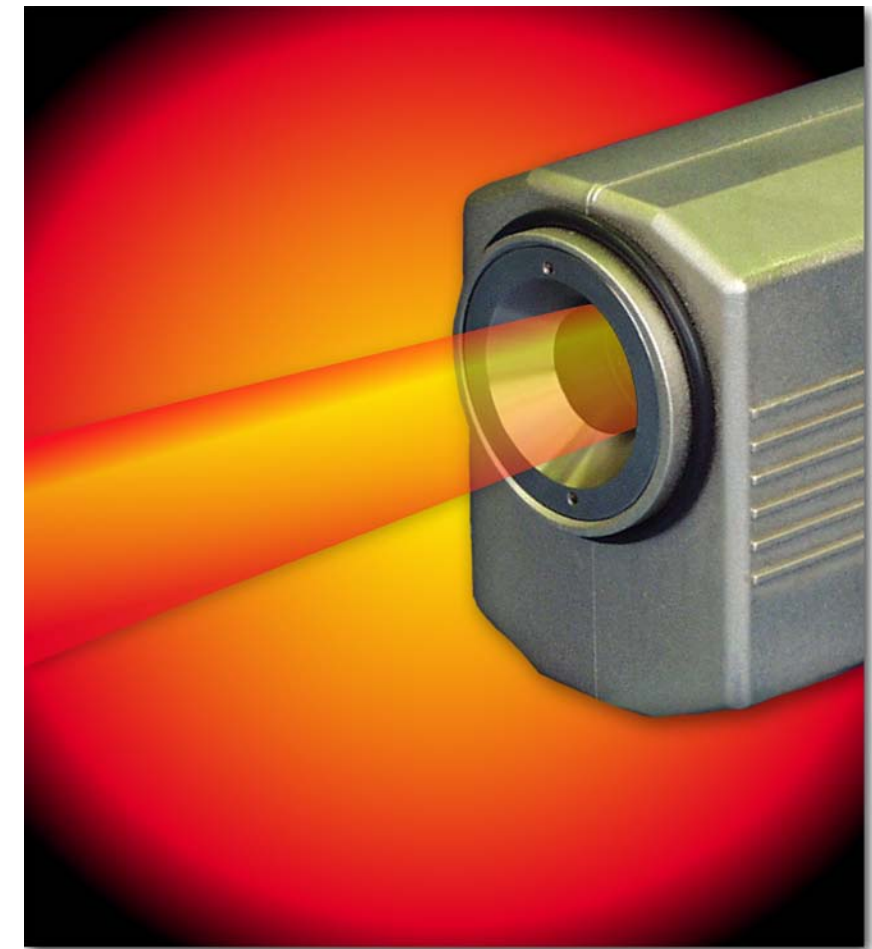


# LAND



## LANDCAL

A RANGE OF TEMPERATURE  
CALIBRATION SOURCES

# LAND

Non-Contact Temperature  
Measurement Solutions

Land Instruments International Ltd • Dronfield S18 1DJ • England  
Email: [land.infrared@ametek.co.uk](mailto:land.infrared@ametek.co.uk) • [www.landinst.com](http://www.landinst.com) • Tel: +44 (0) 1246 417691 • Fax: +44 (0) 1246 410585

AMETEK Land, Inc. • 150 Freeport Rd • Pittsburgh, PA 15238 • U.S.A.  
Email: [irsales@ametek.com](mailto:irsales@ametek.com) • [www.ametek-land.com](http://www.ametek-land.com) • Tel: +1 (412) 826 4444 • Fax: +1 (412) 826 4460

For a full list of international offices, please visit our website.



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Applies in the UK

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# LANDCAL Blackbody Temperature Calibration Sources

## ... extending the calibration route

LANDCAL calibration sources are designed to provide accurate, traceable calibration, whatever the temperature, wherever the type of thermometer.

LANDCAL sources enable you to calibrate your thermometers as and when it is convenient for you, with the added assurance that all measurements are traceable to National Standards.

LANDCAL comprises a range of blackbody calibration sources providing high precision calibration of radiation thermometers within the temperature range -10 to 1600°C/15 to 2900°F.

The Landcal calibration sources are divided into two groups: Primary Standard and Reference Standard.

