Driving
Quality
Together

Proficiency Testing

2019

Food & Feed
Water & Environment
Beverage
Clinical
Consumer Safety
Forensics
Petroleum

UKAS
PROFICIENCY TESTING
0001

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ISO/IEC 17043

LGC provides proficiency testing schemes with localised support across a truly global network.

1,700+

Annual proficiency tests

12,000+

Laboratories served worldwide

160+

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LGC
Proficiency Testing

Great results are born out of confidence and by working with LGC Proficiency Testing you can have the assurance that your decision making is informed, reliable and effective.

If you are a laboratory seeking accreditation to ISO/IEC 17025 or ISO 15189, or an organisation looking for consistency in delivering a quality product, then LGC will have a proficiency testing scheme designed for you.

Driving Quality Together

Fulfill accreditation requirements.

Demonstrate competency to customers and regulatory bodies.

Compare results with laboratories around the world.

Manage risk through early warning of potential problems.

Verify methods and instrumentation.

Educate and train staff.

LGC
Proficiency Testing

Proficiency Testing (PT) is a requirement for accreditation to ISO/IEC 17025 and ISO 15189. LGC operates PT schemes across the food, beverage, environmental, clinical, pharmaceutical, consumer safety, forensic and petroleum sectors – your laboratory will get the support it needs in demonstrating the effectiveness of your quality system.

If you are managing multiple laboratories and are looking for consistency in results, LGC offers fully managed solutions for large groups. Multi-laboratory, multi-method and multi-analyst reporting is all covered by our exclusive web based PORTAL platform.

Using an accredited PT provider provides you with the assurance of the quality and reliability of the service. LGC is accredited to ISO/IEC 17043 by the United Kingdom Accreditation Service (UKAS). In addition we are certified to ISO 9001.

Our world class experts provide a comprehensive service ensuring a reporting process focused on speed, ease and efficiency and which delivers excellent value.

Procurement, preparation, dispensing and quality control testing of test materials.	6 — 12 Weeks prior
Despatch of test materials and instructions to participants.	Week 1
Participants analyse test materials and report results through PORTAL (**portal.lgcstandards.com**) as instructed and within the specified deadline.	Week 2 — 4
Results analysed and the performance of laboratories compared using appropriate techniques, such as performance scores.	Week 5
Reports issued and participants notified once reports are available on PORTAL.	Week 5

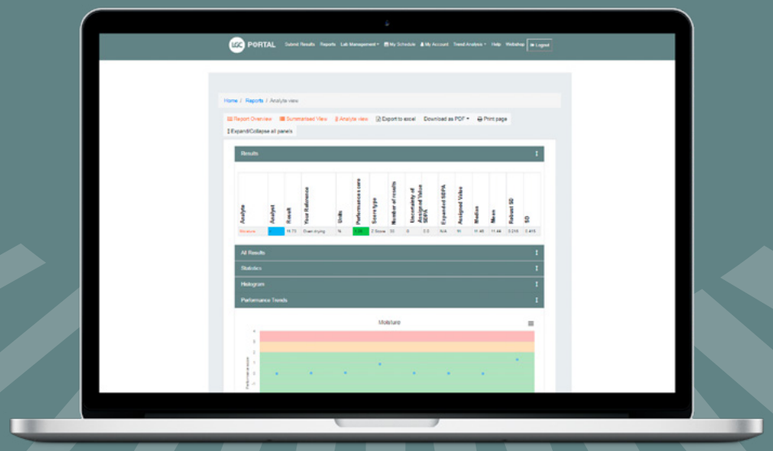
Round reviewed. Changes made if required.

PORTAL is the secure web based data reporting and analysis tool exclusively available to LGC Proficiency Testing scheme participants. It is a laboratory's gateway to improving performance, an online hub for results submission, report downloads, data export and trend analysis — **anytime, anywhere.**

PORTAL

Fast. Simple. Interactive.

New features for 2019 include a fast, simple and responsive user interface, a brand new interactive PT report, enhanced trend analysis charts, a PT event calendar and more.



Full control of all of your LGC Proficiency Testing data 24 hours a day.

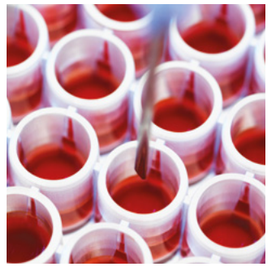
portal.lgcstandards.com

LGC Proficiency Testing schemes are operated in a wide range of sectors from Food to Forensics, Clinical to Consumer Safety. Whatever your quality needs, LGC will have a scheme that delivers the confidence in results that you are looking for.

Food & Feed

Water & Environment

Beverage

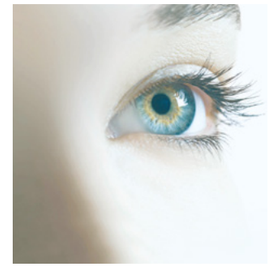


Clinical

Consumer Safety

Forensics

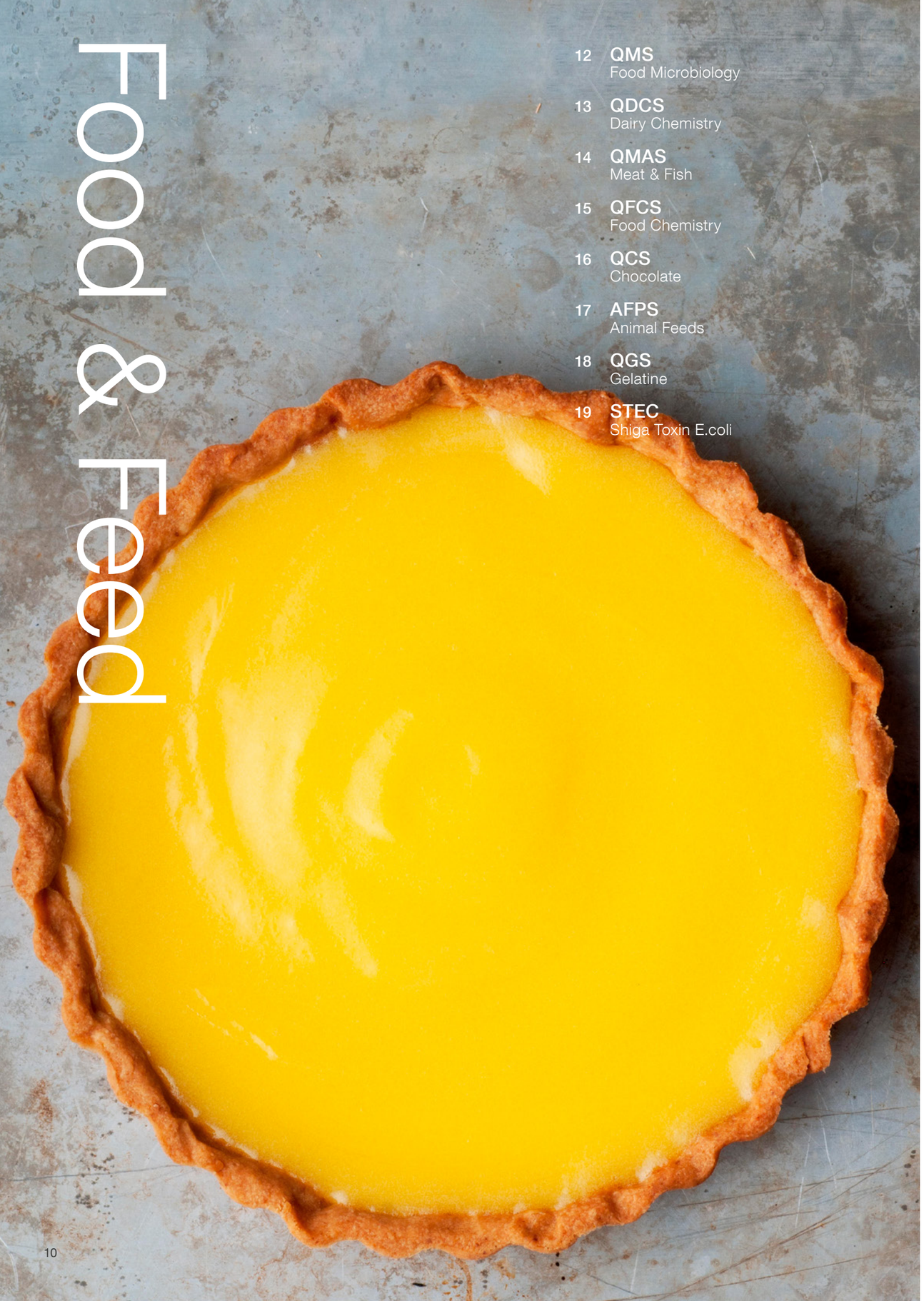
Petroleum



FAQS

LGC Proficiency Testing

Food & Feed



Food & Feed Scheme Selector

Scheme	Distribution per year	Test	Test Material Matrix*	Analyte Group*
QMS Food Microbiology	12	Microbiological	Oatmeal and skimmed milk powder, tea, herb and spice.	Comprehensive range of microorganisms of relevance to food products, including pathogens, indicator organisms, spoilage organisms and probiotics.
QDCS Dairy Chemistry	4	Chemical	Butter, cheese, cream, milk, milk powder, whey powder, yoghurt and standard solutions.	Chemical parameters covering routine nutritional analysis and more complex testing such as mycotoxins and antibiotics.
QMAS Meat & Fish	6	Chemical and Microbiological	Meat, fish and shellfish.	Chemical and microbiological parameters relevant to meat, fish and seafood industry. Trace elements, authenticity and veterinary drug residues. Salmonella and other pathogens, indicator organisms.
QFCS Food Chemistry	6	Chemical	Bread, cake, cereals, cured meat, flour, fruit/ vegetable, hard cheese, nuts, oils, 'ready to eat' products, rice, tea and standard solutions.	Chemical parameters covering nutritional analysis, toxic elements, pesticides and other contaminants.
QCS Chocolate	3	Chemical and Microbiological	Chocolate and cocoa powder.	Chemical and microbiological parameters relevant to the chocolate and food testing industries including nutritional and elements analysis.
AFPS Animal Feeds	4	Chemical and Microbiological	Animal feed: (e.g. broiler, cattle, chicken, pig, sheep), calf replacer and premix.	Comprehensive range of chemical and microbiological analysis of animal feeds covering proximates and contaminants, Salmonella and other pathogens, indicator organisms.
QGS Gelatine	2	Chemical and Microbiological	Gelatine, gelatine hydrolysate.	Physicochemical testing and microbiological parameters of relevance to gelatine.
STEC Shiga Toxin E.coli	4	Microbiological	Skimmed milk powder, ground beef powder, with lyophilised vials.	Detection of pathogens, STEC E.coli (serovars O26; O45; O103; O111; O121; O145; O157:H7).

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

QMS
Food Microbiology

The LGC Quality in Microbiology Scheme (QMS) is intended for use by microbiologists working in the food industry, including dairy, ready meals, dried foods, herbs and spices and many other sectors.

Food testing is an essential element of the 'Hazard Analysis Critical Control Point' (HACCP) process in food production as it verifies the controls are working at the critical points in manufacturing. Failures leading to food poisoning outbreaks can have a devastating effect on reputation, brand value, a decline in consumer confidence in the product and ultimately profits.

In rare cases it may also lead to civil and criminal charges.

Laboratories carrying out microbiological testing need to be able to demonstrate that they are producing accurate and meaningful results to help identify problems before they affect the quality and safety of products. This can be achieved if a comprehensive quality assurance programme is conducted, which includes regular participation in a suitable proficiency testing scheme.

Test material*	Analyte*
Oatmeal	Enumeration of aerobic psychrotrophs. Detection of Shigella species, Vibrio parahaemolyticus, Vibrio species.
Skimmed milk powder	Enumeration of Salmonella species, Cronobacter species, Yersinia enterocolitica.
Oatmeal or skimmed milk powder	Enumeration of Bacillus cereus, Bacillus species, Coagulase positive-staphylococci, Coliforms, Clostridium perfringens, Enterobacteriaceae, Enterococci, Escherichia coli, Lactic acid bacteria, Listeria monocytogenes,Listeria species, Pseudomonas species, Staphylococcus species, Thermotolerant coliforms. Anaerobic sulphite-reducing bacteria, Mesophilic aerobic spores, Mesophilic anaerobic spores, Thermophilic aerobic spores, Total aerobic mesophilic count, Total anaerobic mesophilic count, Osmophilic yeast, Osmophilic mould, Yeast, Mould, Yeast and mould. Detection of Clostridium species, Coliforms, Enterobacteriaceae, Escherichia coli, Escherichia coli O157 (non toxigenic strain), Listeria monocytogenes, Listeria species, Salmonella species.
Lyophilised material	Enumeration of Bifidobacterium species (Probiotic), Lactobacillus species (Probiotic), Campylobacter species. Detection of Campylobacter species. Identification of an unknown microorganism. Identidication of Salmonella species (serology).
Tea	Enumeration of Coagulase positive-staphylococci, Coliforms, Total aerobic mesophilic count, Yeast and mould.
Herbs, spice, tea	Detection of Salmonella species.
Paper exercise (image)	Colony count and calculation of number of microorganisms.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed.
For accredited and non-accredited status please see current application form/scheme description.

QDCS
Dairy Chemistry

The LGC Quality in Dairy Chemistry Scheme (QDCS) is a comprehensive proficiency testing scheme available to laboratories performing compositional and safety analysis in the dairy sector.

Laboratories may test dairy products to ensure a commercial product performs within preset quality standards, or to look for adulterations or contaminants that could adversely affect a product.

For laboratories that perform the analysis of dairy products using traditional 'wet' chemistry techniques, as well as determinations by infrared analysers and other methods, participation in a relevant LGC Proficiency Testing scheme can provide confidence that results are meaningful and accurate which, in turn, helps to ensure the safety of dairy foodstuffs.

Food & Feed

Test material*	Analyte*
Butter	Moisture, pH, Salt.
Hard & soft cheese	Ash, Calcium, Fat, Lactose, Moisture, pH, Protein, Salt, Sodium.
Double & single cream	Fat.
Whipping cream	Fat, Titratable acidity.
Freeze dried milk	Aflatoxin M1, Antibiotics (penicillin and/or sulfur-based, beta lactam based), Phosphatase.
Milk	Calcium, Freezing point depression, Lactose, Protein, pH, Titratable acidity, Total solids.
Skimmed, semi-skimmed & whole milk	Fat.
Skimmed milk powder	Ash, Fat, Insolubility index, Moisture, Protein, Scorched particles, Titratable acidity, WPNI
Whole milk powder	Fat, Insolubility index, Minerals (calcium, potassium, copper, sodium, chloride, iron, magnesium, manganese), phosphorus, zinc), Moisture, Protein, Titratable acidity, WPNI.
Milk powder	Vitamins A, C, D.
Whey powder	Ash, Fat, Lactose, Moisture, Protein, Scorched particles.
Whey protein concentrate	Ash, Bulk density, Fat, Insolubility index, Lactose, Moisture, pH, Protein
Yoghurt	Fat, Protein, Total solids.
Buffer solution	pH.
Potassium hydrogen phthalate	COD.

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For accredited and non-accredited status please see current application form/scheme description.

QMAS
Meat & Fish

The LGC Quality in Meat and Fish Analysis Scheme (QMAS) is intended for chemists and microbiologists working in, or providing analytical services to the meat, fish and shellfish processing industries.

International consumption of meat and fish in human diets has increased rapidly. Therefore the manufacturing processes need to be highly regulated, to help prevent food safety issues occurring.

