FLUKE®

Hot solutions for temperature measurement

Contact and non-contact thermometers from Fluke

Infrared thermometry explained

With the 60 Series and 570 Series, Fluke offers you a wide choice of non-contact infrared thermometers. Infrared thermometry is a convenient, safe and accurate technique for temperature measurement. This page outlines some of the factors to consider when choosing a model to suit your needs.

What is infrared (IR) radiation?

Infrared (IR) radiation is invisible to the human eye. It's part of the electromagnetic spectrum (which also includes radio frequencies, microwaves and ultraviolet), and is just beyond the visible light band. All objects naturally reflect, transmit and emit IR energy. By sensing the IR energy emitted from an object's surface, a Fluke IR thermometer can accurately determine its temperature. The instruments are adjusted to compensate for the transmitted and reflected IR energy.

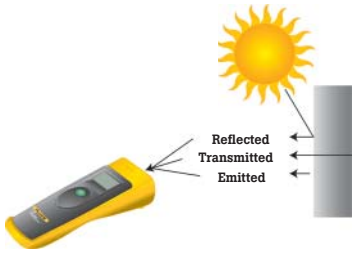
What are the benefits of non-contact measurement?

IR allows non-contact temperature measurement, which means you don't have to physically touch the surface being measured with a probe. This has clear safety benefits as it reduces the danger of electric shocks and burns. There are also speed advantages as an IR thermometer can take several temperature readings in a matter of seconds, whereas contact techniques may take minutes to reach a stable reading. The temperature of hard-to-reach objects can also be measured, and there is no risk of surface contamination.

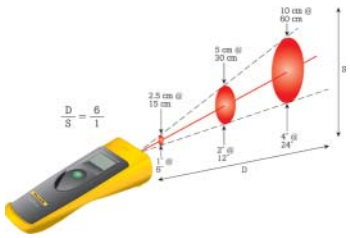
How accurate is IR temperature measurement?

The Fluke IR thermometers have an optical system to focus the emitted IR onto a detector, which converts it into an electrical signal. This is displayed as a temperature value (in °C or °F). Several factors influence the accuracy of a reading, and the most important are emissivity, distance-to-spot and ratio field of view.

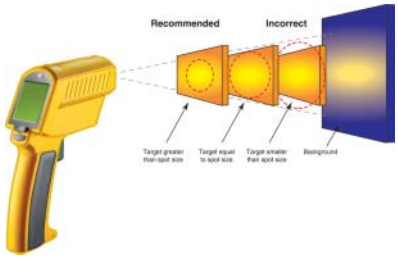
- **Emissivity** – this is a numerical value between 0 and 1 that indicates the ability of an object to emit IR energy. Most organic materials and painted or oxidized surfaces have an emissivity of 0.95 so most IR thermometers are calibrated according to this value. Fluke also has IR thermometers with (digitally) adjustable emissivity.



- **Distance-to-spot ratio** – the optical system of an IR thermometer focuses IR energy from a spot on the target's surface onto the instrument's detector. The optical resolution is defined as the ratio of the distance from the instrument to the diameter of this spot (distance-to-spot ratio, D:S). The larger the ratio, the better the instrument's optical resolution.



- **Field of view** – this relates to the spot size, which should not be bigger than the surface being measured (target). The smaller the target, the closer the instrument has to be to it. Ideally the target should be twice as large as the spot.



How to make a temperature measurement

- Point the instrument at the object (Fluke IR thermometers have visible laser guidance systems)
- Squeeze the trigger and read the temperature. It's that simple!

Note: allow the IR thermometer to normalize for 20 minutes if the ambient temperature abruptly changes by 20°C or more.

Basic guidelines

Do:
- Make sure the spot size is smaller than the target
- Measure surface temperature only

Do not:
- Try to measure internal temperatures
- Take a temperature measurement through glass

Be aware that:
- Smoke, steam, dust and other environmental conditions can affect accuracy
- IR thermometers are not recommended for measuring the temperature of shiny or polished surfaces (such as stainless steel)

Typical IR thermometry applications
- Electrical – defective transformers, electrical panels and connectors, running motors
- HVAC – air stratification, ducting, furnace performance
- Automotive – cylinder heads, heating/cooling systems
- Food safety – holding, serving and storage temperatures

60 Series Infrared Thermometers

Point, press and read temperature

The Fluke 60 Series non-contact thermometers are the ideal professional diagnostic tools for quick and accurate temperature measurements.
These handheld tools are ideal for measuring surface temperatures of rotating, hard-to-reach, electricity live or dangerously hot targets like electrical motors and – panels, and heating and ventilation systems.
The laser sighting system guides measurements to the right target and in less than a second, the large temperature display provides a readout of the surface temperature.