**P Primary Standard Sources**  
e.g. P1600B2 - the calibration of a primary source is traceable directly to National Standards via a certified probe installed in the radiation cavity.

**R Reference Standard Sources**  
e.g. R1200P - traceability to National Standards can be achieved either by using optional certified radiation thermometers and adopting the calibration by comparison method, or by purchasing the source complete with a calibration certificate.

The sources are also divided into groups relating to their size, weight and application:

**P Portable**  
e.g. P550 - these sources are comparatively small and light, so can be carried over short distances using the built-in carrying handle. This makes them ideal for on-site as well as laboratory use. An optional carrying case is available for safe storage when the source is not in use.

**T Transportable**  
e.g. R1500 - these sources can be used either on-site or in laboratory environments. They can be lifted into place, but it is not recommended that they are carried.

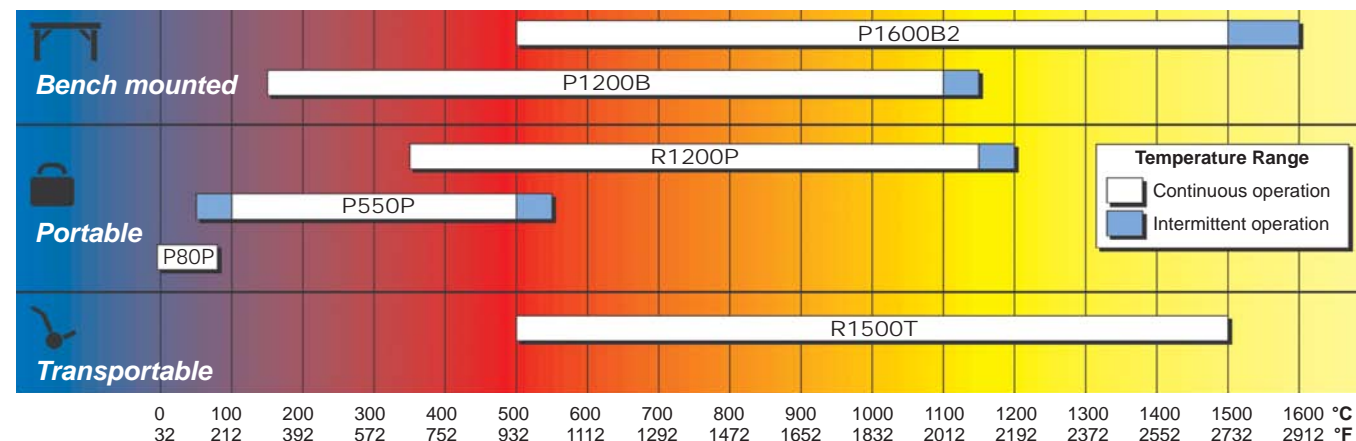
**B Bench mounted**  
e.g. P1200 - these sources require assembly in the place where they are to be used. They are designed primarily for the precise calibration of radiation thermometers in a laboratory environment.

The table shows the recommended calibration source for each LAND thermometer type, with alternatives indicated where appropriate.

For calibration of thermal cameras, process imagers and linescanning products, refer to Land Instruments International.

