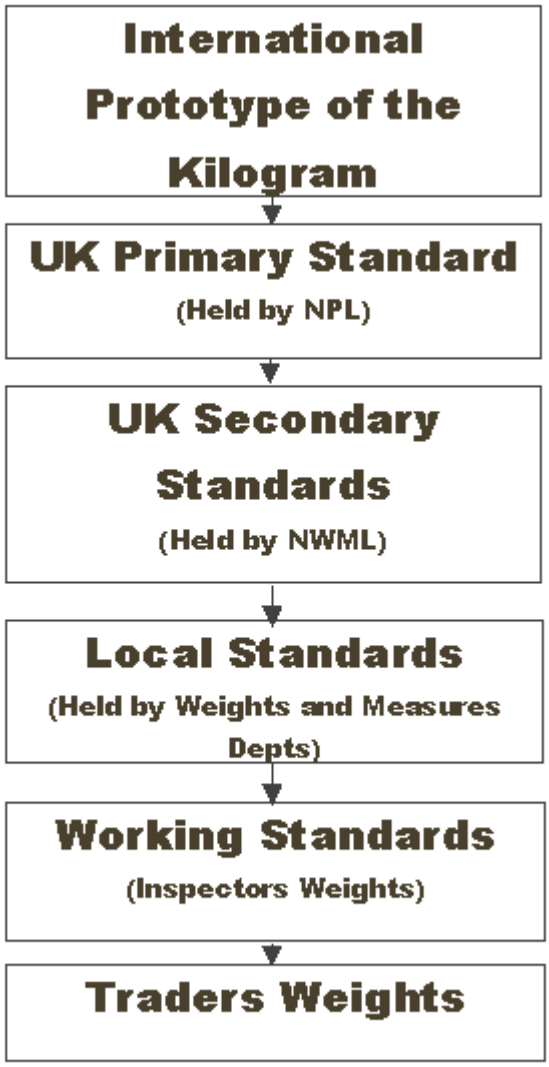
The Trading Standards Service (Weights and Measures department) ensures the accuracy of its own equipment as follows:

Metrology Equipment: Traceability of measurement.

Traceability of equipment is maintained through a series of ever more accurate comparisons to a superior standard. For legal metrology purposes this can be roughly summarised below. The example is for mass, but is similar for other units.



In the above example the trader's weight are compared to our working standards, which are calibrated to tighter tolerances. The materials etc of our weights are usually of a higher standard. If our weights fall outside of legally permitted tolerances they are adjusted and reweighed or renewed if adjustment cannot be made. The tolerances for working and local standards are prescribed in the Weights and

Measures (Local and Working Standard Weights and Testing Equipment) Regulations 1986. (Similar regulations exist for volume and length). Our Working Standards are then compared to our local standards on an annual basis. These are more accurate again. Our local standards are then compared to the National "Secondary Standards" held by the National Measurement Office (NMO) in Teddington every five years. This process is repeated up the hierarchy until we reach the international prototype of the Kilogram. The Kilogram is a physical standard (not derived from nature) and is held in a vacuum sealed vault in France. All measurements of metric mass are derived from this platinum-iridium block.

We test trade weighing equipment (scales etc) using our working standards. When we are using our own scales and balances, they are calibrated using these higher accuracy weights. These scales are tested using our working standard weights, which are tested in accordance with the working and local standard regulations above. The laboratory itself conforms to ISO 17025 and holds UKAS accreditation for mass, ensuring all measurements are tightly controlled.

For volume it is slightly different. In line with most Trading Standards Services we now perform what is known as a gravimetric determination. This involves weighing the quantity of water needed to fill a measure and then using a formula, accounting for temperature, density and expansion, derive a volume. This can then be compared to the purported volume. This allows us to use mass in the determination and is covered under the hierarchy above. It should be noted that volume measures are not easily adjusted and are replaced if out of legal tolerances.

Length is ultimately compared to a natural standard. The primary measure is the distance travelled by light in approximately 1/300,000,000th of a second. In practice the metre is derived by measuring the wavelengths of lasers using an interferometer. This is used to assess the length of the UK secondary standards and down to the inspector's tape measure and trader's wooden ruler.

Our working standards are calibrated against our local standard, similar to mass. For smaller measures (i.e. meter) we have a brass local standard metre. For tape measures we have a 20m steel tape which is calibrated every 5 years by the NMO (10 years if less than 3 metres). We take into account factors such as tension and temperature when comparing the measures. Further up the hierarchy the use of lasers is employed at the NMO to ensure accuracy. These are used to get a closer approximation to the natural standard for length above.

Some further information, including a couple of basic guides to measurement can be downloaded from the websites below.

National Measurement Office

National Physical Laboratory

Further details of our testing services are available on our website - www.tradingstandards.gov.uk/lancashire

Other Equipment:

The Service also has a number of other pieces of testing equipment e.q. equipment to check the safety of products. This equipment is tested in line with our ISO 9001 Quality System for which we are externally audited and accredited.