The 60 Series IR thermometers feature:

- Laser guided sighting system for easy targeting with 1% accuracy
- Up to 12 points datalogging with Min, max average functions
- Up to 50:1 optical resolution
- Choice between models with fixed or adjustable emissivity
- Backlit display for easy reading in the dark
- Temperatures up to 760°C

Features

	61	62	63	65	66	68
Form factor	Flat grip	Pistol grip	Pistol grip	Flat grip	Pistol grip	Pistol grip
Temperature range	-18 to 275°C	-30 to 500 °C	-32 to 535°C	-40 to 500°C	-32 to 600°C	-32 to 760°C
Optical resolution	8:1	10:1	12:1	8:1	30:1	50:1
Laser beam for accurate targeting	●	●	●	●	●	●
Backlit LCD display	●	●	●	●	●	●
Use selectable °C or °F	●	●	●	●	●	●
MIN/MAX/AVG/DIF readings		Max	MAX only	Min/Max/avg only	●	●
Datalogging				●	●	●
Hi/Lo Alarm					●	●
Adjustable emissivity					●	●

Specifications

	61	62	63	65	66	68
Range	-18 to 275°C	-30 to 500 °C	-32 to 535°C	-40 to 500°C	-32 to 600°C	-32 to 760°C
Response time	< 1 second	<500ms (95 % of reading)	≤ 0.5 second	<1 second	≤ 0.5 second	≤ 0.5 second
Resolution	0.2°C	0.2°C	0.2°C	0.1°C to 200°C, 1°C over 200°C	0.1°C	0.1°C
Repeatability (% of reading)	± 2% or ± 2°C*	±0.5% or < ±1°C*	± 0.5% or ≤ ± 1°C*	± 1% or ± 1°C*	± 0.5% or ≤ ± 1°C*	± 0.5% or ≤ ± 1°C*
Accuracy: (assumes ambient operating temperature of 23°C)	For targets at: -18 to -1°C: ± 3°C -1 to 275°C: ± 2% of reading or ± 2°C*	For targets at: 10 °C to 30 °C: ±1 °C ± 1.5% of reading or ± 1.5°C over the balance of the range	For targets at: -32 to -26°C: ± 3°C -26 to -18°C: ± 2.5°C -18 to 23°C: ± 2°C 23°C -510°C: ± 1% of reading or ± 1°C* For targets above 510°C: ± 1.5% of reading	For targets at: -40 to 0°C: ± 5°C 0 to 100°C: ± 2°C 100 to 500°C: ± 2% of reading	For targets at: -32 to -26°C: ± 3°C -26 to -18°C: ± 2.5°C -18 to 23°C: ± 2°C For targets above 23°C: ± 1% of reading or ± 1°C*	For targets at: -32 to -26°C: ± 3°C -26 to -18°C: ± 2.5°C -18 to 23°C: ± 2°C For targets above 23°C: ± 1% of reading or ± 1°C*
Typical distance to target	Up to 1m	Up to 1,5 m	Up to 2 m	Up to 1m	5 m	8 m
Emissivity	Fixed at 0.95	Fixed at 0.95	Fixed at 0.95	Fixed at 0.95	Digitally adjustable from 0.1 to 1.0 by 0.01	Digitally adjustable from 0.1 to 1.0 by 0.01

* whichever is greater

Battery Life:
Fluke 66 and 68: 20 hours with laser and backlight on 50%
Fluke 65: 15 hours with laser and backlight activated
Fluke 63: 10 hours with laser and backlight activated
Fluke 62: 12 hours with laser and backlight on
Fluke 61: 12 hours with laser and backlight activated

Size (HxWxD):
Fluke 63, 66 and 68: 200 mm x 160 mm x 55 mm
Fluke 65: 185 mm x 64 mm x 38 mm
Fluke 62: 152 mm x 101 mm x 38 mm
Fluke 61: 184 mm x 45 mm x 38 mm

Weight:
Fluke 63, 66 and 68: 0.320 kg
Fluke 65: 0.284 kg
Fluke 62: 0.200 kg
Fluke 61: 0.227 kg

