



# Infrared Thermometers

non-contact surface temperature measurement



The advantage of an infrared thermometer against a conventional probe thermometer is speed and the fact that it is non-contact; but keep in mind, infrared thermometers only measure the surface temperature. Infrared thermometers are easy to use, simply point the instrument at the object you wish to measure and read the temperature on the LCD.

## what is infrared?

Infrared energy is emitted from the surface of all objects. This energy is part of the electromagnetic spectrum. Infrared radiation can have a wavelength of a fraction of a micron up to several hundred microns. Infrared thermometers measure infrared with a wavelength of between 4 and 14 microns.

## infrared thermometer limitations

As it is the surface of an object that emits infrared, an infrared thermometer will not measure its internal (core) temperature. You cannot accurately measure through any covering (glass, polythene, clingfilm etc.). Any surface you are measuring must be clean and dust free. Air temperature cannot be measured by an infrared thermometer.

## emissivity

Emissivity is a measure of the efficiency in which a surface emits thermal energy. It is defined as the fraction of energy being emitted relative to that emitted by a thermal black surface (a black body). A black body is a material that is a perfect emitter of heat energy and has an emissivity value of 1. A material with an emissivity value of 0 would be considered a perfect thermal mirror. For example, if an object had the potential to emit 100 units of energy but only emits 90 units in the real world, then that object would have an emissivity value of 0.90. In the real world there are no perfect 'black bodies' and very few perfect infrared mirrors so most objects have an emissivity between 0 and 1.

The table below is just a small selection of different emissivity values, for a full listing visit [www.etilt.com/emissivity](http://www.etilt.com/emissivity)

aluminium (anodised)	0.77	plastic (black)	0.95
brass (oxidised)	0.61	porcelain (glazed)	0.92
brick (red)	0.90	rubber	0.95
cement	0.54	skin (human)	0.98
copper (oxidised)	0.65	soil (dry)	0.92
glass	0.92	stainless steel	0.59
paper (white)	0.68	water	0.95
perspex	0.86	water (ice)	0.96
pipe (galvanized)	0.46	water (frost)	0.98
plastic (white)	0.84	wood (planed)	0.90

## lens care

Care must be taken with the infrared thermometer's lens. The infrared waves are focused and filtered by the lens, therefore if the lens gets dirty or damaged in any way (even light scratches) then the accuracy can change at some temperatures.



# IR-Pocket Thermometer

with max/min, display hold & lock functions

- LED spot alignment - safer than a laser
- display hold function

The IR-Pocket non-contact, infrared thermometer has an easy to read, LCD display with low battery indication and an auto-power off facility that turns the instrument off after 15 seconds.

This infrared thermometer features a two-button keypad, simply aim the thermometer at the target and press the 'measure' button to display the surface temperature instantly. Pressing the 'mode' button allows the user to access a variety of functions, i.e. max/min, °C/°F, lock and emissivity. The lock function allows for continuous temperature measurement and the emissivity is adjustable so the user can measure a variety of surface types.

The unit incorporates LED spot alignment, which allows the user to precisely target the diameter of the area being measured.

order code	description
814-060	IR-Pocket



specification	IR-Pocket
range	-9.9 to 199.9 °C
resolution	0.1 °C/°F
accuracy	±2 °C or ±2 % whichever is greater
field of view	target ratio 1:1
emissivity	0.95 default - adjustable 0.1 to 1
battery & life	2 x 1.5 volt AAA - 20 hours continuous use
display	custom LCD
dimensions	25 x 52 x 100 mm
weight	88 grams

# RayTemp® 2 IR Thermometer

high accuracy ±1 °C over a limited range

- FREE traceable certificate of calibration
- displays ambient temperature

Designed and manufactured in the UK, the RayTemp 2 infrared non-contact thermometer features a large, easy to read LCD and a three-button keypad, incorporating measure, mode and max/min functions. Simply aim the thermometer at the target and press the measure button to display the surface temperature.

Incorporating a 5:1 optic ratio (target distance ratio) and a fixed emissivity of 0.95 making it suitable for a wide range of food and industrial applications, each RayTemp 2 is housed in a robust ABS case that contains 'Biomaster' additive which reduces bacterial growth.

