

Infrared Thermometers

On the next pages you will find various infrared thermometers for non-contact surface temperature measurements. The infrared thermometers are suitable for measurements wherever direct contact is impossible or impractical. ebro also offers models that measure not only the surface temperature but also the relative humidity or the core temperature by means of an external probe.



Applications

- Surface temperature measurement
- Core temperature measurement with penetration probe
- Humidity measurement
- Process monitoring

Find your perfect infrared thermometer:

| Infrared Thermometers | Measurement range | Probe type | Probe connection | Channels | Distance:spot ratio | Fast response time | Splashproof housing |
|---|---------------------|-------------------------------------|------------------|----------|---------------------|--------------------|---------------------|
| TFI 54 Infrared Thermometer | -60 °C ... +550 °C | Infrared | | 1 | 12:1 | ✗ | ✗ |
| TFI 250 Basic Infrared Thermometer | -60 °C ... +550 °C | Infrared | | 1 | 12:1 | ✗ | |
| TFI 550 Infrared Dual Thermometer | -60 °C ... +550 °C | Infrared and NiCr-Ni | SMP | 2 | 30:1 | ✗ | |
| TFI 650 Infrared Dual Thermometer | -60 °C ... +1500 °C | Infrared and NiCr-Ni | SMP | 2 | 50:1 | ✗ | |
| THI 350 Infrared Thermometer/Hygrometer | -60 °C ... +500 °C | Infrared (temperature and humidity) | | 2 | 12:1 | ✗ | |
| TLC 730 Dual Infrared/Fold-Back Thermometer | -50 °C ... +350 °C | Infrared and thermocouple type K | | 2 | 8:1 | ✗ (Infrared) | ✗ |

TFI 250 Basic Infrared Thermometer with two adjustable emissivity factors



Technical Data

| | |
|------------------------|---|
| Measurement range | -60 °C ... +550 °C (-76 °F... 1022 °F) |
| Accuracy | ±2 °C + 0,05 °C per °C below 0 °C (at -60 °C ... 0 °C) ±2 °C (at 0 °C ... +15 °C) ±1,5 °C (at +15 °C ... +35 °C) ±2 °C or 2%, larger value is applicable (at +35 °C ... +550 °C) |
| Resolution | ±0.1 °C |
| Operating temperature | 0 °C ... +50 °C (+32 °F ... 122 °F) |
| Response time | 1 s |
| Emissivity factor | 0.95 standard, adjustable from 0.1 to 1.0 |
| Distance : spot ratio | 12:1 |
| Battery | 2 x AAA (Micro) |
| Battery lifetime | Approximately 14 hours of continuous use |
| Housing material | ABS |
| Dimensions (L x W x H) | 153 x 115 x 48 mm |
| Weight | 177 g (with batteries) |
| Protection class | IP 20 |
| Certificate | Factory calibration certificate |

- Single laser pointer
- Distance:spot ratio = 12:1
- Replaceable battery

| Type | Description | Part No. |
|---------|--|-----------|
| TFI 250 | Infrared Thermometer including factory calibration certificate | 1340-1753 |

TFI 54 Infrared Thermometer with splash proof housing



Technical Data

| | |
|------------------------|---|
| Measurement range | -60 °C ... +550 °C (-76 °F ... +1022 °F) |
| Accuracy | ±2 °C + 0,05 °C per °C below 0 °C (at -60 °C ... 0 °C) ±2 °C (at 0 °C ... +15 °C) ±1,5 °C (at +15 °C ... +35 °C) ±2 °C or 2%, larger value is applicable (at +35 °C ... +550 °C) |
| Resolution | ±0.1 °C |
| Operating temperature | 0 °C ... +50 °C (+32 °F ... +122 °F) |
| Response time | 1 s |
| Emissivity factor | 0.95 standard, adjustable from 0.1 to 1.0 |
| Distance : spot ratio | 12:1 |
| Battery | 2 x AAA (Micro) |
| Battery life time | Approximately 14 hours of continuous use |
| Housing material | Rubberized |
| Dimensions (L x W x H) | 144 x 117 x 43 mm |
| Weight | 180 g (with batteries) |
| Protection class | IP 54 |
| Certificate | Factory calibration certificate |

