Infrared Thermometers
non contact

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 electro magnetic 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.etiltd.com/emissivity

aluminium (anodised)	0.77	plastic (black)	0.95
brass (oxidised)	0.61	porcelain (glazed)	0.92
brick (red)	0.92	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.

TN1 Infrared Thermometer
with max/min function

The TN1 is a non-contact infrared thermometer. Simply aim the thermometer at the target and press the measurement button to display the surface temperature instantly. The TN1 indicates temperature over the range of -33 to 220 °C with a resolution of 0.1 °C and is switchable between °C/°F.

Each unit incorporates maximum and minimum temperature functions together with an auto power off facility that automatically turns the instrument off after 15 seconds, maximising battery life and a lock function for continuous temperature measurement.

The distance to target ratio is 1:1 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 0.01 to 1.

specification	TN1
range	-33 to 220 °C
resolution	0.1 °C/°F
accuracy	±2 % of reading or ±2 °C whichever is greater
field of view	target ratio 1:1
emissivity	0.95 default - adjustable 0.01 to 1 emissivity
battery	3 volt CR2032 lithium coin cell
battery life	40 hours continuous use
display	custom LCD
dimensions	18 x 37 x 68 mm
weight	32 grams

order code	description
814-050	TN1 infrared thermometer

TN2 Infrared Thermometer
with laser alignment & max/min function

The TN2 infrared thermometer incorporates laser alignment. Simply aim the TN2 at the target and press the read button to display the surface temperature instantly over the range of -33 to 250 °C with a resolution of 0.1 °C/°F (switchable).

The distance to target ratio is 6:1 and therefore the thermometer should be positioned as close to the target as practical without touching.

Each unit incorporates maximum and minimum temperature functions together with an auto power off facility that automatically turns the instrument off after 15 seconds, maximising battery life and a lock function for continuous temperature measurement.

specification	TN2
range	-33 to 250 °C
resolution	0.1 °C/°F
accuracy	±2 % of reading or ±2 °C whichever is greater
field of view	target ratio 6:1
emissivity	0.95 default - adjustable 0.01 to 1 emissivity
battery	3 volt CR2032 lithium coin cell
battery life	40 hours continuous use
display	custom LCD
dimensions	18 x 50 x 100 mm
weight	62 grams

order code	description
814-055	TN2 infrared thermometer

IR-Chill Infrared
thermometer with max/min function

✓ instant reading of chilled or frozen foods

✓ records maximum & minimum readings

✓ minimal ambient effect in cold environments

✓ compact, pocket-sized & simple to use

The IR-Chill thermometer is designed to measure the temperature of chill cabinets and freezers. Simply aim the thermometer at the target and press the measurement button to display the surface temperature instantly. The IR-Chill indicates temperature over the range of -55 to 220 °C with a resolution of 0.1 °C.

Each thermometer incorporates a max/min function together with an auto-power off facility that automatically turns the instrument off after 15 seconds, maximising battery life. A lock function is included for continuous measurement, this is particularly useful when scanning a number of items. The distance to target ratio is 1:1 therefore the thermometer should be positioned as close to the target as possible. The default emissivity is 0.95 but is adjustable from 0.01 to 1, so you can point and measure just about any surface.

The IR-Chill is perfect for supermarkets, food processors and general purpose applications. Whilst the IR-Chill is cheaper than many infrared gun-type thermometers, it out-performs most in low temperature applications.

why use an IR-Chill thermometer?

The accuracy of electronic infrared (IR) thermometers is often affected by the temperature of the environment in which they are being used. Large changes in the ambient temperature can introduce errors in the readings of the IR thermometer. When an IR thermometer is first taken into a refrigerated space, the readings may be as much as five or six degrees different. If the IR thermometer is allowed to acclimatise to the new ambient temperature before being used, it will provide fairly accurate readings.