The unit does not incorporate laser alignment, which will appeal to those who are health and safety conscious and do not require this feature.

order code	description
228-020	RayTemp 2
830-227	protective silicone boot



specification	RayTemp 2
range	-49.9 to 349.9 °C
resolution	0.1 °C & 1 °C
accuracy	±1 °C (0 to 100 °C) otherwise ±2 °C or ±2 % of reading whichever is greater
field of view	target ratio 5:1
emissivity	0.95 fixed
battery & life	3 x 1.5 volt AAA - 5000 hours continuous
display	12 mm LCD
dimensions	25 x 56 x 128 mm
weight	130 grams

FREE traceable certificate of calibration included

# Thermapen® IR

## infrared thermometer with foldaway probe

- patented, automatic 360° rotational display
- adjustable emissivity for different surfaces
- motion-sensing sleep mode - probe only
- FREE traceable certificate of calibration

The Thermapen IR is two instruments in one compact unit, combining the advanced technology of two ETI designed and manufactured products, the RayTemp 2 Plus infrared thermometer and Thermapen 4 digital probe thermometer.

Housed in a robust ABS case containing 'Biomaster' additive which reduces bacterial growth, the Thermapen IR incorporates a motion-sensing sleep mode (penetration probe only) which automatically turns the instrument on/off when set down or picked up, maximising battery life.

### infrared thermometer

Simply aim the infrared thermometer at the target and press the scan button to display the surface temperature. **Please Note:** the infrared non-contact function will only measure when the probe is in the closed position.

The Thermapen IR thermometer incorporates a max/min temperature function accessed via the mode button (IR only). The distance to target ratio is 5:1, therefore the thermometer should be positioned as close to the target as possible. The default emissivity is 0.95 but can be adjusted between 0.1 and 1, if required via the mode button.

### penetration probe

Alternatively, it is possible to take liquid or the core temperature of semi-solid food products using the fast response, stainless steel penetration probe (Ø3.3 x 110 mm). Displaying the temperature in just 3 seconds. The probe conveniently folds back through 180° into the side of the instrument when not in use.



wall bracket



UK Patent No. GB 2504936

order code	description	
228-065	Thermapen IR	
830-480	protective silicone boot	
830-001	zip pouch	
832-002	s/steel wall bracket	



specification	Thermapen IR
range - infrared	-49.9 to 349.9 °C
range - probe	-49.9 to 299.9 °C
resolution	0.1 or 1 °C/°F - user selectable
accuracy - infrared	±1 °C (0 to 100 °C) otherwise ±2 °C or ±2 % of reading whichever is greater
accuracy - probe	±0.4 °C (-49.9 to 199.9 °C) otherwise ±1 °C
field of view	target ratio 5:1
emissivity	0.95 default - adjustable 0.1 to 1
battery	2 x 3 volt CR2032 lithium coin cell
battery life	1000 hours - continuous use
display	12 mm (horizontal) & 10 mm (vertical) LCD
dimensions	19 x 50 x 157 mm
weight	125 grams
FREE traceable certificate of calibration included (probe & IR)	



# RayTemp® 2 Plus

infrared thermometer with automatic 360° rotating display

- adjustable emissivity for different surfaces
- FREE traceable certificate of calibration
- records the max/min temperatures
- target distance/diameter ratio 5:1

Designed and manufactured in the UK, the RayTemp 2 Plus infrared non-contact thermometer incorporates all the features of the RayTemp 2, but with the addition of a 360° self-rotating display, backlight and adjustable emissivity. Simply aim the thermometer at the target and press the measure button to display the surface temperature.

The unit incorporates a 5:1 optic ratio (target distance/diameter ratio) and therefore the thermometer should be positioned as close to the target as possible. The default emissivity is 0.95 but can be changed from 0.1 to 1, if required. The unit does not incorporate laser alignment, however this will appeal to those who are health and safety conscious and do not require this feature.

The RayTemp 2 Plus features a three-button keypad, incorporating measure, mode and max/min functions. Pressing the mode button allows the user to select °C/°F, adjust emissivity values and display the ambient temperature. The max/min function displays the highest and lowest recorded temperatures over the measurement period.

Featuring a large, easy to read LCD display with low battery indication and an auto-power off facility that turns the instrument off after 30 seconds, maximising battery life, each unit is housed in a robust ABS case that contains 'Biomaster' additive which reduces bacterial growth and is powered by three AAA batteries that give a minimum of 5000 hours battery life.



