

Proficiency Testing Schemes

ielab's PROGRAMME 2022

Issue June 10th, 2022



Accredited Provider by ENAC
according to ISO/IEC 17043.

Check the accredited offer inside.





INDEX

ielab: committed with Quality Control	4
Objectives of Proficiency Testing Schemes	5
Who should participate in the Proficiency Testing Schemes?	6
Benefits of Participating in Proficiency Testing Schemes	7
Why choose ielab as your Proficiency Test Provider?	8
Who participates in ielab 's Proficiency Tests?	9
International Presence	9
Main features of ielab 's Proficiency Testing Schemes	10
Information management system	11
How to participate in ielab 's Proficiency Tests?	13
ielab Proficiency Testing Schemes: 2022 Programme	14
POTABLE WATER	15
CONTINENTAL WATER	18
WASTE WATER	20
SEA WATER	23
ATMOSPHERIC POLLUTION	24
SOLIDS	25
LEGIONELLA	28
BACTERIOPHAGES	30
BOTTLED WATER	31
SWIMMING POOL WATER	32
SARS-CoV-2	33
<i>IN SITU</i> ANALYSIS	34
SAMPLING	35
ielab Proficiency Testing Schemes: 2022 Schedule	36
Frequently Asked Questions (FAQs)	37
Parameters Index	41

ielab: committed with Quality Control

ielab is an international company dedicated to provide products and services for the implementation of quality in testing laboratories.

Taking the Quality as the main reference, together with the independence and the response to the technological needs that have arisen in the course of our work, we have been adapting our resources and expanding our services. Our commitment to quality and efficiency are demonstrated by the certification of all our activities in accordance with ISO 9001, our accreditation in accordance with ISO / IEC 17043 as a Proficiency Testing Schemes provider and our accreditation under ISO 17034 standard as a Reference Material Producer.

ielab's international Proficiency Testing Schemes are a prestigious instrument to evaluate, compare and improve the quality of the results of environmental testing laboratories, with more than 1,575 participants distributed worldwide. Besides the Proficiency Tests presented in this catalogue, **ielab** manufactures and commercializes microbiological and physical-chemical reference materials, and has comprehensive solutions for qPCR molecular diagnostic. **ielab** also offers tailored services

to accomplish to the customer's needs and technical advice that facilitate quality control tasks in the laboratory.

By the end of 2019, ENAC signed an international agreement with the International Laboratory Accreditation Cooperation (ILAC) for the acknowledgement of the activity of providers of Proficiency Tests. This agreement represents the recognition of **ielab** as a provider of internationally accredited Proficiency Testing Schemes in more than 30 new countries, in addition to the 16 countries with which it already had prior recognition with the European Accreditation (EA) body. With the inclusion of these markets it is achieved that, immediately and easily, **ielab's** clients benefit from internationally accredited Proficiency Testing Schemes, providing them with the necessary confidence in the veracity and technical solvency in the execution of this service.

Willing to provide a cutting-edge service, in May 2021 **ielab** became the first Accredited Provider of Proficiency Testing Scheme for SARS-CoV-2 in Spain. This extension of the scope of accreditation represents a very important achievement and a further contribution by **ielab** to the development of laboratory work.



Objectives of Proficiency Testing Schemes

Proficiency Testing Schemes consist in the organization, development and evaluation of tests (of the same item or similar items) by several laboratories, according to predefined conditions.

Proficiency Testing Schemes (also known as “Intercomparisons”) are organized at all levels of science, but the objectives, protocols and participants may vary. In certification assays, measurements are used to assign values to reference materials and evaluate their validity for their use in specific test procedures. Validation studies of methods (collaborative trials) are used for the characterization of methods. If the aim is to use intercomparisons to assess the effectiveness of a laboratory for testing or measuring, it is called a proficiency test (PT).