● Preferred ▲ Possible

THERMOMETER TYPE		RECOMMENDED SOURCE					
		PRIMARY			REFERENCE		
		P80P	P550P	P1200B	P1600B2	R1200P	R1500T
FIXED, ON-LINE THERMOMETERS	M1 & U1			●	●	▲	●
	M2 & U2		▲	●	▲	▲	●
	M4 & U4	▲	●				
	M5 & U5 (400/1300)		▲	●	●	▲	●
	M5 & U5 (1000/2500)			▲	●	▲	●
	M6 0/300	●	●				
	M6 100/700		▲	●	▲	●	▲
	M7	▲	●	▲			
	M8	▲	▲	●	▲	●	▲
	R1 & V1			▲	●	▲	●
	R4Z		●	▲		●	▲
	VDT		▲	▲	●	▲	●
	AET		●	▲		●	
	AQT		●	▲		●	
	AST/AST4		●	▲		●	
	GST		●	▲		●	
	FTS			▲	●	▲	●
	FLT5/A		▲	●	▲	▲	●
	CD1		▲	●	●		●
	SOLO 1			▲	●	▲	●
SOLO 2			▲	●	▲	●	
SOLO 3		▲	●	▲	▲	●	
MICRATHERM 3	▲	●	▲				
RT3 & ROADSTONE	▲	●	▲				
MF3	●	●					
CF			▲	●	▲	●	
FIBROPTICS	M1 & U1			●	●	▲	●
	M2, U2 & ADT		▲	●	▲	●	▲
	M3		●	▲			
	R1 & U1			▲	●	▲	●
	SOLO 1 Fibroptic			▲	●	▲	●
	ABT		●	▲		▲	●
	DTT			▲	●	▲	●
	Model FG			▲	●	▲	●
	Spray Chamber			▲	●	▲	●
	MeltMaster			▲	●	▲	●
PORTABLES	C53 & C153/153A			●	●	▲	●
	C241		▲	●	▲	●	▲
	C300AF/300bAF	▲	▲	●	▲	●	▲
	FurnacePro		▲	●	▲	●	▲
	PockeTherm	●	●	▲			
	GMT		●				



## PRODUCT PORTFOLIO

Land Instruments International design and manufacture an extensive range of on-line thermometers, linescanners and thermal imagers for continuous temperature measurement and process monitoring, and portable thermal imagers for condition monitoring purposes. A comprehensive range of temperature calibration sources is also available.

### FIXED ON-LINE TEMPERATURE MEASUREMENT SYSTEMS

Land's range of on-line temperature measurement systems combine high accuracy, continuous temperature measurement with long term reliability.

Your requirements for a fixed system, which precisely matches your needs, can be selected from a comprehensive range of general purpose and dedicated purpose thermometers, thermometer signal processors, mountings and accessories.

### PORTABLE INFRARED THERMOMETERS

The Land family of hand held portable infrared thermometers provide accurate spot temperature measurement within the range -50 to 3200°C/-50 to 5800°F.

A range of low cost, hand-held thermometers is also available designed specifically for food manufacturing processes and preventative maintenance.

### LINESCANNERS

Landscan linescanners use an infrared scanning system to produce a temperature profile across a hot object.

These systems are designed for ease of operation and maintenance in hostile environments such as hot rolling mills and glass plants and perform as accurately as the best radiation thermometers available.

### PORTABLE THERMAL CAMERAS

The Land Cyclops portable thermal imager system provides high definition thermal images and accurate temperature measurement from -20 to 1500°C/-4 to 2732°F in condition monitoring programs. LIPS image processing software provides a full report writing and image processing facility.