UK Patent No. GB 2504936



## automatic 360° rotational display

The RayTemp 2 Plus features an automatic 360° display, which rotates in 90° increments enabling the user to read the temperature in any position i.e. left hand, right hand, vertical or horizontal. This feature can be 'locked' by the user, if required.



order code	description	
228-120	RayTemp 2 Plus	
830-227	protective silicone boot	
814-132	Comparator	

specification	RayTemp 2 Plus
range	-49.9 to 349.9 °C
resolution	0.1 °C & 1 °C
accuracy	±1 °C (0 to 100 °C) otherwise ±2 °C or ±2 % of reading whichever is greater
field of view	target ratio 5:1
emissivity	0.95 default - adjustable 0.1 to 1
battery	3 x 1.5 volt AAA
battery life	5000 hours (continuous use, w/out backlight)
display	12 mm (horizontal) & 10 mm (vertical) LCD
dimensions	25 x 56 x 128 mm
weight	130 grams
FREE traceable certificate of calibration included	



# Mini RayTemp® Infrared Thermometer

## for routine day-to-day temperature checks

- compact, lightweight & easy to use
- target distance/diameter ratio 12:1
- temperature range -50 to 330 °C
- laser dot alignment

The Mini RayTemp infrared thermometer is a compact, lightweight and low cost infrared thermometer. Simply aim and pull the trigger to display the temperature of the item being measured.

Measuring temperature over the range of -50 to 330 °C with an assured accuracy of  $\pm 2$  °C over the range of 0 to 330 °C, outside of this range (-50 to 0 °C) accuracy is  $\pm 4$  °C, the Mini RayTemp has a clear, easy to read, LCD display with low battery, backlight indication and an auto-power off facility that turns the instrument off after ten seconds, maximising battery life.

Ideal for numerous temperature measurement applications where contact with the item to be measured is an issue. The Mini RayTemp features laser assisted alignment as standard, to assist in pin-pointing the area of measurement.

The unit incorporates a 12:1 optic ratio (target distance/diameter ratio) and a fixed emissivity of 0.95 making it suitable for a wide range of food and industrial applications.



order code	description	
814-080	Mini RayTemp	
830-040	protective nylon pouch	

### optional accessories

- protective nylon pouch with belt strap (830-040)



### low cost calibration checker

The Comparator (814-132) provides an inexpensive way of checking the temperature of infrared thermometers when used in conjunction with a Reference thermometer, see pages 93 and 94 for details.



specification	Mini RayTemp
range	-50 to 330 °C
resolution	0.1 °C/°F
accuracy - infrared	$\pm 2$ °C (0 to 330 °C) otherwise $\pm 4$ °C or $\pm 4$ % whichever is greater
field of view	target ratio 12:1
emissivity	0.95 fixed
battery & life	9 volt PP3 - 80 hours continuous use
display	custom LCD
dimensions	36 x 88 x 131 mm
weight	143 grams

# RayTemp® 3 Infrared Thermometer

ideal for the foodservice industry

- $\pm 1$  °C accuracy over the critical food range
- 8 dot circular laser for precise targeting
- compact, lightweight & easy to use
- temperature range -60 to 500 °C

The RayTemp 3 infrared thermometer is compact, lightweight and easy to use. Simply aim and pull the trigger to display the temperature of the item being measured. In addition the LCD will display the maximum temperature.

The instrument measures temperature over the range of -60 to 500 °C with an assured accuracy of  $\pm 1$  °C over the critical food range of 0 to 65 °C, outside of this range  $\pm 2$  °C of reading in an ambient temperature of between 15 °C and 25 °C, with a repeatability of  $\pm 1$  °C of reading.

Incorporating a clear, easy to read, LCD display with low battery, laser and backlight indication and an auto-power off facility that turns the instrument off after 15 seconds, maximising battery life. The RayTemp 3 thermometer is ideal for measuring food surface temperatures, eliminating the need to touch or contaminate the food you are measuring, avoiding the risk of cross-contamination. The unit can be used by anyone, as there is no need to focus or adjust the instrument.

Each RayTemp 3 thermometer features a single push button, allowing the user to select °C or °F. The thermometer also incorporates an 8 dot circle laser indicator, which allows you to precisely target the diameter of the area to be measured. As you move closer or further from the target the laser circle changes diameter. The unit incorporates a 12:1 optic ratio (target distance/diameter ratio) and a fixed emissivity of 0.97 making it more suitable for chilled and frozen foods, although this thermometer can be used for a wide range of other applications.