- Single laser pointer
- Distance:spot ratio = 12:1
- Replaceable battery

| Type | Description | Part No. |
|--------|--|-----------|
| TFI 54 | Infrared Thermometer including factory calibration certificate | 1340-1754 |

TFI 550 Infrared Dual Thermometer with NiCr-Ni connection



Technical Data

| | |
|-----------------------------------|---|
| Measurement range | -60 °C ... +550 °C (-76 °F ... 1022 °F) |
| Accuracy | ±2 °C at -18 °C ... +23 °C (±3.6 °F at 0 °F ... 73 °F) ±1 % of measurement ±1 °C (whichever is larger) at +23 °C ... +510 °C ±1.8 °F (whichever is larger) at 73 °F ... 950 °F |
| Resolution | 0.1 °C at -9.9 °C ... +199 °C, otherwise 1 °C (0.2 °F at 14 °F ... 391 °F, otherwise 1.8 °F) |
| Response time (t _{90%}) | Approximately 1 s |
| Emissivity factor | 0.1 ... 1.0 |
| Distance : spot ratio | 30:1 |

NiCr-Ni probe measurement

| | |
|-----------------------|---|
| Measurement range | -64 °C ... +1400 °C (-83 °F ... 2552 °F) |
| Connection | SMP |
| Accuracy | ±1 % of measurement value / ±1 °C (±1.8 °F), whichever is larger |
| Battery | 2 x AAA (Micro) |
| Battery lifetime | Typically 180 hours |
| Operating temperature | 0 °C ... +50 °C (32 °F ... 122 °F) |
| Storage temperature | -20° C ... +65 °C (-4 °F ... 149 °F) |
| Housing material | ABS |
| Protection class | IP 20 |
| Weight | Approximately 180 g |
| Certificate | Factory calibration certificate |

Optional external NiCr-Ni probes
with SMP connection available
(starting on page 106).

- Double laser pointer
- Distance:spot ratio = 30:1
- Alarm when MIN/MAX exceeded

| Type | Description | Part No. |
|---------|--|-----------|
| TFI 550 | Infrared thermometer with NiCr-Ni connection | 1340-1786 |
| AN 144 | Extension cable, 2.5 m silicone, SMP | 1343-2627 |

TFI 650 Infrared Dual Thermometer with NiCr-Ni connection and wide measurement range



Technical Data

| | |
|------------------------|---|
| Measurement range | -60 °C ... +1500 °C (-76 °F ... +2732 °F) |
| Accuracy | ±2% of measurement value / ±2 °C (whichever is larger) |
| Resolution | 0.1 °C |
| Response time | Approximately 1 sec |
| Emissivity factor | 0.1 ... 1.0 |
| Distance:spot ratio | 50:1 |
| Probe | With SMP connection |
| Operating temperature | 0 °C ... +50 °C |
| Storage temperature | -20 °C ... +65 °C |
| Housing material | ABS |
| Protection class | IP 20 |
| Battery | 2 x AAA (Micro) |
| Battery lifetime | Typically 140 hours |
| Dimensions (L x W x H) | 47 x 197 x 203.3 mm |
| Weight | Approximately 385 g (with battery) |
| Certificate | Factory calibration certificate |

Optional external NiCr-Ni probes
with SMP connection available
(starting on page 106).

