The Different Types of Thermometer and Their Uses

There are many different types of thermometer available on the market. Whether you’re ensuring your catering establishment complies with health & safety regulations, monitoring room or outdoor temperatures at the workplace, choosing a thermometer for a medical kit, or taking critically important industrial measurements, it’s vitally important to choose the right thermometer(s) to suit your intended application(s).

In today’s market, more thermometers are used without firstly being checked for traceable accuracy, or suitability of purpose, yet the accuracy and suitability of your thermometer to its intended application could be the difference between passing and failing a health & safety audit, wasting a whole industrial process, or being correct the first time.

When you’re choosing a thermometer, it’s important to understand its associated application, temperature measurement range, resolution, accuracy, and the maintenance required to achieve repeatable measurements. Some applications will require you to achieve a much more accurate reading than others. You’ll also need to consider the environment in which the thermometer is used. In a professional environment, the accuracy of your reading will ultimately affect the credibility of your future measurements, and organisation as a whole.

So, let’s briefly consider the types of thermometer on the market, and their accredited application(s)

**Traditional Thermometers (Spirit Filled)**

Often the cheapest and most popular type of thermometer, these are ideal for use at home or in non-specialist environments where traceable accuracy is not required.

- Spirit level indication
- Easy to read, typically measuring in both °C and °F
- Can often be wall mounted or submerged in liquids
- They require very little maintenance
- Variable measurement range, resolution and accuracy

**Example Product:** [ATH-390](#) ATP’s workplace thermometer range are specially designed to help monitor working environments in accordance with Workplace (Health, Safety & Welfare) Regulations 1992 Section 7.
**Dual Sensor / Multiple Sensor Thermometers**

Often used in a professional environment, these thermometers allow the simultaneous monitoring of two or more environments over both short and long periods of time. They are ideal for applications such as indoor and outdoor temperature comparisons, the monitoring of storage areas, and classroom maintenance.

- Typically consist of display unit and external temperature sensors
- Each external sensor reading is displayed on the main unit
- The main unit can typically be wall or desk mounted
- Traceable accuracy is recommended
- Variable measurement range, resolution and accuracy

**Example Product:** ATH-986 This thermometer has 2 sensors & each sensor has its own readout. One sensor is inside the unit. The external sensor has a 3 metre connection lead.

**Irreversible Temperature Labels**

Temperature indicator labels are self-adhesive temperature proofing foils. They are ideal for use in processes where specific temperature values need to be achieved, such as sterilisation. They are also suitable for use where temperature values should not be exceeded, such as engine or bearing monitoring. They are a relatively cheap, yet effective way to achieve permanent records of accuracy.

- Each foil segment on a label is sensitive to a different temperature and when exposed to its rating will turn black
- Each segment has both °C and °F temperature values
- Each label is oil and water resistant
- The colour change is irreversible even after the object being measured cools down
- After use, labels can be removed
- Variable measurement range, resolution and accuracy

**Example Product:** 5 Segment Irreversible Temperature Label These labels are supplied in packs of 50 labels and are water and oil resistant.

**Fixed & Wired Probe Thermometers**

Fixed probe thermometers are designed to deliver instant temperature readings of foods, liquids and semi-solid samples via its fixed probe, which will be suitable for both immersion and penetration. They are ideal for use in the catering trade for hygiene testing, retail outlets, and laboratories.

- Very easy to use and highly portable
- Probes will vary in size, material, and manoeuvrability
- Wired probe thermometers are similar to fixed probe thermometers, the difference being that the probe is attached to the thermometer via a wire. This maximises utility without compromising accuracy
- Traceable accuracy is recommended if used in a professional environment
- Variable measurement range, resolution and accuracy

**Example Product:** AST-10 This product is easy to use with only 3 function buttons and a large display.
K-Type Thermometers

K-Type thermometers deal with extreme temperatures and are normally found in laboratories and industry. They cater for applications requiring high precision, and can facilitate a range of interchangeable plug in probes for air, liquid, penetration and surface temperature measurements. They're often the best choice of thermometer if you have several applications in one professional environment.

- They offer wide temperature measurement ranges, high accuracy, and fast measurement response times
- Non-slip function buttons and impact-resistant casing make these thermometers ideal for use in harsh working environments
- Probes will vary in size, material, and manoeuvrability
- Traceable accuracy is recommended if used in a professional environment
- Variable measurement range, resolution and accuracy

Example Product: ATK-612 This product offers dual input with individual measurements or as differential (T1 minus T2).

Data Logging Thermometers

Data logging thermometers allow continuous temperature measurements to be displayed in real-time, or downloaded and stored to PCs or Laptop computers. They are designed to record temperature history in critical areas such as storage rooms, transportation, and laboratories, and are ideal if you’d like to submit regular records to management, auditors, or work colleagues.

- The recorded measurements can be attached to emails or reports, and is great for fault finding or traceability in controlled environments
- A user may select the logging rate, start time, alarm limits, and logging mode
- The supplied analysis software provides a graphical display of data, showcasing the total readings, a zoom facility for individual readings, and a visual indication of alarm levels throughout the logging period
- Traceable accuracy is recommended if used in a professional environment
- Variable measurement range, resolution and accuracy

Example Product: AEL-USB-1LCD This Data Logger stores up to 16,382 individual readings and allows the data to be directly downloaded to your PC or Laptop via a USB connection.

Infrared Thermometers

Infrared thermometers are designed for non-contact measurement of very high / low surface temperatures, and are frequently equipped with a laser to measure radiated heat. They are suitable for temperature measurements of air conditioning systems, transport and automotive spot checks, and food preparation surfaces.

- Important factors to consider before measuring are laser spot-size, and the emissivity value of the surface being measured
- The error in the accuracy of a measured value can be as much as 30% of the reading just based on emissivity
- Traceable accuracy is recommended if used in a professional environment
- Variable measurement range, resolution and accuracy

Example Product: AIR-801 This is a compact infrared thermometer with a class II laser sighting. It is simple to operate by simply pointing, pulling the trigger and reading the measurement.
Thermal Imaging Cameras

Thermal image cameras allow immediate identification of hot and cold areas via thermal imagery. They are ideal for detecting hidden problems, surveying buildings to find moisture and leaks, identifying energy loss and poor insulation, electrical faults, and detecting plumbing issues.

Some cameras facilitate the download of imagery to PCs or Laptop computers. The recorded data can then be attached to emails or reports, and is great for fault finding or traceability in controlled environments.

- Variable image display resolution
- Some models include a correction for emissivity and reflected temperature
- Variable measurement range, resolution and accuracy

Example Product: AE-4 This product is a simple point, shoot and detect thermal imaging camera providing high quality thermal images.

If you can choose the thermometer best suited to your intended application, AND provide traceable instrument calibration to an auditor, you can always be assured of your measurement's creditability. If you're unsure of a thermometer's suitability, always consult the help of a professional body.

ATP Instrumentation has a wide range of thermometers available designed to suit your individual requirements. If you have a technical query, please call us now on 01530 566800, and we'll refer you to our instrument technical team.