Proficiency Testing Schemes are a tool available for laboratories who want to improve the quality of their services, by influencing the basic aspects of their technical performance and providing an independent assessment of laboratory data, compared with reference values or with the performance of similar laboratories. They also

allow to test the performance in new tests or measurements, in those that are carried out with low regularity and to compare the results obtained using different methods (or different concentration levels, etc.), thus helping to select the methodology that best suits to its characteristics and the needs of its customers.

The fact of choosing an accredited supplier assures the participant laboratory that the entire PT scheme management process (preparation of the items, assurance of the homogeneity and stability of the samples, exploitation and interpretation of the results and publication of the report) has been carried out with the required level of technical competence. In this sense, accredited Proficiency Testing Schemes greatly facilitate the work of laboratories, since they do not have to evaluate their suppliers because they can rely on the external and independent evaluation carried out by the accreditation bodies. This evaluation allows to demonstrate the maintenance of technical competence and the validity of the laboratory results to clients and public bodies.

Who should participate in Proficiency Testing Schemes?

ISO 17025 states: “The laboratory shall have procedures for quality control for monitoring the validity of tests and calibrations performed” and includes participation in intercomparison programs between the basic tools for quality assurance, so participation in intercomparison programs is essential for all accredited laboratory according to the standard. Confidence that a testing laboratory produces consistently reliable results is essential for users of its services. Therefore accreditation authorities expect from accredited laboratories regular and successful participation in intercomparison programs.

In addition, any laboratory that needs to demonstrate the quality of its analytical results in an independent way should participate in Proficiency Testing Schemes, since the quality of the analytical results is directly linked to the quality of service / product, to the market credibility and brand image.



The selection of a PT Scheme is critical to ensure that the participant obtains the most benefit from participating; therefore the selection process of an appropriate PT is important. It is therefore essential that the participant evaluates the competence of the PT provider. A PT provider that operates according to ISO/IEC 17043 can be considered as competent.

EURACHEM, Selection, Use and Interpretation of Proficiency Testing (PT) Schemes, Second Edition 2011

Benefits of participating in Proficiency Testing Schemes

Participation in Proficiency Testing Schemes is an essential tool to demonstrate the technical competence of the laboratory and it allows to:

- Compare own results with those obtained by other laboratories.
- Confirm the correct initial validation of a method.
- Use the data obtained from participation in Proficiency Testing Schemes for validation of measurement methods.
- Determine systematic errors.
- Improve the test method used.
- Learn from the methods used by other laboratories.
- Monitor the accuracy and precision of the method.
- Encourage collaboration between laboratories.
- Demonstrate technical competence against third parties.



Why choose ielab as your Proficiency Test Provider?

- Applied statistical studies have high significance, since the number of participants is high, with more than 1,575 participants from 75 countries.
- As a provider accredited by ENAC according to ISO/IEC 17043, compliance with the requirements of this Standards is objectively demonstrated assuring a quality guarantee.
- Great diversity of environmental Proficiency Tests with a large number of rounds for different matrices, including more than 320 parameters.
- Speed in getting results. Publication of detailed round reports. Specific management softwares.
- Specialized technical support and extensive experience in quality control and in the organization of Proficiency Testing Schemes.
- Service capacity and continuous improvement, adapting our offer to the needs of the participants, including new tools and systems that improve and upgrade the services offered.
- Free attendance at webinars organized by **ielab** on topics of interest.
- The large number and diversity of participants, both regarding the types of laboratories and their countries of origin, increases the robustness of the schemes, thanks to the different methodologies and techniques employed, which allows to make intercomparison studies between in the round reports.
- Annual sharing of the development of the most relevant rounds and display of main topics of interest.
- Free downloading through the website of the certificates of participation for each round.



National and International Presence

ielab has a national and international presence, and is committed to a model of marketing of their products based on proximity to clients for customized assistance. He has broad experience in the sector and extensive knowledge of the laboratories' needs. In addition, it has the collaboration of a network of distributors specialized in providing solutions in the Environmental field.

ielab currently offers 22 proficiency testing schemes distributed in 46 different rounds that include a total of 320 parameters for study.