### ON-LINE THERMAL IMAGING SYSTEMS

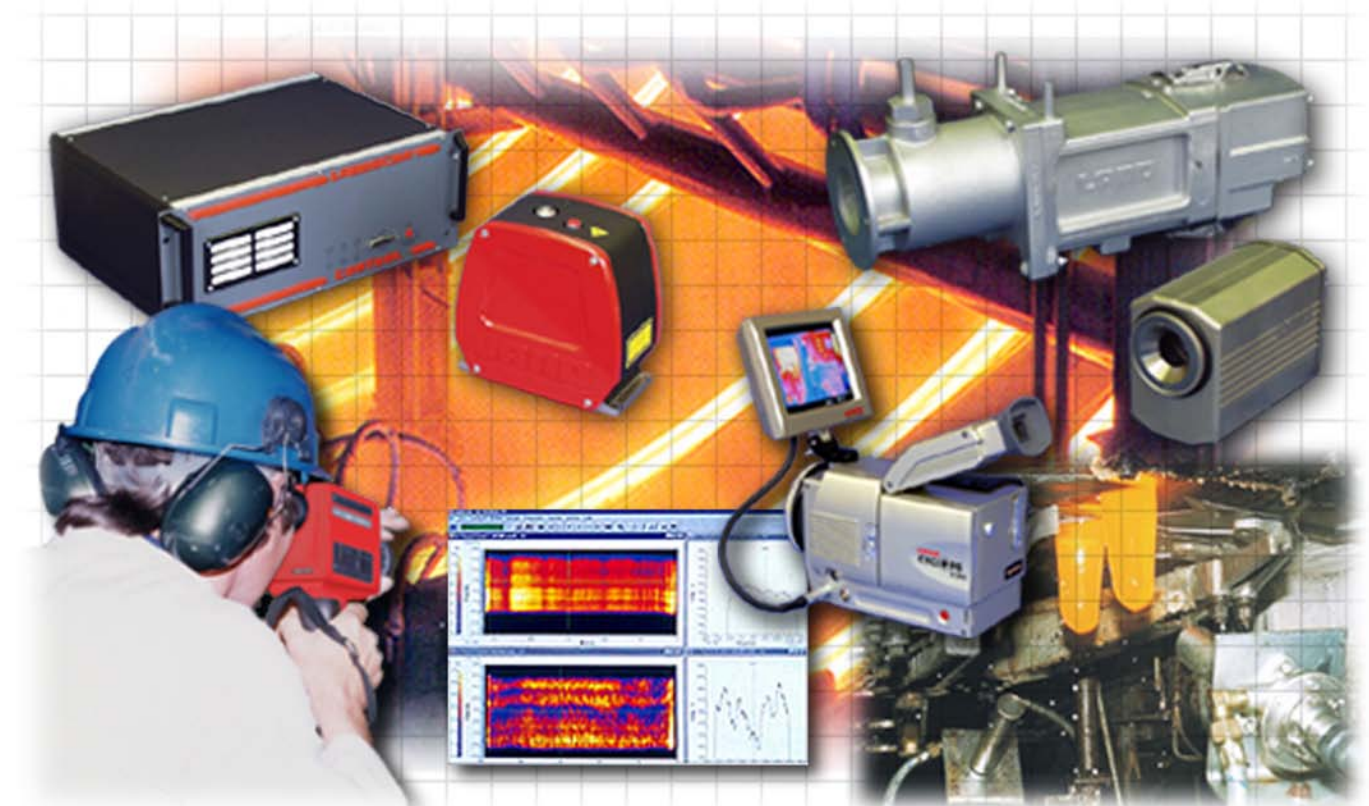
A new range on on-line and process imaging systems are available for plant and process monitoring, and routine test and investigation purposes within the temperature range -20 to 2000°C/-4 to 3600°F. LIPS image processing system provides comprehensive temperature analysis and trending on either live or stored images, alarms, exchange of data, and full remote control.

### APPLICATION DEDICATED THERMOMETERS

There is a range of thermometers and thermometer systems designed to solve temperature measurement problems in specific industrial applications, such as steel, non ferrous metals, glass and mineral processing.

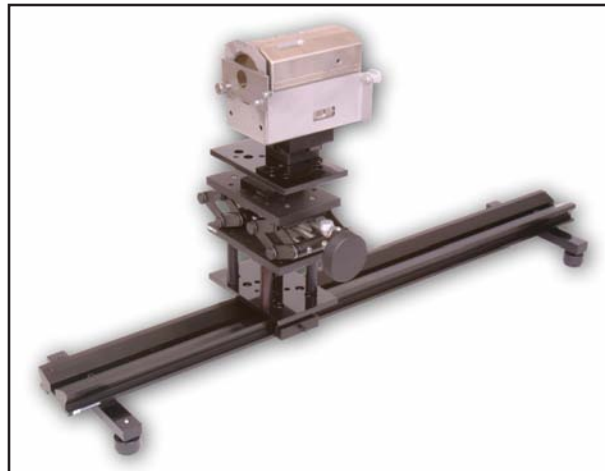
### CALIBRATION SOURCES

A comprehensive range of blackbody temperature calibration sources and accessories is available for customers who wish to establish their own calibration facility.