The IR-Chill is designed to be used only a few inches from the surface being measured. The electronics incorporate an accurate temperature compensation circuit to minimise thermal drift. Therefore, the IR-Chill gives maximum reading accuracy in changing ambient temperatures. This means that you can come and go between cold and warm environments and take accurate temperatures on the move.

order code	description
814-090	IR-Chill

specification	IR-Chill
range	-55 to 220 °C
resolution	0.1 °C (-9.9 to 199.9 °C) or 1 °C
accuracy	±1 °C (0 to 64.9 °C) (±1.5 % above 65 °C)
field of view	target radio 1:1
emissivity	0.95 default - adjustable 0.01 to 1 emissivity
battery	3 volt CR2032 lithium coin cell
battery life	40 hours
display	custom LCD
dimensions	37 x 40 x 113 mm
weight	40 grams

Combo Infrared Thermometer
with foldaway penetration probe

✓ two instruments in one

✓ 0.1 °C resolution

✓ infrared range -32.9 to 219.9 °C

✓ simple to use

The Combo is two instruments in one compact unit - a digital infrared non-contact thermometer and a traditional probe thermometer that features a foldaway penetration probe. Each unit incorporates an auto power off facility that automatically turns the instrument off after 15 seconds, maximising battery life. plus a lock function for continuous temperature measurement.

infrared thermometer
Simply aim the infrared thermometer at the target and press the measurement button to display the surface temperature over the range of -32.9 to 219.9 °C with a resolution of 0.1 °C/°F.

The Combo IR thermometer incorporates a max/min temperature function. The distance to target ratio is 5:1 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 0.01 to 1, if required.

foldaway probe thermometer
Alternatively, it is possible to take liquid or semi-solid product temperatures, using the Combo's stainless steel penetration probe (Ø3.3 x 120 mm). The probe conveniently folds back through 180 degrees into the side of the instrument when not in use.

optional accessories
• 830-001 zip pouch
• 830-110 protective wallet
• 832-200 wall bracket (screws not supplied).

°C/°F   MAX/MIN   AUTO OFF

specification	Combo
infrared range	-32.9 to 219.9 °C
probe range	-54.9 to 329.9 °C
resolution	0.1 °C/°F
infrared accuracy	±2 % of reading or ±2 °C whichever is greater
probe accuracy	±1 % of reading or ±1 °C whichever is greater
field of view	target ratio 5:1
emissivity	0.95 default - adjustable 0.01 to 1 emissivity
battery	3 volt CR2032 lithium coin cell
battery life	40 hours continuous use
display	custom LCD
dimensions	25 x 40 x 156 mm
weight	75 grams

order code	description
814-065	Combo
830-110	protective wallet
830-001	zip pouch
832-200	wall bracket

RayTemp™ 3 Infrared Thermometer
ideal for the food industry

✓ simple push button operation

✓ range -60 to 500 °C

✓ assured accuracy of ±1 °C over the range of 0 to 65 °C

✓ compact, lightweight & easy to use

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

The RayTemp 3 measures temperature over the range of -60 to 500 °C with an assured accuracy of ±1 °C over the range of 0 to 65 °C, outside of this range ±2 °C of reading in an ambient temperature of between 15 °C and 25 °C, with a repeatability of ±1 °C of reading.

The instrument incorporates 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 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 laser assisted alignment as standard, to assist in pin-pointing the area of measurement. The unit incorporates an 11:1 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

• 830-040 protective pouch

• 834-740 ABS carrying case for transporting the thermometer

low cost calibration checker

The Comparator provides an inexpensive way of checking the temperature of infrared thermometers when used in conjunction with a Reference thermometer, see page 77.

°C/°F   MAX/MIN   AUTO OFF   BACKLIT

specification	RayTemp 3
range	-60 to 500 °C
resolution	0.1 °C (-9.9 to 199.9 °C) or 1 °C
infrared accuracy	±1 °C (0 to 65 °C) or ±2 °C
field of view	target ratio 11:1
emissivity	0.97 fixed
battery	2 x AAA alkaline
battery life	140 hours continuous use
display	custom LCD
dimensions	39 x 72 x 175 mm
weight	180 grams

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

RayTemp™ 4 Infrared Thermometer
compact & lightweight with max function

✓ range -50 to 400 °C

✓ continuously displays the maximum temperature

✓ target ratio 9:1

✓ laser dot alignment

The RayTemp 4 infrared thermometer is a compact and lightweight non-contact instrument that is easy to use. Simply aim, pull the trigger and display the temperature of the item being measured. In addition the LCD will display the maximum temperature.