In our website www.ielab.es you will be able to find further information.

Who participates in ielab's Proficiency Tests?

ielab counts with the participation in its rounds of clients from different sectors: independent public and private laboratories and inspection bodies, laboratories of agri-food, pharmaceutical, cosmetic, chemical, petrochemical industries, drinking water suppliers, wastewater treatment stations, maintenance and disinfection of facilities. Our participants also include research centres, universities, health agencies and authorities, city councils and regulatory bodies.



Main features of ielab Proficiency Testing Schemes

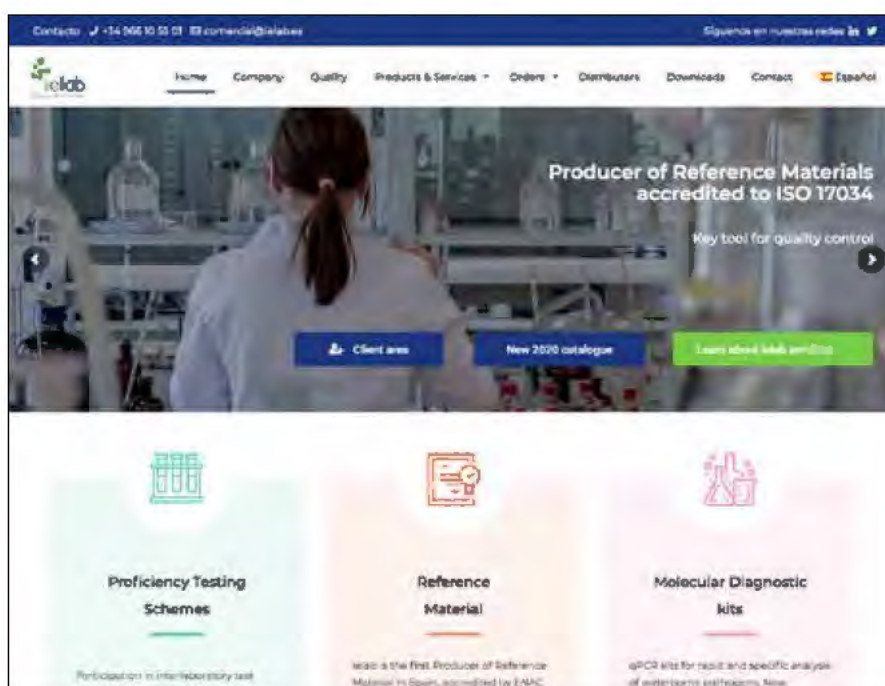


Information management system

ielab has several systems for information management, including:

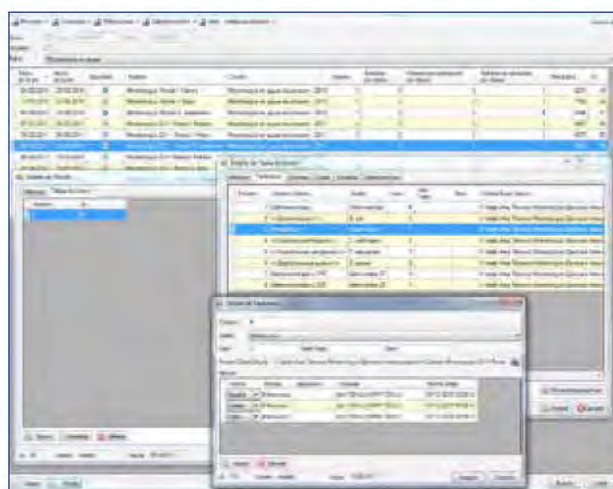
WEBSITE / www.ielab.es

With an innovative design and easy application from where you can make offers / budgets, register, access technical documents, send results, download round reports, as well as certificates of participation, download the raw data of the results in Excel format, personal data management and participation code, etc.