## OPTIONAL EXTRAS AND ORDERING INFORMATION



<b>LANDCAL P1600B2</b>		<b>Part No.</b>
Power requirement:	220/240V	800358
	415/240V (3 phase)	800359
	380/220V (3 phase)	800360
Optical bench assembly:	915.0mm/36.0in	135.204
Thermocouple assembly with calibration certificate:	Type R	135.152
	Type S	135.153
	Type B	135.154

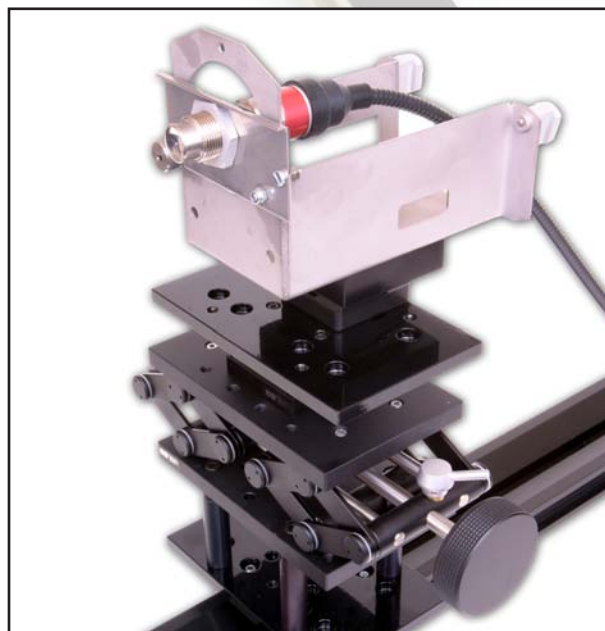
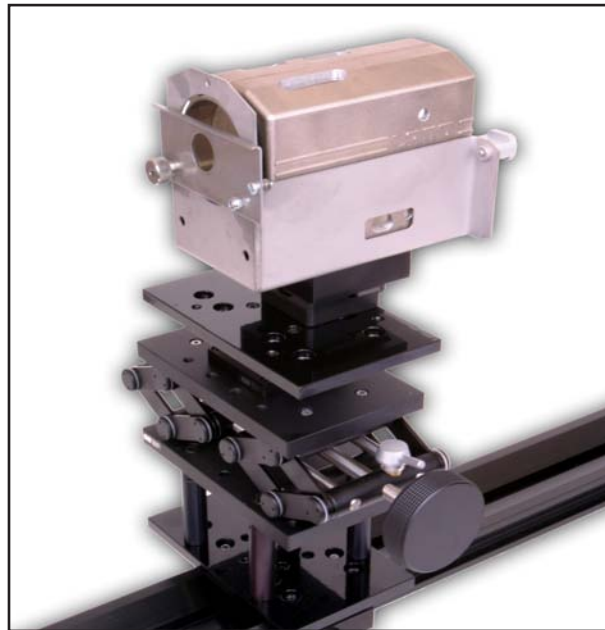
<b>LANDCAL P1200B</b>		<b>Part No.</b>
Power requirement:	110/120V	135.193
	220/240V	135.183
Optical bench assembly:	915.0mm/36.0in	135.204
Thermocouple assembly with calibration certificate:	Type R	135.152
	Type S	135.153
	Type B	135.154

<b>LANDCAL R1200P</b>		<b>Part No.</b>
Power requirement:	115/230V, selectable	135.192
Calibration certificate:	400-1100°C/ 750-2010°F ±3K/6°F	-
Thermometer holder assemblies		
System 4 standard body and Fibroptic:		135.190
System 3 standard body:		135.110
System 3 Fibroptic:		135.109
Aluminium carrying/storage case		135.131

<b>LANDCAL P550P</b>		<b>Part No.</b>
Power requirement:	110/120V	135.198
	220/240V	135.182
Optical bench assembly:	915.0mm/36.0in	135.204
Aluminium carrying/storage case:		135.130
PRT with calibration certificate:		135.142

<b>LANDCAL P80P</b>		<b>Part No.</b>
Power requirement:	110/120V	135.199
	220/240V	135.181
Optical Bench Assembly:	915.0mm/36.0in	135.204
Aluminium Storage/Transportation Case		135.130
PRT with Calibration Certificate		135.142

<b>LANDCAL R1500T</b>		<b>Part No.</b>
Power requirement:	110/120V	135.180
	220/240V	135.191
Calibration certificate:	500-1500°C/ 930-2730°F ±3K/6°F	-
Optical bench assembly:	915.0mm/36.0in	135.204