Fluke 62: 2 years
Other models: one year warranty

Included Accessories

Fluke 61: 9V Battery
Fluke 62: 9V Battery, storage holster
Fluke 63, 66 and 68: Hard carrying case, 9V batteries
Fluke 65: C50 Soft carrying case and 2 AA batteries

Ordering information

Fluke 61 Infrared Thermometer
Fluke 62 Mini Infrared Thermometer
Fluke 63 Infrared Thermometer
Fluke 65 Infrared Thermometer
Fluke 66 Infrared Thermometer
Fluke 68 Infrared Thermometer

Recommended Accessories


80PR-60


H6

570 Series
Precision Infrared Thermometers

FLUKE®

New

Fluke 576

Fluke 572 Fluke 574

Measure temperature with ease and precision

The Fluke 570 series are the most advanced IR non-contact thermometers, and are ideal for predictive and preventative maintenance applications.
Offering a broad temperature range and a true dimension laser sighting system for precise targeting resulting in more accurate measurements. When requiring analysis and documentation use the 100-point data logging and software for graphing and analysis. The top-of-the-range Fluke 576 even has a built-in digital camera that photographs the location when the temperature measurement is made. From close-up electrical connections, to far-distance room balancing checks, the Fluke 570 series can take IR temperature measurements with ease and precision.

- Enhanced optics allows measurements of smaller objects from farther away
- True Dimension™ three-dot laser sighting system highlights the true diameter of measurement spots at all distances
- Adjustable emissivity setting and 30 pre-set common material values for more accurate measurements
- 100 data point memory for storage of measurements (Fluke 574, 576) and photographic images (Fluke 576)
- Instantly captures photographs of temperature measurement locations for improved documentation (Fluke 576 only)

Features

	572	574	576
Temperature range		-30 to 900°C	
Optical resolution		Standard: 60:1 Close focus: 50:1	
3 dot laser beam for accurate targeting	●	●	●
Adjustable emissivity	●	●	●
Bar graph display	●	●	●
Backlit LCD display	●	●	●
Use selectable °C or °F	●	●	●
Audible and visible Hi/Lo Alarm	-/●	●/●	●/●
MIN/MAX	●	●	●
AVG/DIF readings		●	●
Datalogging (number of measurements)		100	100
PC interface		RS232	USB
Built-in Digital camera			●

Specifications

	572	574	576
Temperature range		-30 to 900°C	
Response time		250ms (95 % of reading)	
Resolution		0.1°C of reading up to 900°C	
Repeatability		±0.5% of reading or ±1°C*	
Accuracy: (assumes ambient operating temperature of 23 °C to 25 °C)		±0.75% of reading, ±0.75°C *	
Typical distance to target		10,5 m	
Emissivity		Digitally adjustable from 0.10 to 1.0 by 0.01	

*whichever is greater.

Battery Life:
Fluke 572, 574: 10 hours typical
Fluke 576: 8 hours typical (13 hours with photographic mode off)

Size (HxWxD):
Fluke 572/574: 200 mm x 170 mm x 55 mm
Fluke 576: 240 mm x 170 mm x 55 mm

Weight: Fluke 572: 0.480 kg
Fluke 574: 0.480 kg
Fluke 576: 0.580 kg

Two years warranty

Included Accessories

Fluke 572: Hard case, 2 batteries
Fluke 574: Hard case, 2 batteries, Thermocouple K probe, 220V power supply, DataTemp software, RS232 cable
Fluke 576: Hard case, 2 batteries, Thermocouple K probe, DataTemp software, USB cable.

Ordering Information

Fluke 572	Precision Infrared Thermometer
Fluke 574	Precision Infrared Thermometer
Fluke 576	Precision Infrared Thermometer
Fluke 572CF	Precision Infrared Thermometer with close focus option
Fluke 574CF	Precision Infrared Thermometer with close focus option
Fluke 576CF	Precision Infrared Thermometer with close focus option

Recommended Accessories

AN5

C570

50 Series II Thermometers

Fluke 54 II

Fluke 51 II

Fluke 52 II

Fluke 53 II

Laboratory accuracy. Wherever you go.

The Fluke 50 Series II contact thermometers offer fast response and laboratory accuracy (0.05% + 0.3°C) in a rugged handheld test tool.