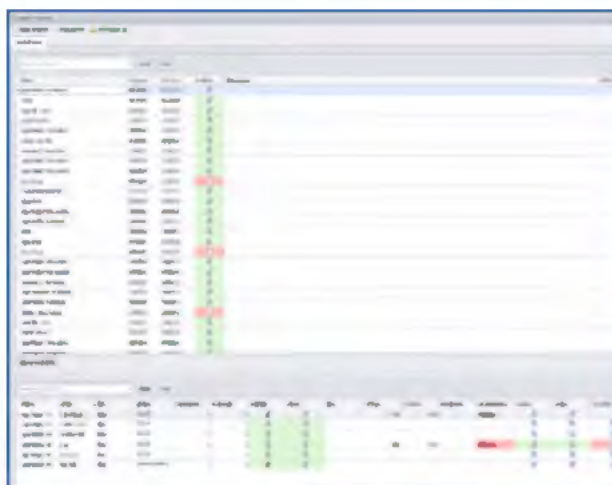
PTAS / Proficiency Testing Assessment Software

It is a customized application for the management of the Proficiency Tests, customers data, technical documentation, design and planning rounds, statistical data of participation, etc. linked with our invoicing system (SAP) for a better agility in the management of all phases of the Proficiency Testing Schemes.



Computer software (SMOKE)

An informatic tailor-made system, based on our specific requirements for faster and automatic processing of statistical studies and reports, both general and personalized. This application reduces the delivery times of reports, automatic processing and archive historical of results, reports and parameters.



How to participate in ielab's Proficiency Tests?

Join our website (www.ielab.es), and in the up of the screen, you will find the CLIENT AREA button.



REGISTRATION

For the new season 2022 our recent participants will receive a link which will enable them to access directly **ielab** website for registrations. There they will find a pre-loaded registration on the basis of their latest selection, and it can be easily confirmed or modified at will with just a few clicks.

Besides, all our customers can register by logging in as usual with their current user and password. We recommend you check your contact data and update them if needed.

If you are a new customer and you have never worked with **ielab** before, you can access it through the "New Clients Registration" section. Once registered, with the credentials obtained (username and password) you can access your profile in the "Registered clients Access" section



INSCRIPTION ⁽¹⁾

Once in your profile, when you enter the menu option "Registration", you will find a table with all the rounds offered, where you can choose those of your interest by clicking on the corresponding box or with the "Add" button to register in all the rounds of a circuit. If you want to undo any selection, press "Delete".



CONFIRMATION

By clicking on "Accept" you will get an assessment of what was selected, in the form of "Pre-registration/ budget".

To formalize the order, it is essential to press "Confirm". A message will be displayed informing that the registration has been carried out successfully and allowing as an OPTION to make the payment by credit card, either at the time of registration, or later by accessing from the order query. Otherwise, you can pay the amount regularly by bank transfer once the invoice has been issued by our accounting department.



CHECKING

In addition, you will receive an *email* with a summary of the purchased. Please, always verify that you receive it and that the data shown corresponds to your choice; otherwise, contact us.

(1) If you prefer, you can also do the registration process by our *email*: **comercial@ielab.es**

ielab Proficiency Testing Schemes: 2022 Programme



POTABLE WATER

Physical-chemical A (p. 15)
Physical-chemical B (p.16)
Physical-chemical (p. 17)
Microbiology (p.17)



CONTINENTAL WATER

Raw water (p. 19)
Microbiology (p. 19)



WASTE WATER

Physical-chemical (p. 21)
Reclaimed water (p. 21)
Microbiology (p. 22)



SEA WATER

Physical-chemical and
Microbiological parameters (p. 23)



ATMOSPHERIC POLLUTION

Stack emissions (p. 24)