## optional accessories

- protective nylon pouch with belt strap (830-040)
- ABS carrying case - ideal for transporting the RayTemp 3 infrared thermometer (834-740)

## low cost calibration checker

The Comparator (814-132) provides an inexpensive way of checking the temperature of infrared thermometers when used in conjunction with a Reference thermometer, see pages 93 and 94 for details



order code	description	
814-040	RayTemp 3	
830-040	protective nylon pouch	
834-740	ABS carrying case	
814-132	Comparator	

specification	RayTemp 3
range	-60 to 500 °C
resolution	0.1 °C (-9.9 to 199.9 °C) or 1 °C
accuracy - infrared	$\pm 1$ °C (0 to 65 °C) otherwise $\pm 2$ °C or $\pm 2$ % of reading whichever is greater
field of view	target ratio 12:1
emissivity	0.97 fixed
battery	2 x 1.5 volt AAA
battery life	140 hours continuous use
display	custom LCD
dimensions	40 x 66 x 155 mm
weight	180 grams



# RayTemp® 6 Infrared Thermometer

## with 8 dot circular laser for precise targeting

- max/min, display hold & backlight functions
- adjustable emissivity for multi-surface
- temperature range -60 to 550 °C
- robust IP54 splashproof casing

The RayTemp 6 infrared thermometer is a compact, durable and easy to use instrument, simply aim and pull the trigger to display the temperature of the item being measured.

Each thermometer incorporates an eight dot circle laser indicator, which allows you to precisely target the diameter of the area to be measured. As you move closer or further from the target the laser circle changes diameter.

The unit incorporates a 12:1 optic ratio (target distance/diameter ratio) and features an adjustable emissivity which allows the user to measure a variety of surface types.

The RayTemp 6 has a clear, easy to read, custom LCD display that features a backlight for when ambient light levels are low and an auto-power off facility that turns the instrument off after 35 seconds when not in use, maximising battery life.

Housed in a robust IP54 splashproof case, the RayTemp 6 features a three-button keypad, allowing the user to select °C/°F, display hold or one of the many mode options available, i.e. max, min, differential or average temperature.



### optional accessories

- protective nylon pouch with belt strap (830-040)
- ABS carrying case - ideal for transporting the RayTemp 6 infrared thermometer (834-740)

### low cost calibration checker

The Comparator (814-132) provides an inexpensive way of checking the temperature of infrared thermometers when used in conjunction with a Reference thermometer, see pages 93 and 94 for details.



order code	description	
814-075	RayTemp 6	
830-040	protective nylon pouch	
834-740	ABS carrying case	
814-132	Comparator	

specification	RayTemp 6
range	-60 to 550 °C
resolution	0.1 °C/°F
accuracy - infrared	±2 °C or ±2 % of reading whichever is greater
field of view	target ratio 12:1
emissivity	0.95 default - adjustable 0.1 to 1
battery	2 x 1.5 volt AAA
battery life	14 hours continuous use
display	custom LCD
dimensions	40 x 79 x 146 mm
weight	195 grams



# RayTemp® 8 Infrared Thermometer

with integral type K thermocouple socket

- temperature range IR -60 to 500 °C, probe -64 to 1370 °C
- includes differential & average temperatures
- target distance/diameter ratio 12:1
- 2-in-1 instrument



The RayTemp 8 portable infrared thermometer is compact, lightweight and easy to use. Simply aim and pull the trigger to display the temperature of the item being measured. The thermometer displays temperature over the range of -60 to 500 °C.

Featuring a clear, easy to read, LCD display with low battery indication, the RayTemp 8 incorporates an auto-power off facility that turns the instrument off after 60 seconds, maximising battery life. The unit features an eight dot circle laser indicator, which allows you to precisely target the diameter of the area to be measured. As you move closer or further from the target the laser circle changes diameter.

The three-button keypad, allows the user to select °C/°F and max/min. Additionally, the difference between the max and min temperature and the average temperature can be displayed.

## two instruments in one

The RayTemp 8 incorporates a miniature thermocouple type K probe socket that enables a wide range of type K thermocouple probes to be used for a variety of temperature measurement applications, including air, liquid and surface temperatures. For details of compatible type K thermocouple probes, see pages 71 to 76.



## RayTemp 8 infrared kit

### each kit contains:

- RayTemp 8 infrared thermometer (814-045)
- penetration probe (123-160)
- FREE mini tub of 70 Probe Wipes (836-022)
- FREE ABS carrying case (834-740)



specification	RayTemp 8
range - infrared	-60 to 500 °C
range - probe	-64 to 1370 °C
resolution	0.1 °C/°F (-9.9 to 199.9 °C) or 1 °C
accuracy - infrared	±2 °C or ±2 % of reading whichever is greater
accuracy - probe	±1 °C or ±1 % of reading whichever is greater
field of view	target ratio 12:1
emissivity	0.95 default - adjustable 0.1 to 1
battery & life	2 x 1.5 volt AAA - 180 hours continuous use
display	custom LCD
dimensions	40 x 66 x 155 mm
weight	185 grams

order code	description	
814-045	RayTemp 8	
860-845	RayTemp 8 kit	
830-040	protective nylon pouch	
834-740	ABS carrying case	
the RayTemp 8 is exclusive of probe		