The RayTemp 4 measures temperature over the range of -50 to 400 °C with an assured accuracy of ±1 °C over the range of 0 to 65 °C, outside of this range ±2 °C of reading in an ambient temperature of between 15 °C and 25 °C, with a repeatability of ±1 °C of reading.

The instrument incorporates 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 4 is ideal for measuring pipe surface temperatures in the HVAC industry, enabling the user to measure ducts and pipework in difficult to reach areas. The unit can be used by anyone as there is no need to focus or adjust the instrument.

The RayTemp 4 is equipped with a 9:1 optic ratio (target distance/diameter ratio) with a laser dot alignment, as standard, to assist in pin-pointing the area of measurement. If the target is 45 cm away, the measurement zone will be 5 cm across. The emissivity is fixed at 0.95 making this instrument more suitable for HVAC and general purpose applications in a wide range of industries.

optional accessories

• protective pouch to help against accidental damage

• hard ABS carrying case for transporting the thermometer safety

• a Comparator provides an inexpensive way of checking the temperature of infrared thermometers when used in conjunction with a Reference thermometer, see page 77.

°C/°F   MAX/MIN   AUTO OFF   BACKLIT

order code	description
814-070	RayTemp 4
830-040	protective pouch
834-740	small hard carrying case
814-132	Comparator

specification	RayTemp 4
range	-50 to 400 °C
resolution	0.1 °C (-9.9 to 199.9 °C) or 1 °C
infrared accuracy	±1 °C (0 to 65 °C) or ±2 °C
field of view	target ratio 9:1
emissivity	0.95 fixed
battery	2 x AAA alkaline
battery life	180 hours continuous use
display	custom LCD
dimensions	39 x 72 x 175 mm
weight	180 grams

RayTemp™ 8 Infrared Thermometer
with type K thermocouple socket

✓ target ratio 12:1

✓ two-in-one instrument

✓ includes differential & average temperatures

✓ range IR -60 to 500 °C, probe -64 to 1370 °C

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

The instrument has 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 a laser dot alignment for ease of use.

The RayTemp 8's four-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 infrared thermometer 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, please see pages 49 to 54.
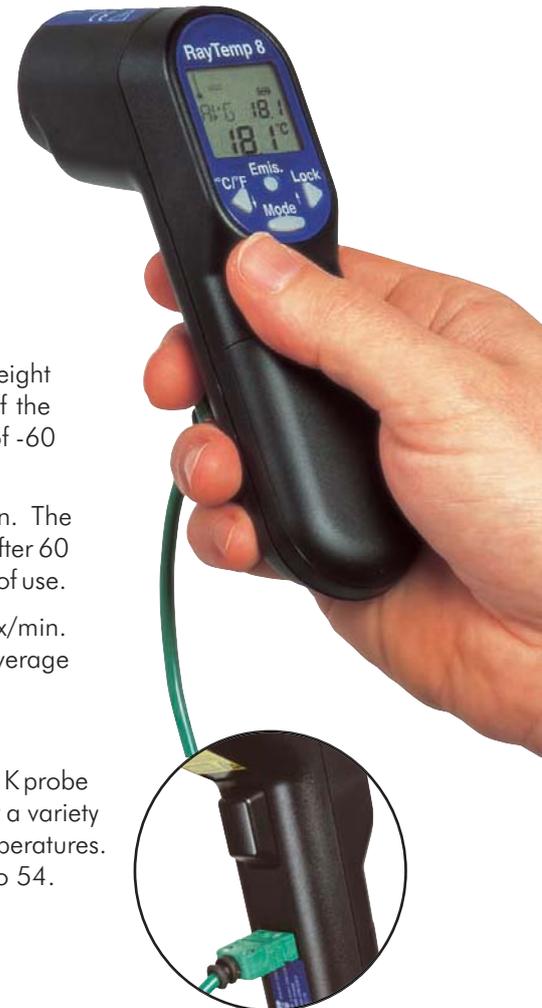
RayTemp 8 kit
The RayTemp 8 together with a penetration probe is available as a kit complete with FREE ProbeWipes and carrying case.
Each kit contains:

        1 x 814-045 RayTemp 8
        1 x 123-160 penetration probe
        1 x 836-022 mini tub of 70 anti-bacterial wipes
        1 x 834-740 ABS carrying case

°C/°F   MAX/MIN   AUTO OFF   BACKLIT

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

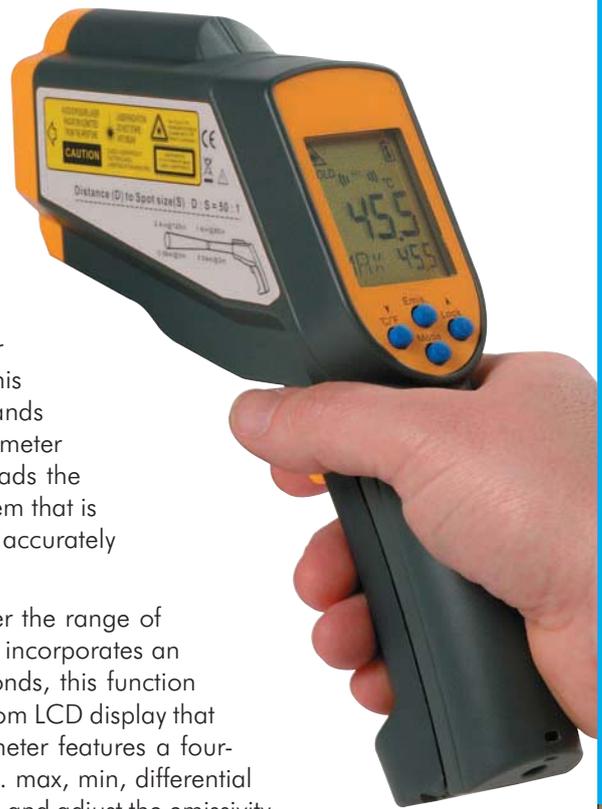| specification	RayTemp 8
infrared range	-60 to 500 °C
probe range	-64 to 1370 °C
resolution	0.1 °C/°F (-9.9 to 199.9 °C) or 1 °C
infrared accuracy	±2 % of reading or ±2 °C whichever is greater
probe accuracy	±1 % of reading or ±1 °C whichever is greater
field of view	target ratio 12:1
emissivity	0.95 default - adjustable 0.10 to 1.00
battery	2 x AAA alkaline
battery life	180 hours continuous use
display	custom LCD
dimensions	39 x 72 x 175 mm
weight	180 grams

RayTemp™ 38 Infrared Thermometer
ideal for high temperature applications

✓ robust housing for durability

✓ auto power off & backlight facilities

✓ wide temperature range -59.9 to 999.9 °C

✓ target ratio 50:1 for measuring small targets

The RayTemp 38 is a professional infrared, gun-shaped, non-contact thermometer with dual laser dot alignment. The thermometer 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 other item that is difficult to reach. This enables the user to measure most surfaces accurately and quickly.

This infrared thermometer measures 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 49 to 54 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.

magnetic holder

specification	RayTemp 38
range	-59.9 to 999.9 °C
resolution	0.1 °C/°F
infrared accuracy	±2 % of reading or ±2 °C whichever is greater
field of view	target ratio 50:1
emissivity	0.95 default, 0.1 to 1.0 adjustable in 0.01 increments
battery	2 x AAA alkaline
battery life	180 hours continuous use
display	custom LCD with backlight
dimensions	47 x 197 x 203 mm
weight	386 grams

order code	description
814-038	RayTemp 38
814-150	magnetic holder
	the RayTemp 38 is exclusive of probe

°C/°F   MAX/MIN   AUTO OFF   BACKLIT   AUTO OFF