- Large backlit dual display shows any combination of T_1, T_2 (52 and 54 only), T_1–T_2 (52 and 54 only) plus MIN, MAX, or AVG
- Relative time clock on MIN, MAX, and AVG provides a time reference for major events
- Electronic Offset function allows compensation of thermocouple errors to maximize overall accuracy
- Readout in °C, °F, or Kelvin (K)
- Sleep mode increases battery life
- Battery door allows easy battery replacement without breaking the calibration seal

Additional features for the 53 and 54 Series II:

- Data Logging up to 500 points of data with user adjustable recording interval
- Real time clock captures the exact time of day when events occur
- Recall function allows logged data to be easily reviewed on the meter display
- IR communication port allows data to be exported to optional FlukeView® Temperature PC software

Features

	51 II	52 II	53 II	54 II
Thermocouple types	J,K,T,E	J,K,T,E	J,K,T,E,N,R,S	J,K,T,E,N,R,S
Number of inputs	Single	Dual	Single	Dual
Time stamp	Relative Time	Relative Time	Time of Day	Time of Day
Splash/Dust resistant	●	●	●	●
Dual display with backlight	●	●	●	●
Min/Max/Avg recording	●	●	●	●
(T_1–T_2) True differential		●		●
Data logging up to 500 points			●	●
IR data port for interface to PC			●	●
Compatible with optional FlukeView Software			●	●

Specifications

Temperature range:			
J-type	Thermocouples	–210°C to 1200°C	(–346°F to 2192°F)
K-type	Thermocouples	–200°C to 1372°C	(–328°F to 2501°F)
T-type	Thermocouples	–250°C to 400°C	(–418°F to 752°F)
E-type	Thermocouples	–150°C to 1000°C	(–238°F to 1832°F)
N-type**	Thermocouples	–200°C to 1300°C	(–328°F to 2372°F)
R** and S-type**	Thermocouples	0°C to 1767°C	(32°F to 3212°F)
Temperature accuracy			
Above –100°C (–148°F):			
J, K, T, E, and N-type**		± [0.05% + 0.3°C (0.5°F)]	
R** and S-type**		± [0.05% + 0.4°C (0.7°F)]	
Below –100°C (–148°F):			
J, K, E, and N-types		± [0.20% + 0.3°C (0.5°F)]	
T-type		± [0.50% + 0.3°C (0.5°F)]	

**Only the Fluke Models 53 and 54 Series II thermometers are capable of measuring N, R, and S-type thermocouples.

Battery life: 1000 hours typical, AA
Size (HxWxD): 173 x 86 x 38 mm
Weight: 0.4 kg
Three Year Warranty

Included Accessories

Impact absorbing holster
Two bead probe thermocouples 80PK-1 (54+52)
One bead probe thermocouple 80PK-1 (51+53)

Ordering Information

Fluke 51 II	Thermometer
Fluke 52 II	Thermometer
Fluke 53 II	Thermometer
Fluke 54 II	Thermometer
FVF-SC1	FlukeView Forms Software including interface cable

Recommended Accessories

C25

80PK-26

80PK-25

FVF-SCI

TPAK

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Applications support for IR thermometer users

Fluke offers support for IR thermometer users with a series of application notes (obtain them free via www.fluke.com).
The following are available:

Using the Fluke 66 and 68 infrared thermometers

- This application note looks at basic theory of IR thermometry, and provides useful information about using the Fluke 66 or 68 to identify overloaded circuit breakers, find bad or failing electrical connections, troubleshoot steam systems, and track motor wear. Tips about operating the instruments are also provided.

Monitoring Electrical Systems with Fluke Infrared Thermometers

- Finding hotspots, preventing arcing, and pinpointing sources of nuisance tripping are typical troubleshooting tasks made easier with Fluke non-contact thermometers.
  This application note covers measuring the temperature of electrical components using the latest Fluke 570 Series IR thermometers.

Non-contact temperature measurements using IR thermometers

- Going a little deeper into the theory of IR thermometry, this application note examines various application areas including electrical, preventive maintenance, HVAC and food processing. Optical resolution and emissivity are discussed in detail, and an example of both correct and incorrect techniques is given.

Quick Diagnostics for HVAC with Fluke Infrared Thermometers

- Specifically aimed at maintaining Heating, Ventilation and Air Conditioning (HVAC) systems, this application note uses the new Fluke 570 Series to demonstrate the techniques involved for tasks such as checking supply and return registers, identifying leaky ducts and room balancing.

Fluke. *Keeping your world up and running.*

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