Measures must be taken to prevent contamination with hazardous chemicals above specified limits, and to reduce the number of microorganisms capable of causing human disease. Customers demand products that are authentic and genuine, preventing contamination from both deliberate fraud and accidental cross-contamination during processing.

Consumers want to be assured their food has been thoroughly tested by competent laboratories. EU Regulation 882/2004 requires official control laboratories to be accredited to ISO/IEC 17025 and use external means of monitoring performance such as proficiency testing.

Chemistry*	Analyte*
Dried and cured meat	Ash, Carbohydrate, Dietary fibre, Energy, Fat, Moisture, pH, Phosphate, Protein, Salt, Sodium, Sugars (total).
Lyophilised meat	Nitrate, Nitrite.
Meat	Fat (total), Hydroxyproline, Mono-unsaturated fats, Poly-unsaturated fats, Saturates, Total trans fatty acids. Arsenic (total), Cadmium, Lead, Mercury, Phosphorus, Zinc. Species authenticity to be screened for presence of other meat species.
Precooked, processed and raw meat	Ash, Calcium, Carbohydrate, Dietary fibre, Energy, Fat, Moisture, pH, Phosphate, Potassium, Protein, Salt, Sodium, Sugars (total).
Fish	Fish speciation, Ash, Fat, Moisture, pH, Protein, Salt, Histamine, Trimethylamine (TMA), Total volatile nitrogen (TVN), Arsenic (total), Cadmium, Lead, Mercury, Phosphorus, Zinc.
Shellfish	Arsenic (total), Cadmium, Lead, Mercury, Phosphorus, Zinc.

Microbiology*	Analyte*
Lyophilised meat	Coagulase-positive staphylococci, Coliforms, Clostridium perfringens, Enterobacteriaceae, Escherichia coli, Lactic acid bacteria, Mould, Pseudomonas, Sulphite-reducing clostridia, Total aerobic mesophilic count, Yeast. Detection of Listeria species, Listeria monocytogenes, Salmonella species.
Lyophilised fish or shellfish + Vial	Coagulase-positive staphylococci, Enterobacteriaceae, Escherichia coli, Total aerobic mesophilic count. Detection of Salmonella species, Vibrio parahaemolyticus, Vibrio species.
Lyophilised meat + Vial	Detection of Campylobacter species, Escherichia coli O157 (non-toxigenic strain).

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For accredited and non-accredited status please see current application form/scheme description.

QFCS
Food Chemistry

The LGC Quality in Food Chemistry Scheme (QFCS) is specifically designed to promote the quality and comparability in the measurement of a range of analytes in food products.

An incredible variety of foodstuffs are available worldwide and all year round. Technology now allows suppliers to harvest, preserve and distribute within a short period of time. Consequently food quality, consumer satisfaction and government regulations are all factors that need to be considered when producing food.

The food we eat can contain potentially harmful chemicals, some naturally occurring, some as contaminants absorbed from soil and water. Testing these end-use products is fundamental for food safety and stability. Consistent good performance in a LGC Proficiency Testing scheme will allow laboratories to show, with confidence, the quality of results to third parties.

Test material*	Analyte*
Bread or cake	Acidity, Ash, Calcium, Chloride, Dietary fibre (total), Fat, Iron, Moisture, Protein, Sodium, (Total sugars– bread only), (Vitamins B1, B2, B3 – cake only).
Cereal based food	Ash, Carbohydrate (total and available), Dietary fibre (total), Energy, Fat, Iron, Moisture, Phosphate, Protein, Salt, Sodium, Sugars (total), Vitamins A, B1, B2, B3, B5, B6, B9, B12, C, D.
Cereal grain, Dried fruit, Edible oil, Green tea, Rice	Arsenic, (Inorganic arsenic – rice only), Arsenic (total), Cadmium, Lead, Mercury, (Selenium - green tea only).
Edible oil or fat	Anisidine value, Colour, Fatty acid compositions, Free fatty acids, Iodine value, Peroxide value, Saponification value (acid number), Unsaponifiable matter, Water.
Extra virgin olive oil	3,5 Stigmastadienes, Delta-7-stigmastenol, Ethyl esters, Fatty acid composition, Free fatty acids (acidity), Insoluble impurities, K232, K270, Moisture and volatile matter at 103°C, Peroxide value, Polyphenols (total), Sterols (total), Wax content.
Olive oil	3,5 Stigmastadienes, Beta-sitosterol (apparent), Campesterol, Delta ECN 42, Delta K, Erythrodiol and uvaol, Fatty acid composition, Free fatty acids (acidity), K270, Rancimat stability at 120°C, Wax content.
Mixed fat spread	Omega 3, Omega 6, pH, Salt, Mono-unsaturates, Poly-unsaturates, Saturates, Total trans fatty acids,Vitamins A and D, Water.
Flour	Ash, Calcium, Fat, Gluten, Iron, Moisture, Protein.
Meat, cheese, cake	Water activity.
Pre-prepared food (ready meals)	Ash, Carbohydrate (total and available), Cholesterol, Dietary fibre (total), Energy, Fat, Moisture, Phosphate, Protein, Salt, Mono-unsaturates, Poly-unsaturates, Saturates, Sodium, Sugars (total), Trans fatty acids (total).
Pesticides in fruit/ vegetable	Fungicides, Herbicides, Organochlorine, Organophosphorus, Synthetic pyrethroids, Triazines.
Pesticides in green tea	Fungicides, Herbicides, Organochlorine, Organophosphorus, Synthetic pyrethroids.
Nuts	Aflatoxins B1, B2, G1, G2, Total Aflatoxins.
Snacks	Acrylamide.
Standards solutions	Benzoic acid, Sorbic acid, Sulfur dioxide. Acesulfame K, Aspartame, Saccharin, Sucralose. Allura red, Brilliant blue, Carmoisine, (Indigo carmine, Ponceau 4R, Quinoline yellow, Sunset yellow, Tartrazine.
Tomato paste/puree	Ash, Brix, pH, Salt, Total solids.
Vegetables	Nitrate, Perchlorates.

QCS
Chocolate

The LGC Quality in Chocolate Scheme (QCS) is intended for chemists and microbiologists working in the chocolate and cocoa powder manufacturing industries.

Chocolate products are one of the specific food commodities whose composition is controlled at European level. Directive 2000/36/EC 'relating to cocoa and chocolate products intended for human consumption', sets common rules and definitions with regard to the composition, manufacture, packaging and labelling of chocolate and cocoa products.

Consumption of contaminated chocolate is rare yet there have been sporadic global outbreaks which have led to product recalls. The consequences could include damaged reputations, possible legal actions resulting in huge financial damage and more. A comprehensive quality assurance programme which includes regular participation in a suitable proficiency testing scheme, may help to safeguard against such negative outcomes.

Chemistry*	Analyte*
Chocolate	Butyric acid, Fat, Moisture, Nitrogen (total), Sugars (total), Theobromine.
Cocoa powder	Ash, Fat, Moisture, Theobromine, Arsenic (total), Cadmium, Lead.

Microbiology*	Analyte*
Chocolate and cocoa powder	Enumeration of Coliforms, Enterobacteriaceae, Enterococci, Total aerobic mesophilic count, Yeast and Mould. Detection of Salmonella species.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed.
For accredited and non-accredited status please see current application form/scheme description.

AFPS
Animal Feeds

The LGC Animal Feeds Proficiency Scheme (AFPS) is specifically designed to meet the needs of laboratories performing chemical or microbiological analysis of animal feeds.

Animal feed quality is highly regulated since many animals, or their products, will ultimately be converted into food for human consumption.

Major food safety crises have occurred as a result of the contamination of animal feed causing risks to animal and human health. The resulting recalls have caused significant financial damage as large quantities of product have to be destroyed; and considerable damage to the reputation of businesses involved. Participation in the LGC AFPS Proficiency Testing scheme can form part of a comprehensive quality system that seeks to promote high standards and avoid potential risks.

Chemistry*	Analyte*
Animal feed	ADF, Ash insoluble in hydrochloric acid, Crude (ash, fat, fibre, protein), Moisture, NDF, PPD, Starch, Sugars. Aflatoxins B1, B2, G1, G2, Total Aflatoxins, Ochratoxin-A.
Animal feed, pre-mix	Arsenic, Cadmium, Calcium, Chloride, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Phosphorus, Potassium, Selenium, Sodium, Zinc.
Wet pet food	Ash insoluble in hydrochloric acid, Crude (ash, fat, fibre, protein), Moisture, Starch, Sugars.

Microbiology*	Analyte*
Simulated animal feed	Enumeration of Clostridium perfringens, Clostridium species Coliforms, Enterobacteriaceae, Escherichia coli, Total viable count, Yeast and Mould. Detetction of Escherichia. coli O157 Listeria monocytogenes, Listeria species, Salmonella species.

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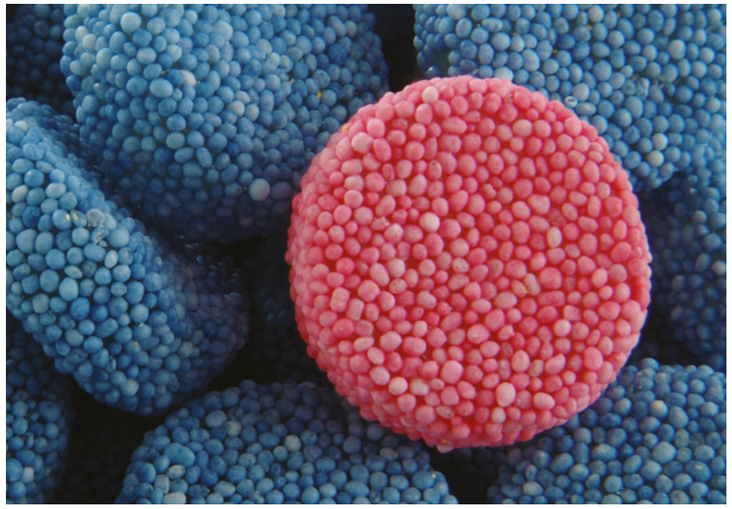
For accredited and non-accredited status please see current application form/scheme description.

Food & Feed

QGS
Gelatine



The LGC Quality in Gelatine Scheme (QGS) has been developed in collaboration with the trade body, Gelatine Manufacturers of Europe (GME).

GME members account for nearly half of the worldwide gelatine production and the key role of the GME is to ensure that gelatine is manufactured to a consistently high quality for the benefit of gelatine customers and consumers.

The most common use of gelatine is in the food and pharmaceutical industries as well as in the cosmetics, photographic and printing industries.

If a laboratory is involved in the quality control analysis of gelatine, QGS provides test materials in gelatine and gelatine hydrolysate matrices to represent a realistic challenge, with relevant chemical, physical, and microbial tests.

Chemistry*	Analyte*
Gelatine	Ash, Gel strength (Bloom), Isoelectric point, Moisture, pH, Viscosity.

Microbiology*	Analyte*
Gelatine hydrolysate	Enumeration of mesophilic anaerobic spores, Sulphite-reducing bacteria, Total aerobic mesophilic count, Clostridium perfringens, Coliforms, Enterobacteriaceae Escherichia coli, Staphylococcus aureus, Salmonella species.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed.
For accredited and non-accredited status please see current application form/scheme description.

STEC
Shiga Toxin E.coli

Most Escherichia coli (E.coli) strains are harmless and can live in the gut of humans without causing any issues. However Shiga toxin-producing E.coli (STEC) strains can cause serious illness and there is therefore a requirement to test for these organisms in foods which may be of risk of contamination by STEC. A comprehensive quality assurance programme featuring the LGC STEC Proficiency Testing scheme is an excellent way of helping to keep consumers safe and ensuring reputations for quality are maintained.

There are many different strains of STEC, and these can be distinguished by their serology. The main ones found to cause illness in humans are serovars O26, O45, O103, O111, O121, O145 AND O157:H7, known as ‘the big six’ in the USA.

As the organisms are pathogens, the test is qualitative rather than quantitative, seeking to identify the presence of these organisms rather than enumerating the levels.

The primary aim of the LGC Shiga toxin E.coli (STEC) Scheme is to enable laboratories performing the microbiological analysis of food and dairy products to monitor their performance and compare with that of their peers. STEC also aims to provide information to participants on technical issues and methodologies relating to testing of food and dairy products.

Test Material*	Analyte*
Skimmed milk powder with lyophilised vials	Detection of pathogens, STEC E.coli (serovars O26; O45; O103; O111; O121; O145; O157:H7).
Ground beef powder with lyophilised vials	Detection of pathogens, STEC E.coli (serovars O26; O45; O103; O111; O121; O145; O157:H7).

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed.
For accredited and non-accredited status please see current application form/scheme description.

Food & Feed

Water & Environment

Water & Environment Scheme Selector

Scheme	Distribution per year	Test	Test Material Matrix*	Analyte Group*
AQUACHECK Water, Agricultural Soils & Sludges	20	Chemical, Ecotoxicological, Physical and Radiochemical	Clean waters and waste waters, agricultural soils and sewage sludge.	Inorganic, organic and elemental analytes for qualitative and quantitative analyses. Determination of radiochemical and ecotoxicological parameters.
QWAS Water Microbiology	10	Microbiological	Waters (e.g. bathing, environmental, mineral, potable, process, recreational, sea, surface, waste) and simulated effluent sludge.	Routine microbiological testing, indicator organisms and complex pathogens.
AIR PT Air & Stack Emissions	6	Chemical and Physical	Filters, tubes and impinger solutions.	Gravimetric, organic and elemental analytes at a range of concentrations.
CONTEST Contaminated Land	5	Chemical and Physical	Soil extracts, soil materials, solid waste, standard solutions and trammel fines.	Inorganic, organic and elemental analytes measured in soil, leachates and standard solutions.
HYGIENE Environmental Hygiene Monitoring	3	Microbiological	Swabs, contact plates, dip slides and ATP systems.	Routine microbiological testing, indicator organisms and complex pathogens.

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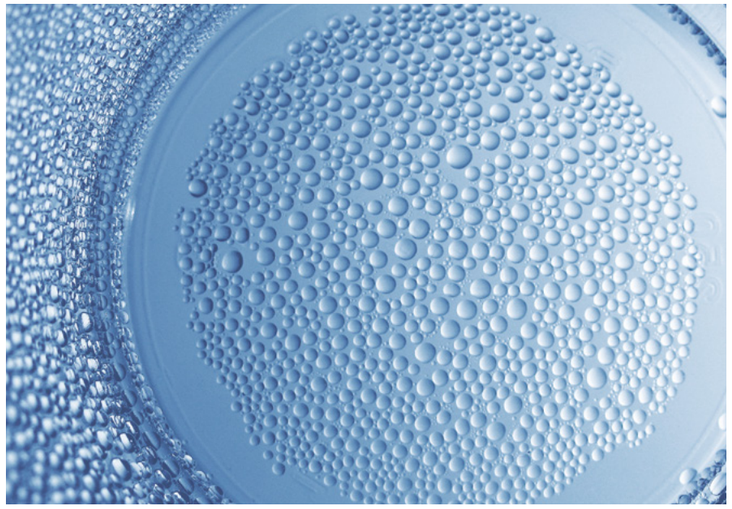
AQUACHECK

Water, Agricultural Soils & Sludges



The industry leading LGC AQUACHECK scheme has been in continuous operation since 1985. Test materials are provided for the analysis of major inorganic/organics; metals; phenols; organochlorine pesticides and many others.