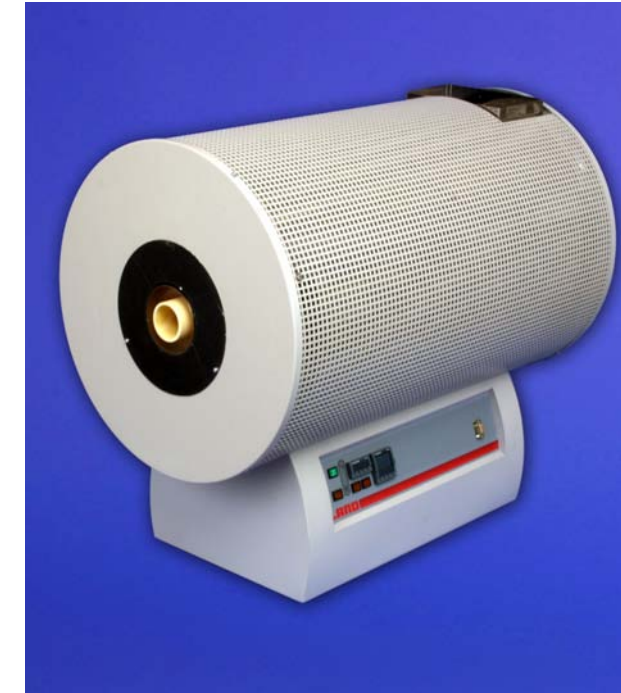


## LANDCAL P1600B2

1600°C/2900°F P Serial

The LANDCAL P1600B2 is a new high stability, bench mounted primary temperature source designed for testing and precise calibration of most industrial infrared radiation thermometers at temperatures up to 1600°C/2900°F. The isothermal enclosure provides a highly stable, uniform temperature along the length of the cavity, which is suitable for the calibration of thermographic instruments and also the calibration of thermocouples by the comparison method.

The large diameter, conical ended, blackbody cavity is heated by six robust silicon carbide heating elements equally spaced around the cavity, providing continuous, reliable operation over many years. The temperature of the cavity is measured using an optional rare metal thermocouple supplied complete with traceable calibration certificate.



### SPECIFICATION

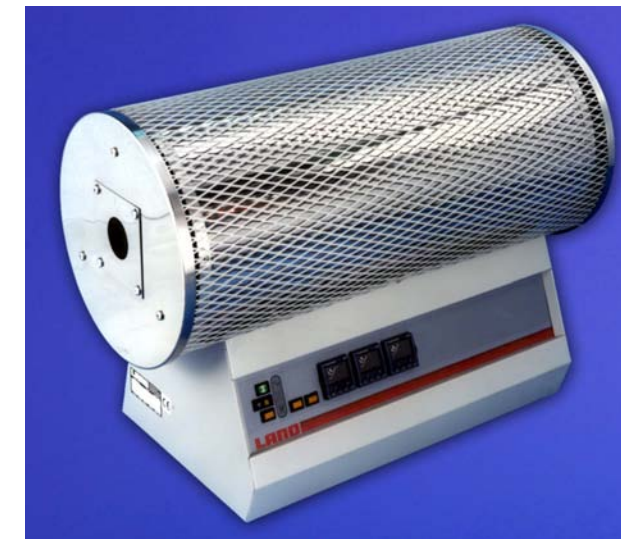
Maximum temperature:	1600°C/2900°F
Recommended temp.:	500 to 1550°C/950 to 2850°F
Heating rate:	1.5 hours to 1400°C/2550°F
Stability:	<±0.5°C/1.0°F over 60 min at set temperature
Radiation cavity:	Silicon carbide
Dimensions:	50mm/2.0in dia. x 300mm/12in
Sighting tube extension:	49mm/1.9in dia. x 100mm/4.0in
Emissivity:	0.998
Heating elements (6):	SiC 151/356/20/25.4/7.4
Control thermocouple:	Pt 13% Rh/Pt, Type R
Controller types	
Master:	Eurotherm with RS232C serial interface
Over-temperature:	Eurotherm
Power requirement:	220/240V a.c. 50 to 60Hz, or 415/240V or 380/220V (3 phase)
Power consumption:	7.0kVA, 2.3kVA per phase (3 phase)
Measuring thermocouple:	Type B (6/30), R (0/13) or S (0/10)
Dimensions:	865 x 500 x 700mm/ 34.0 x 19.6 x 27.5in (L x W x H)
Weight:	62.0kg/136.6lb

## LANDCAL P1200B

1150°C/2100°F P Serial

The LANDCAL P1200B is a bench mounted, primary temperature source designed for testing and precise calibration of most infrared radiation thermometers at temperatures up to 1150°C/2100°F. The isothermal enclosure provides a highly stable, uniform temperature along the length of the cavity, which is also suitable for the calibration of thermographic instruments and also the calibration of thermocouples by the comparison method.

