

DIAL THERMOMETERS - TYPES OF DIAL THERMOMETERS

What is a dial thermometer?

A dial thermometer uses a needle on a circular scale which indicates changes in temperature when used in certain operating systems. Dial thermometers consist of two main components: the needle and the temperature sensor. There are three different types of dial thermometers and each work in different ways, these are:

1. Bimetal
2. Liquid filled
3. Gas-actuated

Bimetal

A bimetal thermometer uses a bimetal spring as the temperature sensor. The spring is made up of two different metals that are welded together. Metals that are often used are usually copper, steel or brass, however, one metal must be sensitive to low heat and the other sensitive to high heat. Once the thermometer is heated, the metals then change length based on their thermal expansion rates, the bimetal strip is then forced to bend or curl in the direction of the metal with the lower thermal expansion coefficient. This movement then deflects the needle over the scale which indicates the temperature.

Liquid filled

A liquid filled dial thermometer consists of a capillary, temperature sensor and bourdon tube, with the measuring systems filled with a liquid, usually spirit, but older ones could be filled with mercury before the EU ban on mercury. When the thermometer is placed in an operating system, the heat is transferred to the liquid, which then expands. This expansion pushes the liquid column higher up the capillary this changes the internal pressure of the thermometer, which then moves the pointer on the scale, indicating the temperature.

Gas-actuated

With a gas-actuated dial thermometer, the capillary and bourdon tube are all housed together in one unit, and it also filled with an inert gas, such as helium, argon or nitrogen. Gas-actuated dial thermometers and liquid filled thermometers behave the same way - it is the pressure inside the thermometer that moves the pointer to indicate the temperature. When placed into an operating system, the bulb and the gas heat up, the pressure increases as the gas cannot expand. The bourdon tube then bends, and this moves the pointer to indicate the temperature.

For more information about any of our dial thermometers, please contact sales@brannan.co.uk.