Water is vital in sustaining all natural systems. Each source requires regular analyses to determine safety and suitability of use. Potable water must be good in quality and quantity and free from harmful chemicals and microorganisms. Discharged water from local wastewater treatment plants and industry must comply with environmental guidelines.

Process waters must be kept clean to ensure product quality. As water sources can change regular testing is advised.

Participation in the LGC AQUACHECK scheme allows laboratories to identify problems before they affect the quality and safety of waters. Participants will be able to demonstrate independently that they are producing accurate and meaningful results to laboratory management and customers.

Test material*	Analyte*
Clean water (Organics)	Acid herbicides, Acrylamide, BTEX, Chlorinated solvents, Chlorophyll a, Fungicides, Geosmin and MIB, Haloform solvents, OC and OP pesticides, PAHs, PCBs, PFOA, PFOS, Formaldehyde, Phenols, Taste and odour, Triazines and Urea herbicides, UV absorbing organics constituents.
Clean water (Radiochemistry)	Aqueous tritium, Gross alpha, Gross beta.
Ground water (Metals)	Metals, Toxic metals.
Qualitative water (Organics)	Organics by purge, trap and/or headspace GCMS, Qualitative determination of unknown contaminant.
Clean water (Inorganics)	BOD, Chromium (VI), COD, DOC, MBAS, Metals, Non-ionic surfactants, Suspended solids, Toxic metals, Turbidity.
Poorly buffered water	pH.
Soil	Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Molybdenum, Nickel, Vanadium, Zinc, Selenium, Total boron, Water extractable boron, Fluoride, Total nitrogen, Total phosphorus, Total potassium, Cobalt, Iron, Manganese, Total solids, Loss on ignition, pH, Extractable phosphorus, Extraction of potassium, Extraction of magnesium, Extraction of sodium, Organic carbon content, Conductivity, Carbonate content.
Clean water	Chlorine (free, total), Inorganic disinfection by-products.
Hard and soft water (Inorganics)	Colour, Conductivity, Major inorganic components, Nutrients and others, pH, TDS.
Ecotoxicology	Ecotoxicology tests.
High salinity potable water	Conductivity, Major ions, pH, TOC, TDS.
Wastewater	Acid herbicides, AOX, BTEX, Chlorinated solvents, Haloforms, OC and OP pesticides, Phenols, PCBs, PAHs, Triazines and Urea herbicides. Mineral oil, Oil and grease.
Effluents & wastewater	BOD, Chromium (VI), COD, DOC, Metals, MBAS, Non-ionic surfactants, Non specific analytes, Nutrients and other analytes, Settleable solids, Suspended solids, Toxic metals, Turbidity.
Effluents & wastewater (Industrial)	Ammonia, Cyanide, Major wastewater analytes, Metals, Nitrogen, Phenol (total), Phosphate, Sulfate, Sulfide (total).
Sludge	Arsenic, Cadmium, Chromium, Cobalt, Copper, Fluoride, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium, Total boron, Total nitrogen, Total phosphorus, Total potassium, Vanadium, Zinc.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

QWAS
Water Microbiology

The LGC Quality in Water Analysis Scheme (QWAS) has been specifically developed for the microbiological analysis of waters and effluent sludge.

Microorganisms occur in water naturally and the majority are relatively harmless. However contamination of water from faecal sources can lead to large outbreaks of disease.

In many countries, water microbiology is the subject of legislation.

Regulations specify how often water sources are sampled, how sampling is done, how analysis will be performed, what microorganisms are to be tested, and the acceptable limits for the target microorganisms.

For laboratories responsible for the analysis of waters, particiption in a relevant LGC Proficiency Testing scheme can provide confidence that results of these analyses and the equipment used to produce those results are meaningful and accurate which, in turn, helps to ensure the safety of water.

Test Material*	Analyte*
Bathing, recreational & surface water	Coagulase-positive staphylococci, Staphylococcus species, Sulphite-reducing Clostridia.
Bathing, surface & wastewater	Enterococci (faecal streptococci), Escherichia coli, Faecal coliforms, Total coliforms, Salmonella species.
Effluent sludge	Escherichia coli, Salmonella species.
Environmental water	Legionella pneumophila by culture, Legionella pneumophila by PCR. Legionella species by culture, Legionella species by PCR.
Potable water	Clostridium perfringens, Coliforms, Enterococci (faecal streptococci), Escherichia coli, Pseudomonas aeruginosa, Sulphite-reducing Clostridia, Sulphite-reducing Clostridia spores ONLY, Total aerobic count at 22°C and 37°C, Legionella species (low levels). Identification of (non-pathogenic) organism to correct family, genus or species level.
Process water	Pseudomonas species, Total aerobic count, Yeast, Mould, Yeast and mould (total).
Sea water	Enterococci (faecal streptococci), Escherichia coli, Faecal coliforms, Total coliforms.
Lyophilised material	Unknown microorganism.
Paper exercise (image)	Colony count and calculation of number of microorganisms.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

AIR PT
Air & Stack Emissions

The LGC AIR PT scheme is a partnership between LGC and the UK Health and Safety Laboratory (HSL).

The scheme is operated by LGC and is supported by the technical expertise at HSL. The scheme combines our scientific and production expertise in different areas, providing an integrated scheme for all laboratories undertaking analysis of samples from various fields of air monitoring.

We take air for granted: it is ubiquitous, essential, and life-giving. However, it is easily polluted by our activity and so requires regular monitoring to assess exposures and the effectiveness of containment or ventilation. Many everyday activities create air pollutants with known or suspected harmful effects on human health and the environment. Such pollution can cause both short and long term effects on human, plant and animal life.

Participation in the AIR PT scheme supports a laboratory's quality system in the monitoring and measurement of air quality in a wide range of contexts.

Test material*	Analyte*
Workplace air (filters)	Aldehydes, Chromium (VI), Lactose, Metals, Respirable grade quartz by FTIR and XRD.
Workplace air (diffusion tubes)	VOCs (charcoal sorbent and thermal desorption).
Workplace air (dust)	Metals.
Ambient air (filters)	Anions, Metals.
Ambient air (diffusion tubes)	Nitrogen dioxide (as nitrite), VOCs (thermal desorption).
Indoor/chamber air (diffusion tubes)	Qualitative and quantitative VOCs (charcoal sorbent and thermal desorption).
Stack emissions (impinger solutions)	Ammonia, Hydrogen chloride, Hydrogen fluoride, Mercury, Nitrogen oxides as (NO2), Sulphur dioxide, Metals, Volume of solution.
Stack emissions (rinsing solution)	Dust (total solids).
Gravimetric filters (workplace air, ambient air, stack emissions)	Dust by gravimetry (mass of solids), Fly ash, Metals.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

LGC is the accredited provider of the PT scheme.

HEALTH & SAFETY LABORATORY

Water & Environment

CONTEST
Contaminated Land

The LGC CONTEST scheme offers a comprehensive range of analytes in soils, soil extracts and standards solutions for the analysis of metals, inorganic contaminants, organics, soil leachates and solid waste.

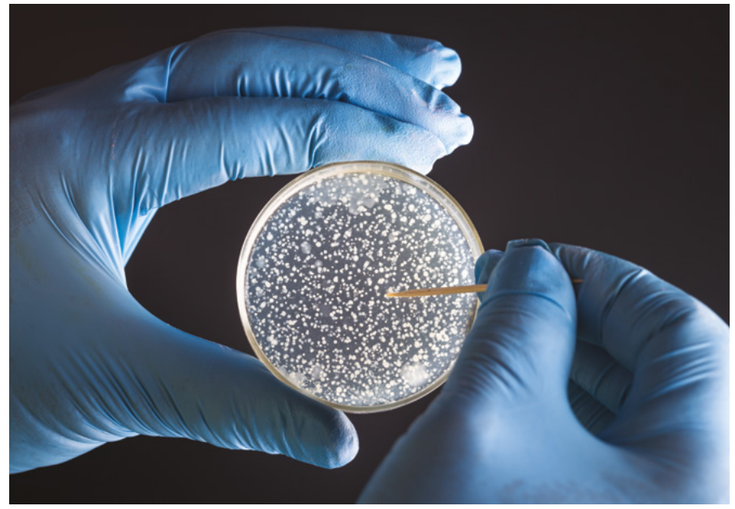
Land contamination can pose both environmental and human health risks. The main causes of contamination are the direct discharge of industrial wastes, domestic pollution, over-usage of pesticides, oil and fuel dumping, leaching of wastes from landfills and leaking underground storage tanks which corrode over time releasing toxic substances into previously clean soils.

Participation in a proficiency testing scheme for soil, such as CONTEST, is a requirement of the UK Environment Agency's Monitoring Certification Scheme (MCERTS) 'Performance Standard for Laboratories Undertaking Chemical Testing of Soil'.

Test material*	Analyte*
Soil, acid extract of soil, standard solution	Chromium (VI), Metals, Toxic metals.
Soil and/or standard solution	Ammonia, Cyanide (complex, free, total), Dry matter, Easily liberated sulfide, Fluoride (total), Loss on ignition, pH, Sulfate (total), Sulfur (total), Thiocyanate, Water soluble (boron, chloride, fluoride, sulfate), BTEX, Distillable phenolic substances, Elemental sulfur, Phenols, PAHs, PCBs, TOC, TPHs, VOCs.
Soil, standard solution	BTEX, TPH, VOCs, OC pesticides.
Soil leachate	COD, Conductivity, Cyanide (complex, free), Major ions, Metals, pH, PI,Thiocyanide, TOC/DOC, Toxic metals.
Soil waste and leachate (Waste acceptance criteria)	DOC, Dry matter content ratio, Major ions, Metals, PI, TDS, Toxic metals.
Standard solution	Qualitative test of SVOCs.
Trommel fines	Loss on ignition (FINES).

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed.
For accredited and non-accredited status please see current application form/scheme description.

HYGIENE
Environmental Hygiene Monitoring



Regular hygiene monitoring of environmental surfaces and equipment in manufacturing and healthcare is a key part of any quality system.

Ensuring control of microbial contamination can directly affect the quality of both product and patient care.

In food and beverage industries, it can help avoid food spoilage and food poisoning, both of which can damage brand value and profits.

In pharmaceutical manufacturing, parenteral medicines, and the environment they are produced in, need to be free from harmful microbial strains.

In healthcare, regular environmental monitoring can demonstrate cleaning and disinfection has been carried out correctly, helping to reduce the potential spread of infection.

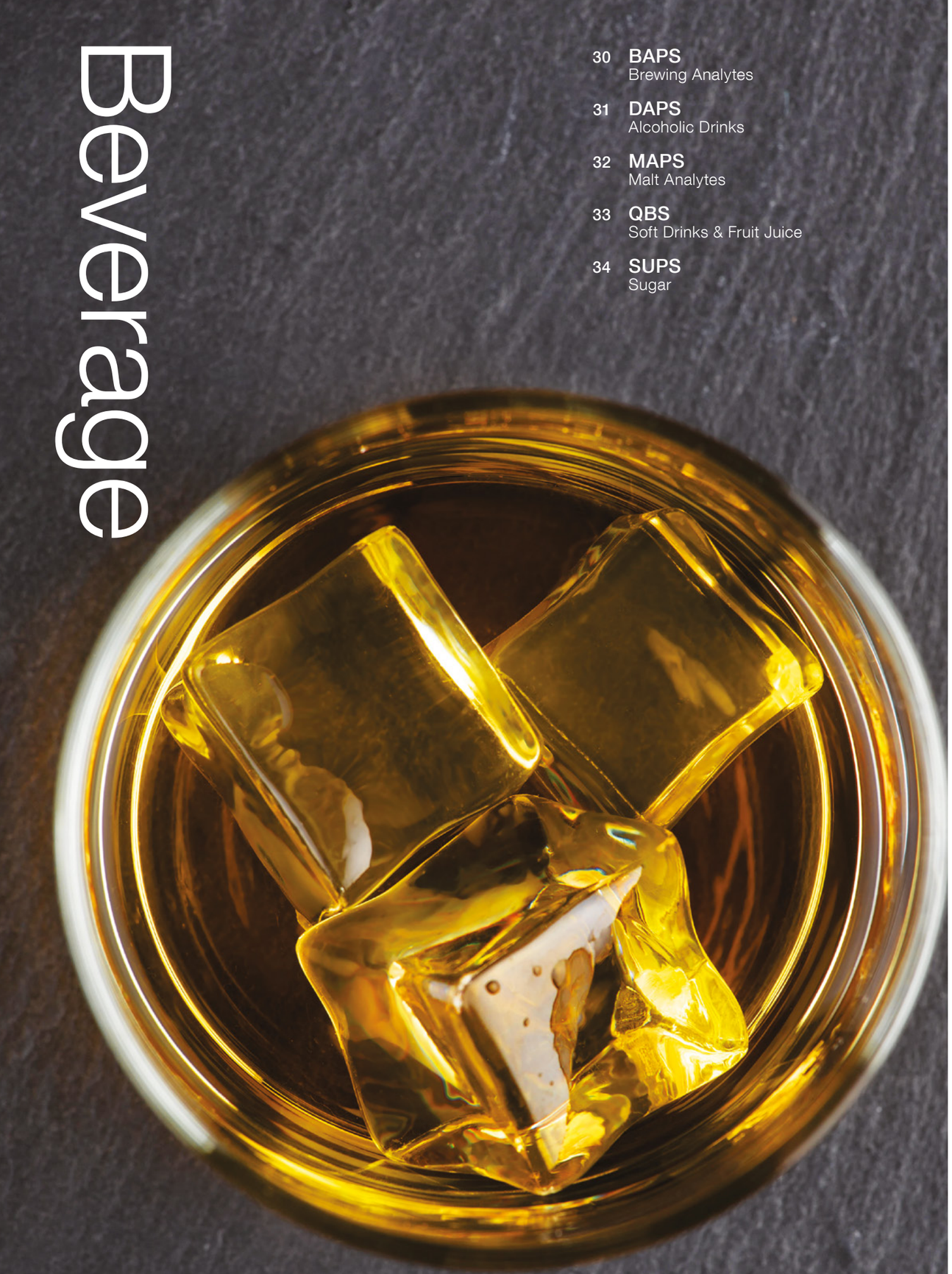
Participation in the LGC HYGIENE scheme can help to demonstrate that environmental monitoring is effective and under control.

Regular monitoring allows information to be collected to review and assess hygiene quality to ensure legislative standards are being met. It also helps to determine the effectiveness of control systems designed to prevent microbial contamination.

Test material*	Analyte*
Surface testing by swabbing	Enumeration of Enterobacteriaceae, Total aerobic mesophilic count, Yeasts and/or Moulds. Detection of Listeria species, Salmonella species.
Surface testing by Contact plates	Total aerobic mesophilic count.
Surface testing by dip-slides	Enumeration of Coliforms, Total viable count.
Surface testing by ATP monitoring	ATP levels.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed.
For accredited and non-accredited status please see current application form/scheme description.