The large diameter, conical ended, blackbody cavity is heated by three separate, independently controlled electrical windings which can be adjusted to minimise thermal gradients. The temperature of the cavity is measured using an optional rare metal thermocouple supplied complete with traceable calibration certificate. A second optional rare metal thermocouple can also be supplied to determine thermal gradients.



### SPECIFICATION

Maximum temperature:	1150°C/2100°F
Recommended temp.:	150 to 1100°C/300 to 2000°F
Heating rate:	2 hours to 1000°C/1850°F
Stability:	<±1°C/2°F over 30 min. at set temp.
Radiation cavity:	Silicon carbide
Dimensions:	50mm/2.0in dia x 300mm/12.0in
Sighting tube extension:	100mm/4.0in
Emissivity:	0.998
Heating elements:	Resistance wire
Control thermocouple:	Nicrosil-Nisil, type N
Controller type:	Eurotherm with RS232C serial interface
Power requirement:	220/240V or 110/120V a.c., 50 to 60Hz
Power consumption:	3.0 kVA
Measuring thermocouple:	Type B (6/30), R (0/13) or S (0/10)
Dimensions:	700 x 360 x 535mm/ 27.6 x 14.2 x 21.1in (L x W x H)
Weight:	33.0kg/73.0lb



## LANDCAL R1200P

1200°C/2200°F R  

The LANDCAL R1200P is a high stability, blackbody, reference source designed for calibration of infrared radiation thermometers at temperatures up to 1200°C/2200°F.

It is completely portable and self-contained, with built-in 3-term controller and separate digital temperature indicator, giving  $\pm 1^\circ\text{C}/2^\circ\text{F}$  resolution.

The R1200P can be used for both on-site or in-laboratory calibration of LAND fixed system and Fibroptic short wavelength radiation thermometers. A calibration certificate can also be supplied as an optional extra where traceability is required. An angle bracket is mounted on the front of the furnace to aid alignment of the thermometers into the cavity.

A robust carrying case is also available as an optional extra.



SPECIFICATION	
Maximum temperature:	1200°C/2200°F
Recommended temp.:	350 to 1150°C/650 to 2100°F
Heating rate:	25 min to 1150°C/2100°F
Radiation cavity:	
Type:	Heat resisting steel (Kanthal APM), 120° cone
Dimensions:	55mm/2.2in dia x 110mm/4.3in
External aperture:	30mm/1.2in dia
Emissivity:	>0.98 at short wavelengths
Controller:	Eurotherm with RS232C serial interface
Indicator:	Eurotherm
Power requirement:	Dual voltage 115V or 230V a.c., 50 to 60Hz selectable
Power consumption:	1.1kVA
Overall dimensions:	200 x 300 x 340mm/ 7.9 x 11.8 x 13.4in (L x W x H)
Weight:	8.8kg/19.5lb
Uncertainty (400 to 1100°C):	$\pm 3\text{K}/6^\circ\text{F}$ (with traceable certificate)

## LANDCAL P550P

550°C/999.9°F P  

The LANDCAL P550P is a portable, blackbody, primary source. It is a primary standard designed for high precision calibration of low temperature radiation thermometers over the range 50 to 550°C/120 to 999.9°F.

When traceability to National Standards is required, the output from the thermometer under test is compared with the source temperature measured by a Platinum resistance thermometer, supplied with a traceable calibration certificate.

The calibration source can also be used without a Platinum resistance thermometer if traceability is unnecessary. The P550P provides a wide angle target which makes it ideal for the calibration of both fixed installation and portable, hand-held infrared thermometers.

A robust carrying case is also available as an optional extra.