# RayTemp® 28 Infrared Thermometer

ideal for high temperature applications

- stores the last 12 readings
- dual laser for precise targeting
- robust IP54 housing for durability
- wide temperature range -50 to 1370 °C

The RayTemp 28 is a professional infrared, non-contact thermometer with dual laser dot alignment, incorporating a 30:1 optic ratio (target distance/diameter ratio), enabling users to measure small targets from a distance or any item that is difficult to reach.

Featuring a three-button keypad, the RayTemp 28 allows the user to select the mode required, i.e. max, min, differential or average temperatures, view the max/min and configurable high/low alarms. Adjustable emissivity enabling the user to measure a variety of surface types.

The unit has a clear, easy to read, custom LCD display that features a backlight for when ambient light levels are low and an auto-power off facility that turns the instrument off after 35 seconds, maximising battery life. The thermometer is housed in a robust IP54 splashproof case to help reduce the possibility of damage in harsh environments and is supplied in a protective ABS carrying case.



## two instruments in one

The RayTemp 28 incorporates a miniature thermocouple type K probe socket that enables a wide range of type K thermocouple probes to be used for a variety of temperature measurement applications, including air, liquid and surface temperatures. For details of compatible type K thermocouple probes, see pages 71 to 76.



order code	description
814-028	RayTemp 28
the RayTemp 28 is exclusive of probe	

specification	RayTemp 28
range - infrared	-50 to 1350 °C
range - probe	-50 to 1370 °C
resolution	0.1 °C to 1000 °C thereafter 1 °C
accuracy - infrared	±2 °C (0 to 1350 °C) otherwise ±4 °C or ±4 % of reading whichever is greater
accuracy - probe	±1 °C or ±1 % of reading whichever is greater
field of view	target ratio 30:1
emissivity	0.95 default - adjustable 0.1 to 1
battery & life	9 volt PP3 - 40 hours continuous use
display	custom LCD
dimensions	83 x 95 x 192 mm
weight	275 grams

# RayTemp® 38 Infrared Thermometer

for measuring small surface areas at greater distances

- auto-power off & backlight functions
- target distance/diameter ratio 50:1
- wide range -59.9 to 999.9 °C
- robust housing for durability

The RayTemp 38 is a professional infrared, non-contact thermometer with dual laser dot alignment that incorporates a 50:1 optic ratio (target distance/diameter ratio), this enables users to measure small targets from a distance. The user stands a safe and comfortable distance from the target, points the thermometer at the surface to be measured, pulls the trigger and instantly reads the temperature. Ideal for measuring the temperature of any item that is difficult to reach. This enables the user to measure most surfaces accurately and quickly.

Measuring the surface temperature over the range of -59.9 to 999.9 °C with a 0.1 °C/°F resolution, the RayTemp 38 incorporates an auto-power off facility that turns the instrument off after 60 seconds, this function can be disabled, if required. Each unit incorporates a backlit custom LCD display that indicates both the temperature and the emissivity. The thermometer features a four-button keypad, allowing the user to select the mode required, i.e. max, min, differential and average temperatures, view the max/min high and low alarms and adjust the emissivity from 0.1 to 1.0 in 0.01 increments (default set at 0.95).

The RayTemp 38 is two instruments in one as it incorporates a thermocouple socket that will accept a type K thermocouple probe, see pages 71 to 76 for available probes. Each RayTemp 38 is supplied in a protective ABS carrying case. An optional strong magnetic holder is also available. The holder screws into the bottom of the thermometer's housing, allowing the unit to be mounted onto a metal surface for continuous monitoring.



Infrared

**magnetic holder**

specification	RayTemp 38
range - infrared	-59.9 to 999.9 °C
resolution	0.1 °C/°F
accuracy - infrared	±2 °C or ±2 % of reading whichever is greater
accuracy - probe	±1 °C or ±1 % of reading whichever is greater
field of view	target ratio 50:1
emissivity	0.95 default - adjustable 0.1 to 1
battery	2 x AAA alkaline
battery life	180 hours continuous use
display	custom LCD
dimensions	47 x 170 x 240 mm
weight	395 grams

order code	description
814-038	RayTemp 38
814-150	magnetic holder

the RayTemp 38 is exclusive of probe