Beverage



Beverage
Scheme Selector

Scheme	Distribution per year	Test	Test Material Matrix*	Analyte Group*
BAPS Brewing Analytes	up to 12 (Chemistry) 6 (Microbiology) 12 (Sensory)	Chemical, Microbiological and Sensory	Ales, craft beers, lagers, and alcohol free/low alcohol beers.	Routine and complex chemical tests relevant to the brewing industry for quality control and product characterisation. Brewery spoilage microorganisms. Sensory assessments in aroma and taste evaluation.
DAPS Alcoholic Drinks	4	Chemical	Distilled spirits, whisky, wort, ciders, wines and fortified wines, liqueurs, cream liqueurs, and other alcoholic beverages.	Chemical tests including esters relevant for alcoholic beverages and intermediate process samples.
MAPS Malt Analytes	12	Chemical and Physical	Brewing/distilling malted barley, barley, malt flour, malted wheat and black/crystal malt.	Chemical and physical tests for quality checks and complex analysis, including mycotoxins analysis.
QBS Soft Drinks & Fruit Juice	4	Chemical and Microbiological	Carbonated drink, carbonated drink (degassed), dilutable/ ready to drink fruit juice, soft drink and apple juice.	Chemical tests for quality checks and complex parameters including vitamins and mycotoxins. Comprehensive range of microorganisms of relevance to beverage products, including pathogens, indicator organisms and spoilage organisms.
SUPS Sugar	12	Chemical and Microbiological	Cane or beet sugar, raw sugar and molasses.	Chemical tests of relevance to the sugar processing, food and beverage industries. Microorganisms of relevance to sugar products, including pathogens and indicator organisms.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

BAPS
Brewing Analytes

The LGC BAPS scheme is jointly run by LGC Proficiency Testing and Campden BRI, promoting quality in the measurement of chemical, microbiological and sensory analytes in real beer.

Routine and complex chemical tests for quality control and product characterisation are available in our lager and ale test materials.

Microbiological test materials contain organisms typically encountered in the brewing industry. For sensory analysis, participants evaluate various aroma and taste characteristics of real beers and can compare their results with the Campden BRI sensory panel that provide an expert profile for the sample to enable immediate training of panels if required.

For laboratories that perform the analysis of beer, participation in BAPS can provide confidence that results are meaningful and accurate which in turn, helps to ensure consistency in the quality of beer and integrity of the brand.

Chemistry*	Analyte*
Lager/ale	Alcohol by volume, Bitterness, Carbon dioxide, Colour at 430nm, Gravity (apparent, original, present), Haze (0°C, 20°C), Original extract, pH, Refractive index, Sulfur dioxide, Total gas pressure.
Lager	2-Methyl butanol, 3-Methyl butanol, 2+3 Methyl butanol. Acetaldehyde, Calcium, Carbohydrate (total), Chloride, Copper, Diacetyl as VDK, Dimethyl disulfide, Dimethyl sulfide, Energy value (kcal), Energy value (kJ), Ethyl acetate, Ethyl hexanoate, Foam stability (HRV), Free alpha amylase, Free diacetyl, Free 2,3-pentanedione, Glucose, Hydrogen sulfide, Iron, Iso-alpha-acids, Iso-amyl acetate, Iso-butanol, Magnesium, Maltose, Maltotetraose, Maltotriose, Methanethiol, Methylthioacetate, Nitrate, n-Propanol, Phosphate, Polyphenols (total), Potassium, Sodium, Sulfate, Tetra-iso-alpha-acids, TSN, Zinc
Dark/craft ale	Alcohol by volume, Bitterness, Colour at (430nm, 530nm), Diacetyl as VDK, Free 2,3-pentanedione, Free diacetyl, Iso-alpha-acids, Tetra-iso-alpha-acids.
Alcohol free/low alcohol beer	Alcohol by volume (qualitative, quantitative), Bitterness, Colour at 430nm, Gravity (apparent, present), pH.

Sensory*	Analyte*
Lager/ale	Alcoholic/Solvent, Astringent, Bitter, Body, Burnt, Caramel, Cereal, DMS, Fruity/Citrus, Fruity/Estery, Hop, Linger, Malty, Other sulfur, Oxidised/Aged, Sour, Sweet, and others.

Microbiology*	Analyte*
Lyophilised material High level/ low level	Identity of organisms, Lactic acid bacteria count, Total aerobic bacterial count, Total aerobic microbial count. Total anaerobic microbial count, Wild yeast, count: Identity of organisms.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

LGC is the accredited provider of the PT scheme.

Campden BRI
food and drink innovation

DAPS
Alcoholic Drinks

The LGC DAPS Alcoholic Drinks scheme covers a wide range of products including distilled spirits, wine, ciders and prepared lifestyle drinks, such as ready-to-drink cocktails and fruit based beverages.

Whilst alcohol content is an important analysis for duty payment purposes, there are many other analytes that influence the flavour of the product.

Consistent analytical performance in the laboratory, supported by participation in the LGC Proficiency Testing scheme, can help ensure the consistency of the product, keeping customers loyal to their favourite drinks.

Test Material*	Analyte*
Fermented and simulated wort	Alcohol, Gravity (original, residual, final), pH (fermented only), Residual fermentable sugars (total amount of glucose, maltose, maltotriose).
Clear/dark distilled spirit & scotch whisky	Acidity (total, volatile), Alcoholic strength (actual, apparent), Chill difference, Colour, Density, Ethyl carbamate, Fructose, Glucose, Sucrose, Sugars (total), NDMA, pH, Refractive index, Specific gravity, Total solids, Turbidity (Haze). 2-Methyl butanol, 3-Methyl butanol, 2 + 3 Methyl butanols, Acetal, Acetaldehyde, Ethyl acetate, Furfural, Iso-amyl acetate, Iso-butanol, Methanol, n-Butanol, n-Propanol. Calcium, Copper, Iron, Magnesium, Potassium, Sodium. 5-HMF, Coniferaldehyde, Ellagic acid, Gallic acid, Scopoletin, Sinapaldehyde, Syringaldehyde, Syringic acid, Vanillic acid, Vanillin. 2-Phenethyl acetate, 2-Phenethyl ethanol, Ethyl decanoate, Ethyl dodecanoate, Ethyl hexadecanoate, Ethyl hexanoate, Ethyl octanoate, Ethyl tetradecanoate, Ethyl-9-Hexadecenoate.
Simulated spirit	Alcoholic strength (actual, apparent), Citric acid, Ethyl carbamate, Fructose, Glucose, Sucrose, Sugars (total), Glycerol, Maltose, NDMA, pH, Propylene glycol.
Non chill filtered whisky	2-Phenethyl acetate, 2-Phenethyl ethanol, Ethyl decanoate, Ethyl dodecanoate, Ethyl hexadecanoate, Ethyl hexanoate, Ethyl linoleate, Ethyl linolenate, Ethyl octadecanoate, Ethyl octanoate, Ethyl oleate, Ethyl tetradecanoate, Ethyl-9-hexadecenoate.
Ciders	Acidity (total, volatile), Actual alcoholic strength, Carbon dioxide, Colour, Haze, pH, Specific gravity, Sulfur dioxide (total).
White/rosé and red wine	Acidity (total, volatile), Alcoholic strength (actual), Ascorbic acid, Citric acid, Colour at (420nm, 520nm, 620nm), Copper, Fructose, Glucose, Iron, Lactic acid, Malic acid, pH, Reducing sugars, Sorbic acid, Specific gravity, Sulfur dioxide (free, total).
Ready to drink	Acidity (total, volatile), Alcoholic strength (actual), Ascorbic acid, Benzoic acid, Brix, Carbon dioxide, Citric acid, Colour absorbance, Density, Dissolved oxygen, pH, Refractive index, Sorbic acid, Specific gravity, Sugars (total).
Liqueur	2-Methyl butanol, 3-Methyl butanol, 2 + 3 Methyl butanols, Acidity (total, volatile), Acetal, Acetaldehyde, Alcoholic strength (actual), Brix (total), Ethyl acetate, Furfural, Iso-amyl acetate, Iso-butanol, Methanol, n-Butanol, n-Propanol, pH, Refractive index, Residue, Specific gravity, Total solids.
Cream liqueur	Specific Gravity, Actual Alcoholic Strength, pH, Residue, Iso-Butanol, 2+3 Methylbutanols, Furfural, Total Brix, Refractive Index (20°C), Total solids.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

MAPS
Malt Analytes

The LGC MAPS scheme covers test materials from the full range of barley and malted barley used for brewing and distilling.

Malt is a complex product and forms a key ingredient in brewing and distilling. It is considered to be at the heart of the process, providing most of the sugars and complex carbohydrates which produce the alcohol and flavour of the final product.

These test materials are analysed for a wide range of analytes, using European Brewing Convention (EBC) and Institute of Brewing and Distilling (IBD) methods, as well as a number of other physical and chemical methods.

Meeting the demanding specifications laid down by brewers and distillers is critical to the business of any maltster and is greatly dependent on the quality of the malting barley. For this reason the accuracy of the laboratory analysis is essential as it will ultimately decide if the product is suitable for use in the production plant.

Test Material*	Analyte*
Brewers and distillers malt	Alpha amylase, Cold water extract, Diastatic power (DP IoB and DPWK), Dimethyl sulfide (free, total), Dimethyl sulfide precursor, EBC fraction IV, EBC reject fraction, Friability, Glassy (whole) corns, Glycosidic nitrile, Hartong VZ45, Homogeneity, Malt mod homogeneity, Malt modification, Moisture, NDMA, Nitrogen (total), Partly unmodified grains, Phenols (total), Residual sulfur dioxide, Sieving tests.
Brewers and distillers malt (EBC wort)	Beta glucan, Boiled wort colour, Colour, Extracts, Extract difference, FAN, Fermentability (boiled), Kolbach index, pH, TSN, Viscosity.
Brewers and distillers malt (IOB wort)	Beta glucan, Colour, Extracts, Extract difference, FAN, Fermentability (boiled, unboiled), pH, Predicted spirit yield, Soluble extract difference, Soluble extract, SNR, TSN, Viscosity.
Barley	BRF (8ml test), EBC fraction IV, EBC reject fraction, Germinative capacity, Germinative energy, Hectolitre weight, Moisture, Nitrogen (total), Sieving tests, Thousand corn weight.
Black malt	Colour, Moisture.
Crystal malt	Colour, Degrees of crystallisation, Moisture.
High diastatic power malt	Moisture, DPWK, Diastatic Power, Alpha Amylase, IoB Soluble Extract 0.7mm, TSN (Total Soluble Nitrogen) FAN (Free Alpha Amino Nitrogen), Glycosidic Nitrile.
Malt flour	NDMA. Mycotoxin analysis (Ochratoxin A and Deoxynivalenol (DON)).
Malted wheat	Moisture, DPWK, Diastatic Power, Alpha Amylase, Protein, Extract: 0.2mm, Boiled Wort Colour, Kolbach Index, EBC Fermentability (Boiled), IoB Extract 0.7mm, pH, Colour, TSN (Total Soluble Nitrogen), SNR (Soluble Nitrogen Ratio), FAN (Free Alpha Amino Nitrogen), Viscosity, Beta Glucan.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

QBS
Soft Drinks & Fruit Juice

The LGC Quality in Beverages Scheme (QBS) is specifically tailored for chemists and microbiologists working in the soft drinks and fruit juice industries (including carbonated drinks).

Soft drinks and fruit juices are widely consumed throughout the world and these global customers expect their beverages to always look and taste the same. The industry continuously aims to meet these high expectations. However, maintaining and confirming the quality and reliability of a given product is a considerable challenge for production facilities and quality control laboratories meaning that contamination from microorganisms, chemicals and foreign matter could compromise product quality.

It is vital to prevent these types of errors as they can lead to the manufacture of out-of-specification product resulting in product wastage and disposal, lost production and the associated costs.

The LGC QBS scheme will allow laboratories to monitor analytical quality, helping to ensure that products are being manufactured to the highest standards.

Chemistry*	Analyte*
Apple juice	Patulin.
Carbonated drinks	Acidity (as citric acid monohydrate), Brix, Carbon dioxide, Fructose, Glucose, pH, Sucrose.
Carbonated drinks (degassed)	Acesulfame K, Aspartame, Benzoic acid, Caffeine, Cyclamic acid (as free acid), Saccharin (as free imide), Sorbic acid (as free acid), Sucralose, Sulfur dioxide (free, total).
Dilutable and ready to drink	Acesulfame K, Acidity (as citric acid monohydrate), Aspartame, Benzoic acid, Brix, Caffeine, Cyclamic acid (as free acid), Fructose, Glucose, pH, Saccharin (as free imide), Sorbic acid (as free acid), Sucrose, Sulfur dioxide (free, total).
Fruit juice	Acidity (as citric acid monohydrate), Brix, Calcium, Fructose, Glucose, pH, Phosphorus, Potassium, Magnesium, Sodium, Antimony, Cadmium, Iron, Lead, Tin, Zinc.
Liquid material	Vitamin C (Ascorbic acid).
Soft drink	Antimony, Cadmium, Calcium, Iron, Lead, Magnesium, Phosphorus, Potassium, Sodium, Tin, Zinc. Vitamin B3 (Nicotinamide), Vitamin B5 (Pantothenic acid), Vitamin B6 (Pyridoxine), Vitamin B12 (Cyanocobalamin), Vitamin C (Ascorbic acid), Vitamin E (DL-alpha-Tocopherol), Total steviol glycosides, Rebaudioside A.

Microbiology*	Analyte*
Fruit juice	Enumeration of Lactic acid bacteria, Mould, Total aerobic mesophilic count, Yeast. Detection of Escherichia coli, Escherichia coli O157 (non toxigenic strain), Listeria monocytogenes, Salmonella species.
Liquid material (membrane filtration)	Enumeration of Lactic acid bacteria, Mould, Thermophilic acidophilic bacteria, Total aerobic mesophilic count, Yeast. Detection of Escherichia coli, Guaiacol producing thermophilic acidophilic bacteria, Listeria monocytogenes.
Soft drink	Enumeration of Lactic acid bacteria, Mould, Total aerobic mesophilic count, Yeast. Detection of Escherichia coli.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

SUPS
Sugar

The LGC SUPS scheme is suitable for all laboratories who analyse sugar and sugar products.

The quality of sugar has to be continually maintained, because in addition to its sweet taste it brings additional benefits to the foods and beverages it is used in, such as improving texture, enhancing flavour, providing consistency, providing natural preservation and many more.

LGC collaborates with the International Commission for Uniform Methods of Sugar Analysis (ICUMSA) who provide robust, internationally validated methods of analysis to aid the trade in sugar and sugar products.

ICUMSA representatives are involved in the review of progress and performance of SUPS and provide advice on the operation and future developments of the scheme.

Participating in SUPS will provide data to help identify performance issues with methods used and will underpin the quality of the analytical results used to inform the commercial decisions about the product.

Chemistry*	Analyte*
Cane or beet sugar	Ash, Colour, Moisture, Polarisation, Reducing sugars, Reflectance grade, Sulfur dioxide, Sediment (insoluble), Turbidity. Arsenic, Cadmium, Copper, Iron, Lead, Mercury.
Molasses	Dry substance, Fermentable sugars, pH, Reducing sugars, Sucrose, Sulfated ash.
Raw sugar	Ash, Colour, Dextran, Moisture, Polarisation, Reducing sugars, Starch.

Microbiology*	Analyte*
Lyophilised material	Enumeration of Thermophilic acidophilic bacteria (TAB), Total aerobic mesophilic count, Osmophilic yeast and mould, Yeast and mould.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

LGC is the accredited provider of the PT scheme.