SPECIFICATION	
Max. temperature range:	50 to 550°C/120 to 999.9°F
Recommended temp.:	100 to 500°C/210 to 930°F
Heating rate:	60 min (approx.) to 500°C/930°F
Radiation cavity:	
Type:	Blackened aluminium, 120° cone
Dimensions:	65mm/2.6in dia x 160mm/6.3in
Emissivity:	>0.995
Controller:	Eurotherm with RS 232C serial interface
Uncertainty of PRT:	$< \pm 0.2\text{K}/0.4^\circ\text{F}$
Power requirement:	110/120V a.c. or 220/240V a.c., 50 to 60 Hz
Power consumption:	0.8 to 1.0kVA
Dimensions:	315 x 260 x 185mm/ 12.4 x 10.2 x 7.3in (L x W x H)
Weight:	11kg/24.2 (nett)/13kg/28.6lb (gross)

## LANDCAL P80P

80°C/175°F P  

The LANDCAL P80P is a portable, blackbody, primary source. It is designed for high precision calibration of low temperature infrared radiation thermometers with sub-zero measurement capability, over the range -10 to 80°C/15 to 175°F.

When traceability to National Standards is required, the output from the thermometer under test is compared with the source temperature measured by a Platinum resistance thermometer, supplied with a traceable calibration certificate.

The source can also be used without a Platinum resistance thermometer if traceability is unnecessary.

The P80P provides a wide angle target which makes it ideal for the calibration of both fixed installation and portable, hand-held infrared thermometers.

A robust carrying case is also available as an optional extra.



SPECIFICATION	
Maximum temperature:	80°C/175°F
Recommended temp.:	-10 to 80°C/15 to 175°F
Heating rate:	60 min. (ambient to 75°C/167°F)
Cooling rate:	90 min. (20 to -10°C/68 to 15°F) depending on ambient temp.
Radiation cavity:	
Type:	Blackened aluminium, 120° cone
Dimensions:	50mm/2.0in dia x 155mm/6.0in
Emissivity:	>0.995
Controller:	Eurotherm with RS232C serial interface
Uncertainty of PRT:	$< \pm 0.1^\circ\text{C}/0.2^\circ\text{F}$ at 50°C/120°F
Power requirement:	110/120V a.c. or 220/240V a.c., 50 to 60 Hz
Power consumption:	0.2kVA
Overall dimensions:	315 x 260 x 185mm/ 12.4 x 10.2 x 7.3in (L x W x H)
Weight:	11kg/24.2lb (nett)/13kg/28.6lb (gross)

## LANDCAL R1500T

1500°C/2750°F R  

The LANDCAL R1500T is a high stability, transportable, blackbody, reference source designed for on-site or laboratory calibration of infrared radiation thermometers up to temperatures of 1500°C/2750°F.

Six silicon carbide elements heat the conical ended cylindrical blackbody cavity to 1450°C/2650°F in approximately 30 minutes. A 3-term controller holds the set temperature to within  $\pm 1\text{K}/2^\circ\text{F}$ .

The R1500T can be used as a transfer standard, providing calibration by the comparison method, using optional standard radiation thermometers. Alternatively a traceable calibration certificate can be supplied for the source, as an optional extra, where direct traceability is required.



SPECIFICATION	
Maximum temperature:	1500°C/2750°F
Recommended temp.:	500 to 1500°C/950 to 2750°F
Heating rate:	30 min. to 1450°C/2650°F
Stability:	$< \pm 1\text{K}/2^\circ\text{F}$ over 30 minutes at set temperature
Radiation cavity	
Type:	Silicon carbide, 120° cone
Diameter:	45mm/1.8in dia x 100mm/4.0in
External aperture:	40mm/1.6in dia
Emissivity:	Approx 0.99 at short wavelengths
Controller:	Eurotherm with RS232C serial interface
Power requirement:	110/120V a.c. or 220/240V a.c., 50 to 60Hz
Power consumption:	3.0kVA
Overall dimensions:	500 x 380 x 540mm/ 19.7 x 15.0 x 21.3in (L x W x H)
Weight:	26kg/57.3lb (nett)/32kg/70.5lb (gross)
Uncertainty (400 to 1500°C):	$\pm 3\text{K}/6^\circ\text{F}$ (with traceable certificate)