- Double laser pointer
- Distance:spot ratio = 50:1
- Alarm when MIN/MAX exceeded

| Type | Description | Part No. |
|---------|--|-----------|
| TFI 650 | Infrared Thermometer with NiCr-Ni connection | 1340-1783 |
| AN 144 | Extension cable, 2.5 m silicone, SMP | 1343-2627 |

THI 350 Infrared Thermometer/Hygrometer with automatic dew point calculation



- Visible and audible alarm upon exceeding of user settable limits
- Distance:spot ratio = 12:1

Technical Data

| | |
|---|--|
| Measurement range | -60 °C ... +500 °C (-76 °F... 932 °F) |
| Temperature accuracy | ±1.0 °C (+15 °C ... + 35 °C), ±2 °C (-33 °C ... 500 °C), ±2 °C for the remaining measurement range |
| Measurement range: Relative air humidity | 1 % ... 99 % |
| Accuracy: Relative air humidity (Tamb = 23±5degC) | ±3 % (20 % ... 80 %), ±5 % for the remaining measurement range |
| Emissivity factor | 0.95 standard, adjustable from 0.1 to 1.0 |
| Resolution (-9,9~199,9 °C) | 0.1 °C / 0.1 °F |
| Response time | 1 sec |
| Operating Temperature | 0 °C to +50 °C (+32 °F to +122 °F) |
| Distance:Spot ratio | 12:1 |
| Measurement range relative air humidity (Tamb = 23 ± 5degC) | 1~99 %, Accuracy: ± 3 % of 20~80 %, otherwise ± 5 % |
| Dew point | -50~50 °C, Accuracy: ±2.5 °C of 20~30 % rH; ±2 °C of 31~40 % rH; ±1,5 °C of 41~95 rH |
| Battery | 2 x AAA Micro (Alkaline recommended) |
| Battery lifetime | Typically 180 h, at least 140 h of continuous use |
| Dimensions (L x W x H) | 46 x 143 x 184.8 mm |
| Certificate | Factory calibration certificate |

| Type | Description | Part No. |
|---------|--|-----------|
| THI 350 | Infrared thermometer with air humidity measurement | 1340-1790 |

TLC 730 Dual Infrared/Fold-Back Thermometer with foldable penetration probe and infrared sensor



- Double laser pointer
- Distance:spot ratio = 8:1
- Visible and audible alarm upon exceeding/shortfall of limit value

Technical Data

| | |
|----------------------------|---|
| Measurement range | -50 °C ... +350 °C (-58 °F ... 662 °F) |
| Accuracy infrared | ±4 °C at -50 °C ... -30.1 °C (±7.2 °F at -58 °F ... -22 °F) ±2.5 °C at -30 °C ... -18.1 °C (±4.5 °F at -22 °F ... -0.4 °F) ±1.5 °C at -18 °C ... -0.1 °C (±2.7 °F at -0.4 °F ... 32 °F) ±1.0 °C at 0 °C ... +65 °C (±1.8 °F at 32 °F ... 149 °F) ±2.0 °C or 2 % at +65 °C ... +350 °C (±3.6 °F at 149 °F ... 662 °F) |
| Accuracy penetration probe | ±0.5 °C at -18 °C ... +120 °C (±0.9 °F at -0.4 °F ... 248 °F) ±1 °C (±2 °F) or 1 % for the remaining measurement range (whichever is larger) |
| Resolution | 0.1 °C / 0.2 °F |
| Sensor | Thermocouple type K |
| Operating temperature | -25 °C ... +50 °C (-13 °F ... 122 °F) |
| Storage temperature | -40 °C ... +70 °C (-40 °F ... 158 °F) |
| Battery | 2 x AAA (Micro), user replaceable |
| Battery lifetime | Approximately 15 h of continuous use |
| Dimensions (L x W x H) | 48 x 24 x 172 mm (without probe) |
| Housing material | ABS |
| Weight | Approximately 140 g |
| Protection class | IP 55 |
| Automatic deactivation | Automatically after 15 seconds, deactivatable |
| Certificate | Factory calibration certificate |

| Type | Description | Part No. |
|---------|---------------------------------------|-----------|
| TLC 730 | Dual Infrared / Fold-Back Thermometer | 1340-5730 |
| AG 121 | Nylon case for TLC 1598 and TLC 730 | 1341-0624 |