ICUMSA

Beverage

Clinical

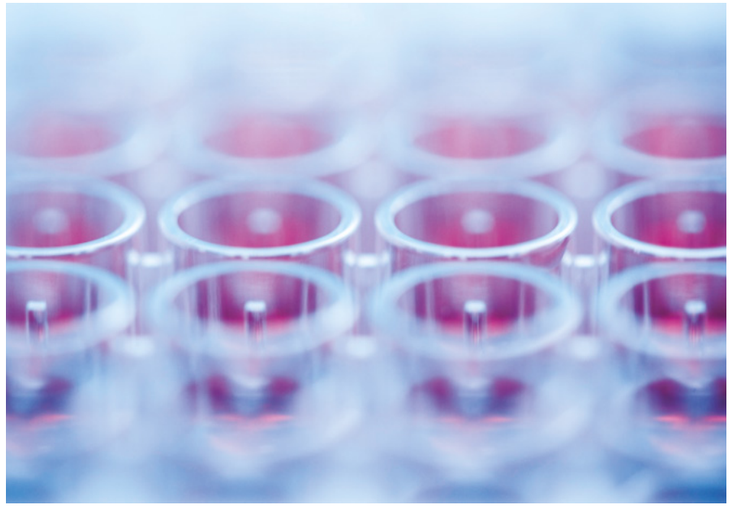
Clinical
Scheme Selector

Scheme (Apr-Mar)	Distribution per year	Test	Test Material Matrix*	Analyte Group*
IPT Immunosup-pressant	12	Clinical	Blood and plasma.	Routine quantification of Immunosuppressant drugs including Ciclosporin; Tacrolimus; Sirolimus; Everolimus; Mycophenolic Acid.
TDM Therapeutic Drugs	12	Clinical	Blood, serum and urine.	Routine quantification of therapeutic drugs including Anti-epileptics; Cardiac; Analgesics; Substance abuse treatments; Psychoactives; Antibiotics; Smoking-related.
TOX Toxicology	12	Clinical	Blood, serum and urine.	Drug and alcohol determination; case studies.
DAU Drugs of Abuse in Urine	4	Clinical	Urine from volunteers and known drug users.	Mixtures of drugs and/or their metabolites from six major classes.
DOF Drugs in Oral Fluid	4	Clinical	Oral fluid from volunteers and known drug users.	Mixtures of drugs and/or their metabolites from six major classes.
DAH** Drugs of Abuse in Hair	4	Clinical	Human hair.	Mixtures of drugs and/or their metabolites from six major classes.
CLS** Clinical Microbiology Laboratory	12	Clinical & Microbiology	Range of relevant materials.	Bacteriology, Mycobacteriology, Mycology, Parasitology, Virology, Molecular Multiplex discipline.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

** Please note that the DAH and CLS schemes are currently not included in our scope of accreditation.

IPT
Immunosuppressant



The LGC Immunosuppressant proficiency testing scheme provides independent performance assessment for laboratories performing quantification of immunosuppressant drugs in blood and plasma.

Immunosuppressant drugs are a class of drugs that suppress, or reduce, the strength of the body's immune system.

In addition to being used to prevent organ rejection, they are often used to treat autoimmune disorders such as lupus, psoriasis, and rheumatoid arthritis.

Regular blood tests are essential for monitoring therapeutic levels and whether dosage changes are needed.

To successfully make these informed decisions laboratories need to demonstrate that drug measurements are reliable, reproducible and accurate.

The operation of the LGC IPT scheme is supported by an Advisory Group consisting of members of the professional bodies, scheme participants, and others experienced in the field.

The scheme reports on the performance of U.K. participants (who have clinical responsibilities) to the National Quality Assurance Advisory Panels for Chemical Pathology.

Test Material*	Analyte*
Human blood	Ciclosporin/Tacrolimus, Everolimus, Sirolimus.
Plasma	Mycophenolic acid.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed.
For accredited and non-accredited status please see current application form/scheme description.

TDM
Therapeutic Drugs Monitoring

The LGC Therapeutic Drugs Monitoring (TDM) proficiency testing scheme provides independent performance assessment for the routine quantification of a wide range of anti-epileptic and other therapeutic drugs.

TDM is a measurement of specific drug concentration levels at timed intervals in patients, usually through blood/serum samples, and is necessary where control of drug concentrations is required to achieve optimum treatment for the patient, or where there is a narrow range between the therapeutic and toxic levels.

The operation of the LGC TDM scheme is supported by an Advisory Group consisting of members of the professional bodies, scheme participants, and others experienced in the field. The scheme reports on the performance of U.K. participants (who have clinical responsibilities) to the National Quality Assurance Advisory Panels for Chemical Pathology.

Test Material*	Analyte*
Therapeutic drug mixture (lyphilised human serum)	Amikacin, Carbamazepine, Carbamazepine+CBZ-epoxide, Caffeine, CBZ-epoxide, Clonazepam, Digoxin, Ethosuximide, Gentamicin, Lamotrigine, Lithium, Methotrexate, Phenobarbitone, Phenytoin, Primidone, Theophylline, Tobramycin, Vancomycin, Valproate.
Anti-epileptic drugs (lyophilised human serum)	Brivaracetam, Felbamate, Gabapentin, Lacosamide, Levetiracetam, OH-oxcarbazepine, Pregabalin, Perampanel, Retigabine (Ezogabine), Rufinamide, Tiagabine, Topiramate, Vigabatrin, Zonisamide.
Cardiac drugs (lyophilised human serum)	Amiodarone, Desethylamiodarone, Flecainide.
Analgesic mixture (lyophilised human serum)	Diclofenac, Ibuprofen, Tramadol.
Substance abuse & treatment (lyophilised human serum)	Buprenorphine, EDDP, Methadone, Norbuprenorphine.
Psychoactive drugs (lyophilised human serum, new born calf serum)	Amisulpride, Amitriptyline/Nortriptyline, Aripiprazole/Dehydroaripiprazole, Citalopram/Norcitalopram, Clomipramine/Norclomipramine, Clozapine/ Norclozapine, Doxepin/Nordoxepin, Dothiepin/Northiaden, Duloxetine, Escitalopram, Fluphenazine, Fluvoxamine, Haloperidol, Imipramine/Desipramine, Fluoxetine/Norfluoxetine, Maprotiline/Normaprotiline, Mianserin, Mirtazapine/ Normirtazapine, Olanzapine, Paroxetine, Perphenazine, Quetiapine/Norquetiapine, Risperidone/HO-risperidone, Sertraline/ Norsertraline, Sulpiride, Thioridazine, Trazodone, Trimipramine/Nortrimipramine, Venlafaxine/ Norvenlafaxine, Ziprasidone, Zuclopenthixol.
Non-smoking compliance (lyophilised human serum)	Cotinine, Nicotine.
Antibiotics (liquid human serum)	Amikacin, Gentamicin, Teicoplanin, Tobramycin, Vancomycin. Atomoxetine, Methylphenidate. Ritalinic Acid.
Clobazam and Norclobazam	Clobazam, Norclobazam.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed.
For accredited and non-accredited status please see current application form/scheme description.

TOX
Toxicology

The LGC Toxicology (TOX) proficiency testing scheme is designed to provide an independent performance assessment of laboratories undertaking clinical and/or forensic toxicological analytical services.

Toxicological analyses may be undertaken on biological specimens, predominantly blood, serum and urine. In general, analyses are undertaken for a range of substances including prescription and non-prescription drugs, illicit drugs and alcohol.

For laboratories performing these analyses, participation in TOX can provide confidence that results are meaningful and accurate.

The operation of our TOX scheme is supported by an Advisory Group consisting of members of the professional bodies, scheme participants, and others experienced in the field. The scheme reports on the performance of U.K. participants (who have clinical responsibilities) to the National Quality Assurance Advisory Panels for Chemical Pathology.

Test Material*	Analyte*
Human serum	Ethanol, Paracetamol (Acetaminophen), Salicylic acid.
Human blood	Carboxyhaemoglobin, Ethanol, Paracetamol (Acetaminophen), Salicylic acid.
Urine	Ethanol.
Lyophilised urine	Gammahydroxybutyrate.
Whole blood	Acetone, Ethanol, Ethylene glycol, Isopropyl alcohol, Methanol.
Human serum and urine	Toxicology case studies include various analytes with clinical or forensic scenario.
Whole blood toxicology	Test materials contain analytes which are pre-defined by our Advisory Group and the requests of participants.
Lyophilised human serum	Diazepam, Nitrazepam, Nordazepam, Oxazepam, Temazepam. Zaleplon, Zolpidem, Zopiclone. Alprazolam, Bromazepam, Clonezepam, Lorazepam, Midazolam.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed.
For accredited and non-accredited status please see current application form/scheme description.

DAU
Drugs of Abuse in Urine

The LGC Drugs of Abuse in Urine (DAU) scheme is designed to provide an independent performance assessment of laboratories and clinics that provide routine services for detection of drugs of abuse in urine.

Human urine has been used for many years to detect the presence of illicit drugs. Urine testing may be requested for a variety of reasons, including health care, occupational monitoring, insurance screening, legal and forensic purposes. Errors in tests could have severe consequences, such as dismissal from work or miscarriage of justice.

Laboratories and clinics are encouraged to participate in suitable PT/EQA schemes to ensure the highest standard of drug testing is achieved through independent assessment of measurement quality.

The operation of the LGC DAU scheme is supported by an Advisory Group consisting of members of professional bodies, scheme participants, and others experienced in the field. The scheme reports on the performance of U.K. participants (who have clinical responsibilities) to the National Quality Assurance Advisory Panels for Chemical Pathology.

Test Material*	Analyte*
Urine test materials obtained from volunteers and known drug users which regularly contain mixtures of drugs and their metabolites	Amfetamines and stimulants, Cannabinoids, Cocaine and metabolites, Ethyl glucuronide, Ethyl sulfate, Gamma-Hydroxybutyrate (GHB), Minor tranquillizers, Non-opiate narcotics, Opiates. Other current drugs and/or metabolites may also be included.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed.
For accredited and non-accredited status please see current application form/scheme description.

DOF
Drugs in Oral Fluid

The LGC Drugs in Oral Fluid (DOF) scheme provides performance assessment for laboratories and clinics who provide analytical services for drugs in oral fluid. Samples are provided as real human oral fluid.

Advances in technology have enabled oral fluid testing for the presence of many drugs. Oral fluid collection is often less invasive, relatively easy to perform, and, in forensic situations, can be achieved under close supervision to prevent adulteration or substitution of the samples.

Drug testing is extremely accurate and reliable when all aspects of the testing process are carried out correctly. However, if poor procedures and inadequate testing methods are utilised, the information obtained may be very misleading and inaccurate.

To minimise this risk, laboratories should perform routine quality control tests and participate in suitable PT/EQA schemes.

The operation of our DOF scheme is supported by an Advisory Group consisting of members of the professional bodies, scheme participants, and others experienced in the field. The scheme reports on the performance of U.K. participants (who have clinical responsibilities) to the National Quality Assurance Advisory Panels for Chemical Pathology.

Test Material*	Analyte*
Oral fluid test materials obtained from volunteers and known drug users which regularly contain mixtures of drugs and their metabolites from six major classes	Amfetamines and stimulants, Cannabinoids, Cocaine and metabolites, Minor tranquillizers, Non-opiate narcotics, Opiates, Other current drugs and/or metabolites may also be included.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

DAH**
Drugs of Abuse in Hair

The LGC Drugs of Abuse in Hair (DAH) scheme is suitable for laboratories performing forensic analysis of hair for drugs of abuse and provides an independent assessment of measurement quality.

Drugs and their metabolites become incorporated in hair when ingested. An analysis for these drug residues can provide a useful assessment of an individual's intake of drugs over a prolonged period of time.

The detection time of drugs in hair is significantly greater than other samples commonly tested such as blood, urine and saliva.

Advantages of analysing hair samples for the presence of drugs include a large window of detection, the assessment of the regularity of drug use (or continued abstinance) and sample stability.

Test materials provided consist of real cut (2–3mm pieces) human hair that has been declared free from common drugs of abuse.

The analytes are then incorporated by a method that includes soaking. Drugs (and/or metabolites) from six major classes are included during the scheme year.

The operation of our DAH scheme is supported by an Advisory Group consisting of members of the professional bodies, scheme participants, and others experienced in the field.

Test Material*	Analyte*
Human hair	Identification and quantification of Amfetamines and stimulants, Benzodiazepines, Cannabinoids Cocaine and metabolites, Opiates. Other current drugs and/or metabolites may also be included.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

** Please note that the DAH scheme is currently not included in our scope of accreditation.

CLS**

Clinical Microbiology Laboratory

The LGC Clinical Microbiology Laboratory (CLS) scheme is for laboratories performing microbiological analysis of clinical samples and provides an independent assessment of measurement quality. The CLS scheme also provides information to participants on technical issues and methodologies relating to Clinical Microbiology.

Test materials mimic clinical specimens in a wide array of samples that are included in the CLS scheme, from the Bacteriology, Mycobacteriology, Mycology, Parasitology, Virology and Molecular Multiplex disciplines.

Focusing on the detection, characterisation and quantification of bacteria, viruses, fungi and parasites microbes, the CLS scheme ensures that laboratories are able to diagnose, treat and prevent infectious diseases.

The operation of our CLS scheme is supported by an Advisory Group.

Test Material*	Analyte*
Bacteriology	Blood culture, CSF culture, Ear/Eye culture, Group B, Strep culture, N. gonorrhoeae culture, Sputum, Stool culture, Throat culture, Urine colony count, Urine culture, Wound culture, Susceptibility Testing, Bordetella pertussis, Bordetella Parapertussis, Bordetella parapertussis, C. difficile Toxin, C. difficile Antigen, Chlamydia trachomatis, Neisseria gonorrhoeae, Gram Stain Interpretation, Leukocytes, Stain Quality, Sputum Specimen Quality, Bacterial vaginosis, Nugent Score, Group B Strep, Legionella pneumophila Antigen, Methicillin-Resistant Staphylococcus aureus culture, Methicillin-Resistant Staphylococcus aureus, Staphylococcus aureus, Mycoplasma pneumoniae, Streptococcus pneumoniae Antigen, Group A Strep, Group C/G Strep, Vancomycin-Resistant Enterococcus.
Mycobacteriology	Acid Fast Bacilli Smear, Mycobacterium tuberculosis complex; Rifampin resistance, Mycobacteriology culture ID.
Mycology	Mycology culture ID.
Parasitology	Blood parasite ID, Trichomonas vaginalis.
Virology	HPV; HPV genotyping, RSV Antigen; Influenza A, Antigen; Influenza B Antigen; Influenza A or B Antigen; Adenovirus Antigen, Rotavirus Antigen.
Molecular Multiplex	
Blood Pathogen Panel (multiplex)	Acinetobacter sp, Acinetobacter Baumannii, Citrobacter sp., Enterobacteriaceae, Enterobacter sp., Enterobacter cloacae complex, Enterococcus sp., Enterococcus faecalis, Enterococcus faecium, Escherichia coli, Haemophilus influenza, Klebsiella oxytoca, Klebsiella pneumoniae, Listeria sp., Listeria monocytogenes, Neisseria meningitides, Proteus sp, Pseudomonas aeruginosa, Serratia marcescens, Staphylococcus sp., Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus lugdunensis, Streptococcus sp., Streptococcus agalactiae, Streptococcus anginosus group, Streptococcus Pneumoniae, Streptococcus pyogenes, Candida albicans, Candida glabrata, Candida krusei, Candida parapsilosis, Candida tropicalis, Resistance Gene.
Gastrointestinal Panel (multiplex)	Campylobacter sp., C. difficile toxin A/B, Enteroaggregative E. col, E. coli O157, Plesiomonas shigelloides, Salmonella, Shigella,Shiga Toxin, Vibrio, Entamoeba histolytica, Astrovirus, Sapovirus.
Meningitis Panel (multiplex)	Escherichia coli K1, Haemophilus influenza, Listeria monocytogenes, Neisseria meningitides, Streptococcus agalactiae, Streptococcus pneumoniae, Cytomegalovirus, Enterovirus, Herpes simplex virus, Human parechovirus, Varicella zoster virus.
Respiratory Panel (multiplex)	Bordetella holmesii, Bordetella pertussis, Chlamydophila pneumoniae, Mycoplasma pneumoniae, Adenovirus, Coronavirus, Human Metapneumovirus (hMPV), Influenza A, Influenza B, Parainfluenza, Respiratory Syncytial Virus, RSV A, RSV B, Rhinovirus.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

** Please note that the CLS scheme is currently not included in our scope of accreditation.

Consumer Safety

Consumer Safety Scheme Selector

Scheme	Distribution per year	Test	Test Material Matrix*	Analyte Group*
PHARMASSURE Pharmaceutical	4	Chemical, Physical and Microbiological	Pharmaceutical products and standard solutions.	Basic and advanced chemical analysis, microbiological analysis and sterility testing.
COSMETICS Cosmetics & Toiletries	4	Chemical and Microbiological	Cream, lipstick, lipgloss, liquids, mouthwash, and toothpaste.	Chemical parameters of relevance to the cosmetics and toiletries testing industries. Microbiological tests including spoilage and indicator organisms.
TOYTEST Toy Safety	4	Chemical, Microbiological, Physical and Instrument Techniques	Toys, paper exercises, real materials and standard solutions.	Interpretation of toy safety standards, various physical measurements, azo-dyes, metals and phthalates.
NiMS Nickel Migration	2	Chemical and Physical	Alloy disks, jewellery or other appropriate articles.	Nickel release and surface area.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

PHARMASSURE
Pharmaceutical

The LGC PHARMASSURE proficiency testing scheme has been specifically designed to meet the needs of the pharmaceutical industry. The test materials are provided for chemical and microbiological analysis including sterility testing.

