

Why Calibrate? (1 of 2)

As children, many of us probably had wooden toys. One typical wooden toy had a flat surface into which were cut several holes of different shapes. There would be a round hole, another would be square and another shaped like a triangle. Almost certainly, one would be star shaped and another an irregular shape, like a trapezium. In addition to this item, there would be several wooden "plugs" with shape outlines the same as the holes. As children, it was great fun to try to fit the plugs into the various holes and when we were not able to make them fit, we would try and force them into one of the holes with the wrong shape.

How frustrating it would be however if, as a manufacturer, I received a component from another company, to fit into part of a machine that I was making, and it would not fit because it was the wrong shape. In reality, it might not be the wrong shape, in the sense of a square plug into a round hole, but the wrong shape sufficiently for it not to fit, or not to work properly. Of course, if I manufactured that part also, then I would get it right. However, the world is not as easy as that. Very few manufacturers, if any, can rely entirely on component parts made totally in-house. So, my supplier and I would have to agree a standard to which the problem component would be made. Part of this standard would be to agree on the size of a centimetre, or an inch. If we couldn't agree on that, there would be little hope of our two parts fitting together perfectly.

Fortunately, we don't have to agree to use the same centimetre every time, because the international community has already agreed about the size of the centimetre. The remaining problem for me as a manufacturer is to be sure that my measuring devices (calliper gauges, micrometers etc), which will be used to check the component's size, are reading correctly. As all measurement devices have some errors, then those errors must be known. In other words, the micrometer or gauge must be calibrated. In practice this means that it must be calibrated against another device which is several times better (which itself will have been calibrated against something even better). This "chain" of calibrations eventually leads to a device that is the national standard and is looked after by the national standards laboratory (NPL in the UK). This chain ensures that my micrometer has a calibration that is traceable back to NPL, with a known set of errors. I can now be very certain that the parts that I make are within the tolerances required. In fact, I could ship my parts anywhere in the world and know that they are correct, with traceability to international standards.

That is a major reason why calibration is important. Without this "traceability", fewer people and companies will want to buy your products. But of course, calibration can mean different things, or different benefits, to each person or company. Some of the different reasons are;

- To improve the quality of my product, so that I can move up-market and ask more money for it.
- To gain an advantage over a competitor and so gain more business.
- To reduce waste in my process and give me the opportunity to make more profit or allow me to reduce prices.
- To reduce my consumption of energy, lowering my costs and helping the environment at the same time.

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Why Calibrate? (2 of 2)

There are many reasons to want to be able to make more accurate measurements and you are the best to judge the potential gains in your business, by improvements in accuracy.

ASL (previously called just ASL) specialises in precise temperature measurement and calibration systems. Why temperature? Practically anything that you can think of is affected by temperature. Many other measured parameters, for example, length, humidity and pressure, are affected by temperature in a big way. Temperature is the single most important measured parameter. Not only is temperature important to many manufacturing industries, but it can be critical in research also. For example, in high energy X-ray Spectrometry, a few milli-degrees are important.

ASL made its first precision temperature instrument in 1966 through to 1967, when it was delivered to the national standards laboratory in England (also called NPL National Physical Laboratory). Since that time, ASL has continued to supply calibration instruments to national standards laboratories around the world and to-date 41 of the 43 major national laboratories use ASL instruments as their main temperature standards.

For thermometer calibration, more than just the measurement instrument is required of course, as the thermometers must be calibrated at several temperatures. To meet this requirement, ASL has provided high performance liquid calibration baths for almost 20 years. In addition to this, ASL also provides other essential items for calibration, for example;

- Calibrated reference thermometers
- Calibrated reference resistors
- Fixed Point Cells (mainly used by national laboratories)
- Multi-channel switch-boxes

Of course, not everyone wants, or needs, to calibrate thermometers to the same level as a national laboratory, so over several years ASL introduced a range of instruments to meet requirements covering national laboratories right through to industrial level calibration. In fact, the main line instrumentation consists of 6 instruments spanning this range, so there is certainly the right one for your requirement.

At the industrial level, liquid calibration baths are often more than is needed, so ASL now has a complete range of metal block calibrators (sometimes called dry block calibrators) covering the temperature range from $>-25^{\circ}\text{C}$ to $+1100^{\circ}\text{C}$.

Whatever your requirement, it is most likely that ASL will be able to help. More information on all our products is available from [ASL](#), or you can obtain useful information from our website on www.aslltd.co.uk.

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