



## Reference materials – ensuring your results measure up

LGC produces a wide range of certified reference materials for the industrial, pharmaceutical, clinical, environmental and food sectors, in order to help laboratories ensure traceability and accuracy of their results.



## The Requirement

Measurements are fundamental to all aspects of life; from modern technology and innovation, to quality control and consumer safety. Chemical and bioanalytical measurements in particular underpin both the enforcement of regulations and the development of new and innovative products. It is therefore essential that organisations producing or using measurement data have confidence in the results obtained. For measurement results to have meaning, it is essential that widely accepted units of measurement are used. There is little point in reporting that a table is 20 units long, if no one knows what one unit represents. To be able to compare results, regardless of when or where the measurements were made, the measurements must be made using properly validated methods and the results must be traceable to recognised references. Traceability is achieved through the calibration of measuring instruments using appropriate measurement standards; for chemical measurement, this must include reference materials for each analyte. Validation of measurement methods involves, among other things, checks for bias which are best carried out using realistic reference materials with a reliable certified value. This means that there is a need across all sectors of analysis for suitable reference materials to support both instrument calibration and method validation. The availability of a wide range of reference materials will assist companies in demonstrating regulatory compliance, facilitate trade and enable innovation.

## The Solution

As the UK's designated National Measurement Institute for chemical and bioanalytical measurement, LGC has a key role to play in the production of reference materials. LGC is accredited to ISO Guide 34 for reference material production which provides confidence in the quality of reference materials produced. In chemical analysis, reference materials are typically classified as either pure substances (which can be used for the preparation of calibration solutions) or matrix materials (used, for example, to evaluate measurement bias as part of method validation). Both are essential for ensuring the reliability and traceability of measurement results.

## Impact

LGC has a long history in the production of reference materials, both by using advanced measurement facilities developed as part of the UK National Measurement System and by coordinating inter-laboratory certification campaigns.

The following highlights the diversity of LGC's capabilities in reference material production.

High accuracy measurement techniques at LGC are used to produce aqueous solutions certified for ethanol content to enforce drink drive regulations as well as blood alcohol limits for safety-critical occupations such as air traffic controllers and airline flight crews. This range of certified reference materials has recently been extended to include solutions with ethanol concentrations that are in line with the different drink drive limits in different European countries. The materials are used to make sure that routine measuring instruments are within the tight specifications required for reliable enforcement, helping to maintain passenger and road safety across the UK.

Food manufacturers need to comply with food labelling regulations to ensure ingredients, additives and allergens are identified clearly for the consumer. To support the food industry in this, LGC produces a range of food matrix reference materials certified for components such as fat, moisture, vitamins and trace elements. LGC's established history in high accuracy selenium measurement is also supporting the food industry by producing certified reference materials for selenium in bio-fortified food and food supplements.

The production of reference materials for clinical measurements is an important area of focus at LGC. Clinical reference materials enable the calibration of equipment within hospital laboratories, which helps ensure that accurate results are obtained and that the correct treatments and drug dosages are administered to patients, ensuring effective treatment as well as minimising unnecessary treatment.

Sulfur emissions represent one of the most significant types of atmospheric pollution. The permitted levels of sulphur in fuels are therefore controlled by legislation. Production of LGC's diesel certified reference materials required high accuracy methods to reliably measure sulfur at the low levels specified by EU legislation. These materials enable companies to optimise their sulfur extraction process and comply with legislation.

Reference materials are commercially available through LGC Standards, a division of LGC that is a dedicated supplier of reference materials and standards to a wide range of industrial sectors.

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