The regulations surrounding the manufacture of pharmaceutical products and laboratories testing them are wide ranging, and compliance with GMP/GLP requirements is aimed at ensuring the safety and efficacy of all pharmaceutical preparations.

Regular participation in a LGC Proficiency Testing scheme offers a truly independent assessment of measurement quality, which enables participants to compare their analytical capabilities with peers. Managers are able to monitor trends in their laboratory's performance over time and enhance the training of individuals as they participate in frequent assessment.

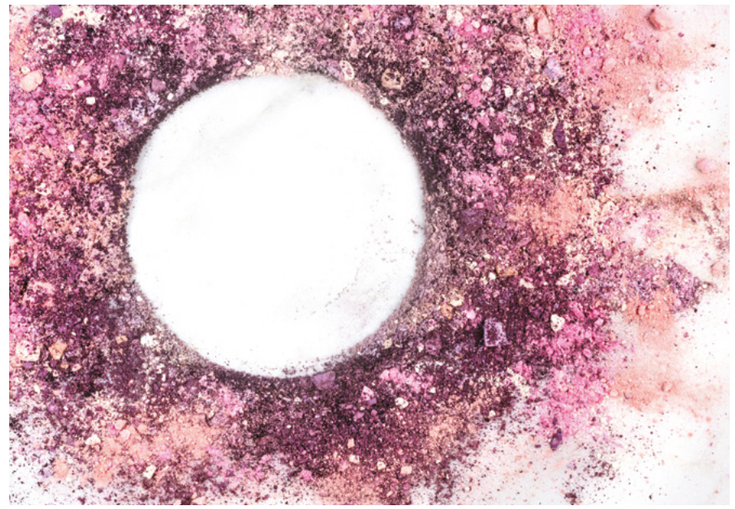
Successful participation in PHARMASSURE is recognised as a demonstration of laboratory quality and competency by a range of third parties, customers, regulators and accreditation bodies.

Chemistry*	Analyte*
Format depends upon test type (oil, powder, solution)	Acid/base titration, Density, Melting point, Other basic titration (actual analytes dependant on test), pH, Refractive index.
Format depends upon test type (powder, solution)	Advanced titration (potentiometric, non-aqueous), Flame spectroscopy, GC, IR/FTIR, LOD, Moisture by Karl Fischer, Polarimetry, TLC, UV, Viscosity, NMR spectroscopy and X-ray Powder Diffraction (XRPD).
Powder or solution	HPLC analysis.
Powder	Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Zinc.
Tablets	Dissolution, Physical measurements.
Solutions	Low level conductivity, Particulate determination.

Microbiology*	Analyte*
Lyophilised material (low-level for direct culture or filtration)	Enumeration and/or identification of a single microorganism.
Lyophilised material (Mixed microorganisms)	Enumeration of bile-tolerant Gram-negative bacteria, Candida albicans, Escherichia coli, Mould, Staphylococcus aureus, Total aerobic microbial count, Total bacterial count, Total yeast and mould, Yeast. Detection of bile-tolerant Gram-negative bacteria, Candida albicans, Escherichia coli, Pseudomonas aeruginosa, Staphylococcus aureus.
Lyophilised material (5 vials for sterility testing)	Sterility testing and identification of isolated microorganisms.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

COSMETICS
Cosmetics & Toiletries



The LGC COSMETICS proficiency testing scheme is intended for chemists and microbiologists performing product and ingredient testing in the beauty and personal care products industries.

Cosmetics have been in use for thousands of years, and the potential for harm to the wearer has been present ever since the use of toxic chemicals such as lead sulfite (galena) as an eye make-up by the ancient Egyptians.

Manufacturers have a duty to ensure that potentially harmful products are not placed on the market. Products must undergo chemical, microbiological and physical testing to ensure safety, quality and legislative requirements are met.

If a laboratory performs these analyses, participation in the LGC COSMETICS scheme can provide confidence that results are meaningful, accurate and will allow for comparison to peers.

Chemistry*	Analyte*
Lipstick, lip gloss and powder	Arsenic, Cadmium, Chromium, Lead, Mercury, Nickel.
Cream	Hydroquinone.
Liquid cosmetic	Density, pH, Viscosity.
Mouthwash, toothpaste	Antimony, Arsenic, Barium, Copper, Fluoride, Mercury, Selenium, Zinc.

Microbiology*	Analyte*
Cream liquid and powder	Enumeration and detection of aerobic mesophilic bacteria, Enterobacteriaceae, Pseudomonas aeruginosa, Staphylococcus aureus, Burkholderia capacia, Candida albicans, Escherichia coli, Yeast and mould (total count).

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

TOYTEST
Toy Safety

The LGC TOYTEST proficiency testing scheme is designed to work with the strict safety regulations that are in place to ensure that toys are appropriate for the target age group of children, and do not pose a hazard in use.

The scheme is intended to support laboratories testing to the key regulations in place in Europe and America, namely the EN71 standard in Europe and the ASTM F963 standard in America.

A combination of physical toys and product information is provided over the scheme year for assessment and testing according to the standards.

Additional materials are also provided for analyses ranging from solutions and paint flakes for heavy metals, materials for kinetic testing, flammability testing, and dye analysis.

Test Material*	Analyte*
Toy product	Paper exercise covering the scope of EN71-1 and ASTM F963 (Mechanical and physical testing).
Cords, plastic films, toys or toy components	Measurement testing according to EN71-1 and ASTM F963.
Toy product	Kinetic energy testing EN71-1 and ASTM F963, Acoustic testing EN71-1.
Magnetic toys or components	Flux testing EN71-1 and ASTM F963.
Sections of fabric or toy product	Flammability testing EN71-2.
Paint flakes, crayons, fabric or finger paint plus standard solutions	Migration of elements EN71-3.
Information and/or toy product for paper exercise	Activity toys EN71-8.
Toy or other electrical item	Electrical testing EN62115.
Section of fabric	Azo-dyes EN14362-1 and EN14362-3.
Dried paint flakes	Cadmium (total), Lead (total), Chromium (total).
Section of plastic plus standard solutions	Phthalates.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

NiMS
Nickel Migration

The LGC NiMS Proficiency Testing scheme is designed to assess the performance of laboratories undertaking the determination of nickel release from articles intended to come into direct and prolonged contact with the skin according to the European Regulation (EC) 1907/2006.

The release of nickel from jewellery products, in close contact or pierced through the skin is the most widespread cause of allergic contact dermatitis - which affects an estimated 10% to 20% of the population.

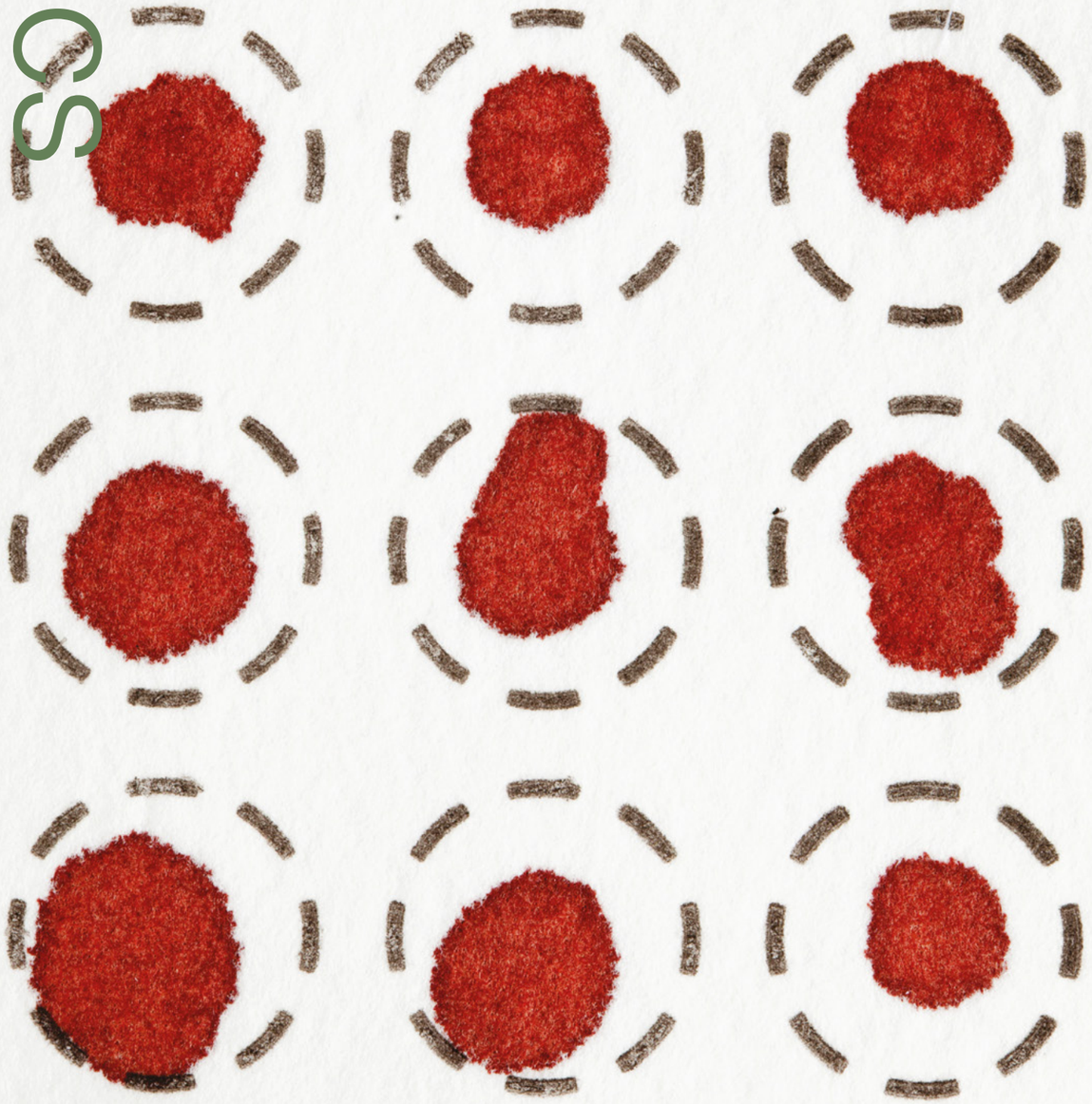
Many ordinary items such as buttons, coins, spectacle frames, watchstraps and zips may also contain nickel and as such is hard for sufferers to avoid.

The method for the determination of nickel release from such products is defined in European standard EN 1811 (2011). The article to be tested is suspended in an artificial sweat solution for a period of a week, after which time the concentration of dissolved nickel in the solution is determined by ICP-MS or a similarly accurate and precise technique.

Test Material*	Analyte*
Alloy disks, jewellery or other appropriate articles	Nickel release and surface area measurement.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

Forensics



Forensics Scheme Selector

Scheme	Distribution per year	Test	Test Material Matrix*	Analyte Group*
QUARTZ Forensic Blood Toxicology	4	Toxicology and Case Study	Blood and urine.	Alcohol Technical Defense case study.
FAE Forensic Analysis for Explosives	1	Chemical	Range of relevant materials.	Explosive, trace explosives and unknowns.
FIRMS Forensic Isotope Ratio Mass Spectrometry	2	Chemical	Range of products in sealed amber vials.	Variations in isotope ratios.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

QUARTZ
Forensic Blood Toxicology

The LGC QUARTZ scheme is aimed at laboratories undertaking forensic toxicology and coroners work. Test analytes and case scenarios included in the scheme are discussed regularly with the Advisory Group.

The scheme offers the choice of a number of test materials comprising blood and urine spiked with drugs and metabolites. Case scenarios provided for interpretation covered include sudden and suspicious deaths, drug facilitated sexual assaults (DFSA), impaired driving and other relevant cases.

There is an Alcohol Technical Defence (ATD) exercise that allows practitioners to demonstrate competency in performing these types of calculations.

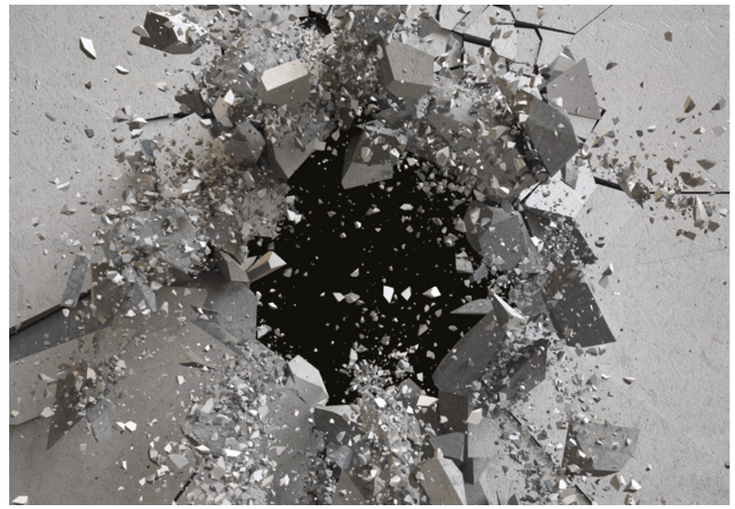
Participation in QUARTZ will provide independent performance assessment and confidence that results are meaningful and accurate. Consistent good performance will allow laboratories to demonstrate to third parties, customers, regulators and accreditation bodies the quality of their results.

The operation of our QUARTZ scheme is supported by an Advisory Group consisting of members of the professional bodies, scheme participants, and others experienced in the field.

