADVANCED	UKAS-TEMP
ADVANCED	5 point calibration for block temperature and reference probe (when ordered) and electrical simulation of indicator	UKAS-SYST
ADVANCED	Calibration of input channels, electrical simulation only	UKAS-SIM