Recommendations for Infrared Measurements

Infrared Radiation Properties of Various Materials

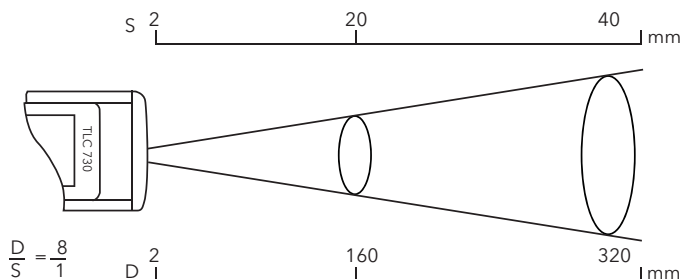
Various materials and surfaces have different infrared light emitting properties and therefore affect the temperature data being measured (emissivity). Most common products (including liquids and foodstuffs packaged in cartons or plastic containers) have an emissivity of 0.95.

Bare or metallic surfaces cause inaccurate measurements due to their reflectivity of light and heat radiation. It is possible to circumvent these problems by measuring parts of the object you are measuring that are already black (e.g. for a grill) or by painting the surface of the respective object black or by covering with matt tape. After covering the object, wait some time before performing the measurement to ensure that the material used for covering can acquire the temperature of the object being measured.

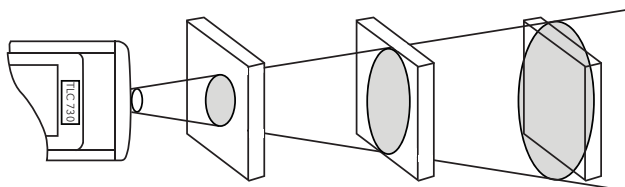
Our thermometers have a factory set emissivity of 0.95. The emissivity value can be set within a range of 0.10 (value shown on display: 10E) and 1 (display: 100E).

Tips for Precise Infrared Measurements

As the distance between the thermometer and the object being measured increases, so does the diameter of the surface being measured (spot size). You can observe this because the distance between the two red laser points projected on the measured object increases as the distance between the thermometer and the measured object increases. The ideal measuring distance is between 5 cm and 10 cm.



Please ensure that the object being measured is larger than the distance between the two laser points. The smaller the measured object is, the closer you must be to the object.



If the accuracy of the measurement is crucial, the object being measured should be at least twice as large as the distance between the two laser points. The device is not well-suited for taking temperature measurements on shiny or highly polished metallic surfaces (e.g. stainless steel, aluminum etc.). The device cannot take measurements through transparent surfaces such as glass. The device will instead measure the surface temperature of the glass. Steam, dust, smoke and other obstructions can interfere with measuring the correct temperature. If you would like to measure liquids, stir up the liquid thoroughly while taking the measurement.

Table of certain known emissivities

| Material Emissivity | Emission 8-14 μm |
|---------------------|------------------|
| Aluminium, oxidised | 0.2 - 0.4 |
| Aluminium, blank | 0.04 |
| Lead, scraggly | 0.4 |
| Lead, oxidised | 0.2 - 0.6 |
| Iron, oxidised | 0.5 - 0.9 |
| Iron, polished | 0.24 |
| Iron, rusted | 0.5 - 0.7 |
| Copper, polished | 0.03 |
| Copper, oxidised | 0.4 - 0.8 |
| Inconel, oxidised | 0.7 - 0.95 |
| Inconel, polished | 0.3 - 0.6 |
| Asphalt | 0.95 |
| Concrete | 0.95 |
| Ice | 0.98 |
| Cement | 0.8 - 0.95 |
| Glass pane | 0.85 |
| Rubber | 0.95 |
| Limestone | 0.98 |
| Wood | 0.9 - 0.95 |
| Cork | 0.7 |
| Graphite | 0.7 - 0.8 |
| Ceramics | 0.95 |
| Gravel | 0.95 |
| Paper | 0.95 |
| Cloth | 0.95 |
| Sand | 0.9 |
| Snow | 0.9 |
| Potter's clay | 0.95 |
| Water | 0.93 |