Test Material*	Analyte*
Blood	Forensic drug identification, quantification and case study covering the following: Anaesthetics, Anticholinergics, Anticonvulsants, Antidepressants, Antihistamines, Antipsychotics, Barbiturates, Benzodiazepines, Cannabinoids, Carboxyhaemoglobin, Cardiovascular drugs, Erectile dysfunction, Hypnotic drugs, Non steroidal anti-Inflammatory analgesics, Opioid analgesics, Stimulants. Abuse and prescribed drug quantification of commonly encountered drugs (alternate rounds of drugs of abuse and prescription drugs). Alcohol in blood quantification of Ethanol and fluoride. Interpretation of a case study (with analytical data, and a scenario or witness statement) to determine the potential blood alcohol level in a given time (Alcohol Technical Defence). Quantification of up to 4 New Psychoactive Substances (NPS). Identification of one of the most common synthetic cannabinoids.
Urine	Identification of up to 4 drugs or metabolites relevant to forensic toxicology. Identification of Synthetic Cannabanoids. Identification of New Psychoactive Substances.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

FAE
Forensic Analysis for Explosives



The LGC Forensic Analysis for Explosives (FAE) scheme aims to provide information depicting realistic scenarios and test materials to allow participating laboratories to demonstrate the competent analysis of trace explosives and associated chemicals.

The European Network of Forensic Science Institute (ENFSI) Working Group on Explosives provides technical advice to LGC Proficiency Testing on the organisation of this scheme.

Forensic examination for explosives may include the analysis of raw materials found at a scene, the identification of potentially explosive substances and the forensic identification of post-blast explosive residues.

Participation in FAE will allow laboratories to monitor performance and compare it with that of peers against the international standards ISO/IEC 17025 and ISO/IEC 17020.

Test Material*	Analyte*
Range of relevant test materials	Explosives, trace explosives and unknowns.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

FIRMS

Forensic Isotope Ratio Mass Spectrometry

Isotope Ratio Mass Spectrometry (IRMS) is a specialised technique that precisely measures small differences in the abundances of isotopes such as 2H/1H, 13C/12C, 15N/14N and 18O/16O. Subtle variations to the ‘natural’ abundance of these isotopes may be introduced during biological, chemical and physical processes.

These changes enable the differentiation of materials that otherwise may not be separated such that IRMS is used in many fields, such as archeology, medicine, geology, food authenticity and forensics.

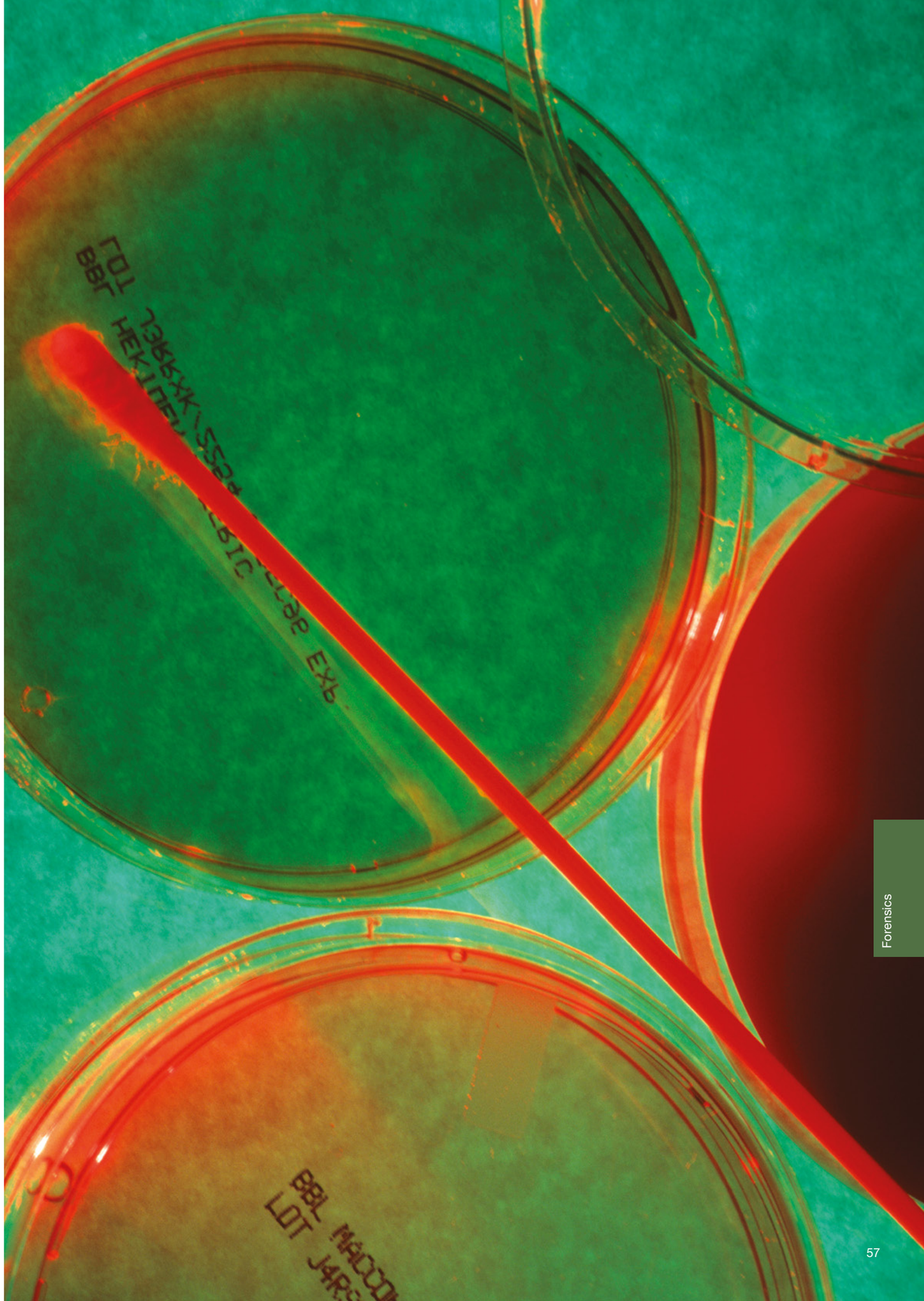
Participation in the LGC FIRMS scheme will help laboratories demonstrate competence in this analytical technique. The scheme is operated by LGC Proficiency Testing and is supported by the FIRMS Network which provides input for the choice of test materials and scheme performance.

Test Material*	Analyte*
Range of products in sealed amber vials	Variations in isotope ratios.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

LGC is the accredited provider of the PT scheme.

FIRMS



Petroleum
Scheme Selector

Scheme	Distribution per year	Test	Test Material Matrix*	Analyte Group*
OIL** Oils & Fuels	3	Chemical and Physical	Oils & Fuels.	Various chemical and physical as per ASTM, IP and ISO protocols.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

** Please note that the OIL scheme is currently not included in our scope of accreditation.

OIL**
Oils and Fuels

The LGC OIL scheme is designed specifically to assist chemists and engineers working in the refinery, fuel, used oil and lubricant laboratories.

Petroleum products, such as oils and fuels, are tested throughout their life span from the time the oil is taken from the ground to beyond the petroleum recyclers. The concentration of contaminants and trace elements is vital in ensuring the quality of oil and petroleum products.

Regulations related to cleanliness standards in engines, contamination particles and water in diesel fuel, and many more, mean it is essential that laboratories performing these measurements are capable of producing accurate data.

If a laboratory is performing the analysis of oils and fuels according to ASTM, IP and ISO protocols, participating in the LGC OIL proficiency testing scheme will enable it to monitor performance and compare it with that of other laboratories worldwide. Consistent good performance will allow laboratories to demonstrate to third parties, customers, regulators and accreditation bodies the quality of their results.

Test Material*	Analyte*
#2 Diesel fuel	Acid number, Ash, Base number, BP distribution, Carbon, Carbon residue, Cloud point, Cold filter plugging point, Colour, Copper corrosion, Density, Distillation, Flash point, Heat content, High temp stability, Hydrocarbon type(s), Hydrogen, Lubricity (HFRR) wear scar diameter, Nitrogen, Particulate contamination by filtration, Pour point, Sediment, Sulfur content, Viscosity, Water.
Crude oil	Acid number (total - potentiometric), API gravity, Asphaltenes, Density, HTSD, Iron, Micro carbon residue, Nickel, Nitrogen (total), Pour point, Reid vapour pressure, Relative density, Salt, Sediment, Sulfur, Vanadium, Viscosity, Water.
Engine oil lubricants	Acid number (potentiometric), Ash, Ash sulfated, Barium, Base number, Calcium, Colour, Demulsibility, Density, Evaporation loss (Noack), Flash point, Gelation, Magnesium, Molybdenum, Nitrogen, Phosphorous, Potassium, Pour point, Saponification number, Shear stability, Silicon, Sodium, Sulfur content, Viscosity (HTHS, kinematic, low temperature, tapered bearing, tapered plug), Volatility (GC), Water, Water content, Zinc.
Simulated in service engine oil	Acid number, Aluminium, Antimony, Barium , Base number, Boron, Cadmium, Calcium, Chromium, Copper, Flash point, FTIR (Fuel dilution, Glycol, Nitration, Oxidation, Phosphate, Sulfation, Water), Fuel dilution Glycol, Insoluble, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Particle count, Phosphorous, Potassium, Silicon, Silver, Sodium, Sulphur content, Tin, Titanium, Vanadium, Viscosity, Water content, Zinc.

* The full range and availability of test materials and analytes is determined on an annual basis and may be added or removed. For accredited and non-accredited status please see current application form/scheme description.

** Please note that the OIL scheme is currently not included in our scope of accreditation.

About Proficiency Testing

What is Proficiency Testing?

Proficiency Testing (PT) provides a regular independent assessment of the the technical performance of a laboratory to assure the validity of measurements and tests, which should form part of an overall quality strategy. PT is often referred to as external quality assessment (EQA), especially in the medical/ clinical arena.

The practice of testing unknown test materials from an outside source provides an additional, independent, means to assure the quality of laboratory test results.

One of the most common designs for a PT scheme is for the Proficiency Testing provider to designate specific dates throughout the year when it will send test materials to all participants at the same time.

The test materials, whose expected values are unknown to the subscribers, are analysed by the laboratory staff who return their results to the Proficiency Testing provider.

The results are reviewed (using statistical techniques described in ISO 13528) to determine acceptable performance levels, and an evaluation is issued to each participant.

The evaluation and accompanying statistical data not only capture the laboratory's current performance, but over time allow the quality team to analyse trends and improve the laboratory's long term performance.

Proficiency Testing is a key element in the laboratory accreditation process, alongside reference materials, enabling laboratories to monitor the quality of their analytical results as stipulated in ISO/IEC 17025 and ISO 15189.

Why enrol in a Proficiency Testing scheme?

- Compare your laboratory's results to those of others performing the same test or measurement.
- Demonstrate and identify performance trends.
- Monitor test performance across all of your organisation's laboratories.
- Complement internal check sample programs.
- Demonstrate competency to customers, accreditation bodies and other regulatory bodies.
- Fulfil accreditation requirements.
- Verify methods and instrumentation.
- Manage risk through early warning of potential problems.
- Educate and train staff.
- Check the reasonableness of the laboratory's estimated measurement uncertainty.

About LGC Proficiency Testing

Which international standards are relevant to LGC PT schemes?

In terms of stipulating the use of Proficiency Testing, the main standards are ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories; and the clinical standard ISO 15189 - Medical laboratories – requirements for quality and competence. All our PT schemes are operated in accordance with the international standard ISO/IEC 17043. The statistical analysis undertaken is in accordance with the international standard ISO 13528. LGC is accredited by the United Kingdom Accreditation Service (UKAS) for the provision of proficiency testing schemes against ISO/IEC 17043; a copy of our current scope of accreditation which lists the accredited schemes is available on our website: **lgcstandards.com**

How are your PT schemes organised?

The day-to-day operation of each PT scheme is the responsibility of LGC. Individual schemes are managed by a team of Scheme Coordinators, to cover reporting, customer service and technical functions. For some schemes, external advisors may also be used to provide the full range of relevant knowledge and expertise needed to operate the scheme effectively. A small number of schemes are run in collaboration with other organisations.

Do you use Advisors and Advisory Groups?

Yes, depending upon the PT scheme in question. Advisors are selected on the basis of their technical knowledge and experience of the industry to which the scheme is related. Advisors may be used on an ad-hoc basis and contacted when specific issues need to be addressed.

Alternatively, formal Advisory Groups may be used. Advisory Groups consist of members who may or may not be participants on the scheme but who are experienced in the field of testing covered by the PT scheme.

The composition and terms of reference of each Advisory Group will be agreed on a scheme-by-scheme basis.

Do you run PT schemes that are jointly managed?

Yes, some PT schemes are operated jointly with a partner organisation. Where schemes are operated jointly, a Management Committee may be set up to address operational issues for the scheme.

What are the fees for participation?

Fees for participation are reviewed annually and the current fees for each PT scheme are available on application. Payment terms are detailed on the application form and invoice. Participants are advised that delays with payments may result in test materials and/or reports being withheld until payments are made.

Where do you source your PT test materials?

The vast majority of test materials are manufactured by LGC Standards. Where this is not possible, test materials are carefully sourced to meet the needs of participants. Wherever practical, test materials will be as similar as possible to those samples routinely tested by participating laboratories. However, in some cases, in order to achieve the required degree of homogeneity and stability, test materials may be in the form of simulated matrices or concentrated spiking solutions.

The analyte concentration range of test materials will usually be varied from round to round in order to be realistic and challenging. Details of individual test material types are available in the relevant scheme description.

How is PT test material stability affected by time, distance and temperature?

The test materials are all stable at the stated storage temperatures for at least the period of the PT scheme round. Studies have shown there is no significant difference between results of test materials tested the day after despatch and those tested on the deadline date. There is also no evidence that results are influenced by different climatic conditions of participating countries.

Distance travelled does not affect test material results. We have undertaken studies on a number of our PT test materials comparing the average result according to distance travelled, and no correlations have been found. Stability consideration is an important part of the design and feasibility process for a PT scheme, where transport conditions such as temperature, humidity, pressure, exposure to x-rays etc are taken into account.

About the LGC Proficiency Testing process

How do I join a PT scheme?

Participants are advised to take part in the PT scheme(s) that are most fitting to their own area of testing. Where necessary, appropriate staff at LGC Standards can advise on which scheme is most suitable for participants.

For each scheme, a scheme description and application form will be available, containing information about the test materials included in the scheme, and the intended distribution dates. This information is available on our website:

Participants are invited to place orders via our webshop at **lgcstandards.com/pt** by selecting which test materials they wish to receive in the PT scheme year. Alternatively, it is possible to complete an application form.

Once a completed webshop order or application form is received, an order confirmation will be sent to the participant, confirming the test materials selected and distribution date.

How often do I need to participate?

The frequency that a laboratory needs to participate in Proficiency Testing depends on a wide range of factors specific to each individual laboratory, such as other quality tools used, the volume of work undertaken and the risk associated to the measurements. Therefore every individual laboratory may have a different need, which is why PT schemes provided by LGC Standards offer flexible participation, although some do have a minimum participation level. Third parties, such as regulatory bodies, may recommend minimum levels of participation. To gain the benefit from trend analysis, participation in a minimum of four rounds over a scheme year is normally recommended.

How are PT test materials packaged and transported?

Test materials are packaged appropriately to protect the contents during transit. The majority of test materials are sent using priority courier. Overseas customers must provide relevant documents to prevent delay in customs such as import permits and may be required to pay import duties locally.

Once packages have been delivered, LGC Standards cannot be held responsible if they subsequently fail to reach the correct personnel or are not stored under the recommended conditions.

Participants are asked to check the contents of packages immediately on receipt and to contact LGC Standards if there are any problems with the condition of the test materials or accompanying documentation.

How do I treat my PT test material?

It is important for laboratories to understand how to get the optimum benefit from PT participation. To do this, a laboratory must participate in an open and honest fashion, being prepared to, on occasion, be evaluated as unsatisfactory. If PT is to achieve its aims, laboratories need to treat the test materials the same as routine test materials, and staff must be encouraged to treat them appropriately and learn from their results in a constructive manner.

Do I have to use specific methods to analyse the PT test materials?

Unless otherwise instructed, participants should analyse the test materials using any method that they feel is appropriate. Participants are asked to treat the test material in the same way as a routine sample.

Participants may be asked to state their method when reporting results. It is important that this information is accurate as results are analysed and reported according to the method stated.

Do I have to report my results within a specific timescale?

Deadlines are specified for the return of results, to ensure the timely issue of assigned values and reports to participants. For each PT scheme a closure date will therefore be specified. For certain tests there may also be a date specified by which examination of the test material is recommended to have been commenced. This is to ensure that sufficient time is available to complete the test and report results in time for the deadline date.

About LGC Proficiency Testing schemes

How should I report my results using PORTAL?

For the majority of PT schemes, results are returned through our bespoke electronic reporting software, PORTAL. Once you are ready to report your results, please go to: **portal.lgcstandards.com** You will need to log in using your lab ID, username and password. We advise that prior to using PORTAL you read the user guide which is available at: **portal.lgcstandards.com** select 'help' from the menu.

If you require further assistance please contact our support team:

Tel: +44 (0)161 762 2500
Email: ptsupport@lgcgroup.com
or your local LGC Standards office.

For some schemes (or parts of a scheme) alternative reporting mechanisms are provided, details of which will be emailed to participants prior to test materials receipt.

It is recommended that results and calculations are checked thoroughly before reporting. Results should be reported clearly, in the format and units detailed in the scheme description. If calculations are used, unless instructed otherwise, the laboratory is to report only the final calculated result.

In general, results of zero should not be reported; results should be reported depending upon the detection limit of the method used, for example, <10. The exception is a small number of parameters, where it may be appropriate to report a result of zero, depending on the measurement scale being used. Results of zero and truncated results, such as < or > cannot often be included in the data analysis and therefore allocated a performance score.

Results will be rounded up or down to the number of reporting decimal places stipulated in the scheme description and may not therefore be identical to your original reported result. The effects of rounding may also mean that occasionally percentage totals do not add up exactly to 100%.

Part of the challenge of Proficiency Testing is the ability to perform calculations and transcribe results correctly. The proficiency testing team cannot interpret or calculate results on participants' behalf. Once submitted and received, results cannot be amended and no changes can be made after the report has been issued. However, if you notice an error in your result before the reporting deadline, this can be corrected using PORTAL until the round closes.

How many results may I submit?

Although it is desirable for participants to submit multiple results in order to compare results between different analysts, methods or instruments, a single laboratory reporting a large number of results could potentially bias the dataset. In order to minimise the effects of bias, LGC Standards therefore limits the number of results participants are able to report. Each participant is able to enter up to 13 different results. Of these results a maximum of 3 results can be 'nominated'. Nominated results are included in the statistical analysis of the dataset whilst non-nominated results are not, however all results will receive z performance scores and assessments as appropriate.

Nominated results must be obtained using different methods, again to minimise the effects of bias.

Further information is available in the **PORTAL User Guide** and the **PORTAL Nominated Results FAQ**, both of these documents are available for download from the PORTAL website and further information is available from **ptsupport@lgcgroup.com**

Can my results be included in the report if I've missed the deadline for reporting?

Participants are asked to return results by the given deadline in order to ensure that their results are included in the statistical analysis and the scheme report. Results received after the closure date will not be included in the report.

For PT schemes where a generic report is issued, this is available to all participants subscribing to the round regardless of whether their results were submitted or not.

Are microbiology results obtained from MPN methods comparable to those obtained using plate count methods?

MPN and plate counts are both estimates of the number of microbial cells in the original test material and therefore provided all dilutions and calculations have been performed correctly, results should be comparable.

For QWAS and QMS, comparing MPN results against results obtained from all other methods show no significant differences.

About reporting and evaluating results

How is the assigned value established?

ISO 13528: 'Statistical Methods for use in Proficiency Testing by Interlaboratory Comparisons' sets out how the assigned value and performance assessment criteria can be established and describes the options for the various performance scoring systems.

The assigned value is the value selected as being the best estimate of the 'true value' for the parameter under test. The method used to determine the assigned value may vary depending upon the particular PT scheme and test material and is detailed in the relevant scheme description.

For quantitative tests, where it is appropriate, practicable and technically feasible, the assigned value will be derived through formulation (or occasionally through the use of a certified reference material) to provide metrological traceability; the associated uncertainty of the value can therefore be estimated. However, in many cases the use of a consensus value is the only practicable and technically feasible approach to use. When the assigned value is determined from the consensus value of participant results, or from expert laboratories, robust statistical methods are used for calculation of the consensus value, the estimated standard uncertainty and the robust standard deviation.

For qualitative tests, participant results are compared against the intended result (assigned value) based on formulation or expert assessment.

For interpretive schemes where the result is subjective rather than quantifiable, a model answer produced by appropriate experts will be published in the report.

For microbiology test materials, all participant results are transformed by converting them to log10 before the statistical analysis is undertaken.

How do I evaluate measurement uncertainty?

The aim when evaluating measurement uncertainty is to combine the effects of all the errors that will influence the measurement result, into a single value. There are many different guides available which provide advice on evaluating measurement uncertainty.

There are two specific guides that are internationally recognised:

- ISO (BIPM, IEC, IFCC, IUPAC, IUPAP and OIML) 'Guide to the Expression of Uncertainty in Measurement'

- EURACHEM/CITAC Guide 'Quantifying Uncertainty in Analytical Measurement' (available at: www.eurachem.org).

Further information on approaches to evaluating measurement uncertainty may also be available from your national accreditation body.

Can I use PT data to estimate my measurement uncertainty?

It is possible, but must be regarded as a very rough estimate, and is not an approach addressed in many guides to evaluating measurement uncertainty. However documents that do address the use of PT data are:

- EURACHEM/CITAC Guide 'Quantifying Uncertainty in Analytical Measurement' (available at www.eurachem.org)

- NORDTEST Report TR 537 'Handbook for Calculation of Measurement Uncertainty in Environmental Laboratories'

- ISO/TS 19036 'Microbiology of Food and Animal Feeding Stuffs - Guidelines for the Estimation of Measurement Uncertainty for Quantitative Determinations'.

What is the Standard Deviation for Proficiency Assessment (SDPA)?

The SDPA expresses the acceptable difference between the laboratory result and the assigned value. An acceptable z performance score represents a result that does not deviate from the assigned value by more than twice the SDPA. The method used to determine the SDPA may vary depending upon the particular PT scheme and test material and is detailed in the relevant scheme description.

A fit for purpose value for SDPA, rather than being derived from participant results, is preferable as this enables z scores to be compared from round to round to demonstrate general trends.

For each scheme, the value of SDPA and the method used to derive it is reported in the scheme description and/or report.

What standard deviation for proficiency assessment (SDPA) is used in microbiology PT schemes?

There are many sources of variation in microbiological testing and the SDPA used to assess performance therefore needs to be fit-for-purpose and take all possible sources of variation into account. From experience and historical data, LGC PT uses a fixed SDPA value of 0.35 log10 for the majority of microbiological tests.

How do I report a 'presumptive' result in microbiology?

Report your result as usual but record in the comments section that the result is 'Presumptive'.

What is the purpose of scoring my result?

Once the assigned value for the parameters under test has been established, participant laboratories are assessed on the difference between their result and the assigned value, with this difference being represented by a performance score called a z score. This provides a simple and consistent measure of performance which is the key to monitoring competence and implementing an improvement programme as required.

How is a z score calculated?

The participant's result, x, is converted into a performance score (z score) using the following formula:

$$z = \frac{(x - X)}{SDPA}$$

Where: X = the assigned value

SDPA = Standard Deviation for Proficiency Assessment

For small data sets, there will be increased uncertainty around the assigned value if derived from a consensus value from participants' results. In such cases, performance scores may not be provided, or may be given for information only.

The z score expresses performance in relation to the assigned value and the standard deviation for proficiency assessment (SDPA). A z score of 2 represents a result that is a distance of 2 x SDPA from the assigned value.

How do I interpret my results?

For quantitative examinations, participant performance is assessed using the z score, and the following interpretation is given to results:

$\|z\| \leq 2.00$	Satisfactory result
$2.00 < \|z\| < 3.00$	Questionable result
$\|z\| \geq 3.00$	Unsatisfactory result

For qualitative examinations or semi-qualitative results, laboratories reporting the assigned result or range of results will be considered correct, and therefore have satisfactory performance.

What are the advantages of using a z score to assess performance?

- Results can be expressed in a form that is easy to interpret and understand.
- Results can be summarised in graphical or tabular form to depict overall performance.
- A z score allows participants to directly compare their own result with others.
- If consistent statistical values are applied, a z score enables participants to monitor and trend their own performance over time.

It is important to interpret any performance score in the full context of the overall results and in the context of a laboratory's own quality control measures.

What is the estimated uncertainty of the assigned value?

The assigned value has a standard uncertainty (ux) that depends upon the method used to derive the assigned value. When the assigned value is determined by the consensus of participants' results, the estimated standard uncertainty of the assigned value can be calculated by:

ux = 1.25 x Robust standard deviation/$\sqrt{n}$

Where n = number of results

When the assigned value is determined by formulation, the standard uncertainty is estimated by the combination of uncertainties of all sources of error, such as gravimetric and volumetric measurements.

If ux is ≤ 0.3 x SDPA, then the uncertainty of the assigned value can be considered negligible and need not be considered in the interpretation of results.

If ux is > 0.3 x SDPA, then the uncertainty of the assigned value is not negligible in relation to the SDPA and so z' (z-prime) performance scores, which take into account the standard uncertainty of the assigned value in their calculation, will be reported in place of z scores.

How is a z' (z-prime) score calculated?

A z' score incorporates the standard uncertainty of the assigned value and is calculated as follows:

$$z' = \frac{(x - X)}{\sqrt{SDPA2 + ux2}}$$

Where x = participant result

X = the assigned value

SDPA = Standard Deviation for Proficiency Assessment

ux = standard uncertainty of the assigned value X

A z' score is interpreted in exactly the same way as a z score, ≤2 is satisfactory, >2 but <3 is questionable and ≥3 is unsatisfactory.

Do you include outlying results due to 'errors and blunders' in the statistical analysis of the data?

Although robust estimators are used in order to minimise the influence of outlying results, extreme results or results that are identifiably invalid should not be included in the statistical analysis of the data. For example, these may be results caused by calculation errors or the use of incorrect units. However, such results can be difficult to identify by the PT organiser. For this reason, the robust mean and standard deviation will be calculated in the usual way, but those results that are out of the range of the assigned value ± 5 x SDPA will be excluded and the robust mean and standard deviation will then be recalculated. These recalculated values will be used for the statistical analysis. By removing these 'blunders' from the dataset any influence on the summary statistics is minimised. All results, including excluded results, will be given performance scores.

How can I graphically plot and analyse trends for qualitative results?

Qualitative results are difficult to depict graphically as they are not normally allocated a performance score. However for qualitative results, a correct result could be allocated a performance score of 0 to represent a satisfactory result. A false positive result can be represented by a performance score of + 3, whilst a false negative result can be represented by a performance score of - 3. If plotted graphically over time, this should give a clear visual indicator of performance in qualitative tests.

How will I receive my report?

Following statistical evaluation of the results, the reports will generally be available on the website within 4 to 10 working days of round closure (see specific scheme description). We aim to provide 95% of our reports to participants within 5 working days. Participants will be emailed when the report is available. The content of reports vary from scheme to scheme but include details of the composition of test materials, the assigned values, and tabular and / or graphical representations of participants' results.

About reporting and evaluating results

How do I assess the reproducibility standard deviation from the PT report?

The robust standard deviation provided in the PT report for a specific method can be taken as an estimate of the reproducibility standard deviation for the PT round for that specific method.

Can I have a report that only includes my group laboratories?

Yes, we can produce reports tailored to a customer's specific requirement. There may be an additional charge for administration and computer programming costs.

My results have not been included in the report. Can I calculate my performance score (z or z' score)?

To calculate your performance score please visit: **portal.lgcstandards.com** Select 'submit results' from the menu.

About privacy and confidentiality

Can you guarantee my laboratory's confidentiality?

In order to ensure confidentiality, participants in all PT schemes are allocated a unique laboratory reference number. This number enables results to be reported without divulging the identities of participant laboratories. Only staff within the proficiency testing team and the laboratory itself will know this number.

How do you prevent collusion and falsification of results?

It defeats the objective of taking part in proficiency testing if participants are not returning genuine results. Certain measures are built into the PT schemes to try and prevent collusion but, ultimately the responsibility rests with each participating laboratory to behave in a professional manner.

About driving quality together

What could be the cause of my poor performance?

A single poor result is not indicative of overall laboratory performance but neither is a single good result. Ideally, PT results should be monitored over time to detect potential bias or repeated unsatisfactory results. There are many possible reasons for a single poor result. It is therefore important to interpret the results from PT schemes within the context of an all-round quality assurance programme, including internal quality control, use of validated methods and reference materials. There are numerous potential causes of poor performance in a PT scheme which may include analytical and non-analytical errors.

Analytical errors

- Calibration / instrument problems
- Extraction / clean-up
- Interferences / matrix effects
- Diagnostic kits / reagents
- Analyst / method performance

Non-analytical errors

- Calculation / transcription
- Reporting format / units
- Poor / incorrect storage
- Test material defects

Test materials are subjected to rigorous quality control testing before being distributed to participants, and are unlikely to be the cause of a poor performance score. All possible reasons for a poor performance should be investigated fully in order to identify the most likely cause and to enable action to be taken to prevent recurrence. Repeat test materials are available after every distribution, but it is most important to investigate and understand the reason(s) for the failure, document this fully, and carry out corrective actions before repeating a test.

How can I measure my laboratory's performance over time?

You can do this by trend analysis. A single result simply reflects the performance of the laboratory on the particular day that the test was carried out and therefore gives limited information. Frequent participation in PT schemes over time can give greater insight into long-term performance and can help identify where internal bias may be occurring.

One of the best methods of summarising performance scores over time is graphically as this gives a clear overview and is less prone to misinterpretation than numerical methods. Participants are therefore advised to monitor their PT results over time.

An online trend analysis tool is included in the cost of your PT participation with LGC. The online tool is built into the PORTAL reporting system and allows you to quickly plot your results over a range of rounds and easily download the charts for further circulation.

More information regarding interpretation and trend analysis of proficiency testing results is given in the Eurachem guide on 'Selection, Use and Interpretation of Proficiency Testing (PT) schemes (available at www.eurachem.org), IUPAC 'International Harmonised Protocol for the Proficiency Testing of Analytical Chemistry Laboratories', 2006 and ISO 13528.

How can I receive advice and feedback?

Communication with participants will be carried out through PT scheme-related documentation, emails, letters, or through local LGC Standards offices. Open meetings may also be organised and all interested parties invited to attend.

How can I send feedback?

Comments on any aspect of our products and services are welcome either by phone, fax, letter, email or by contacting your local LGC Standards office.

Can I suggest a PT scheme or test material?

We welcome suggestions any time. Please complete the 'Wish list' form on our website: **lgcstandards.com/pt**

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