SOLIDS

Soils: Physical-chemical (p. 25)
Sludges: Physical-chemical (p. 26)
Sludges: Microbiology (p. 26)
Solids in Waste Water (p. 27)



LEGIONELLA

Culture isolation (p. 29)
Polymerase Chain Reaction
(PCR) (p. 29)



BACTERIOPHAGES

Bacteriophages (p.30)



BOTTLED WATER

Bottled Water (p. 31)



SWIMMING POOL WATER

Swimming Pool Water (p. 32)



SARS-CoV-2

Evaluation: Extraction and
amplification process (p. 33)
Evaluation: Concentration,
extraction and amplification
process (p.33)



IN SITU ANALYSIS AND SAMPLING

In situ analysis and sampling:
Physical-chemical - Alicante (p. 35)
In situ analysis- Madrid (p. 35)

POTABLE WATER

Within the matrix “Potable water” can be included those waters that originate in the different water supplies for human consumption and for household. These waters must fulfil the legal considerations on the potability of water based on the acceptable thresholds of a series of compounds or substances. In Europe the legal concept that regulates the quality of water intended for human consumption is based on the new European Directive (EU) 2020/2184



and its national transpositions to the different countries of the European Union.

Overall, the different standards understand as potable water the one that fulfils a number of organoleptic and physical-chemical characteristics, related to undesirable substances, toxic substances, microbiology and radioactivity.

Maximum allowable values for a number of parameters are established which correspond to the minimum permissible quality in potable water.



POTABLE WATER: PHYSICAL-CHEMICAL A /REF. 990001/

ROUND I

WEEK 8
21st February

Aluminium;
Ammonium;
Antimony;
Bicarbonates;
Cadmium;
Conductivity at 20°C;
Magnesium;
Manganese;
Nitrates;
Sodium.

ROUND II

WEEK 22
30th May

Arsenic;
Chlorides;
Colour;
Iron;
Mercury;
Nitrites;
Oxidability;
pH;
Potassium;
Selenium;
Zinc.

ROUND III

WEEK 37
12th September

Calcium;
Combined Chlorine;
Residual Chlorine;
Total Chlorine;
Copper;
Chromium;
Fluorides;
Nickel;
Lead;
Sulphates;
Turbidity.

Metals will be determined as “total metals”.

Samples will be dispatched preferably on the Monday of the stated week.

POTABLE WATER



POTABLE WATER: PHYSICAL-CHEMICAL B /REF. 990002/

ROUND I

WEEK 8
21st February

Aldrin;
Aluminium;
Ametryn;
Ammonium;
Antimony;
Atrazine;
Benzo-a-pyrene;
Benzo-b-fluoranthene;
Bicarbonates;
Bromodichlorometane;
Cadmium;
Conductivity at 20°C;
Dibromochloromethane;
1,2-dichloroethane;
Dieldrin;
Magnesium;
Manganese;
Nitrates;
Sodium;
1,1,1-trichloroethane.

ROUND II

WEEK 22
30th May

Alpha-endosulfan;
Arsenic;
Benzene;
Benzo-g,h,i-perylene;
Bromoform;
Chloroform;
Chlorides;
Colour;
Heptachlor;
Iron;
Indeno-1,2,3-c,d-pyrene;
Mercury;
Nitrites;
Oxidability;
pH;
Potassium;
Propazine;
Selenium;
Terbutylazine;
Toluene;
Vinyl Chloride*; **NEW**
Zinc.

ROUND III

WEEK 37
12th September

Benzo-k-fluoranthene;
Beta-endosulfan;
Calcium;
Combined chlorine;
Free residual chlorine;
Total chlorine;
Copper;
Chromium;
4,4'-DDE;
Ethylbenzene;
Fluoranthene;
Fluorides;
Heptachlor epoxide;
Nickel;
o-Xylene;
Lead;
Simazine;
Sulphates;
Tetrachloroethene;
Trichloroethene;
Turbidity.

Metals will be determined as "total metals".

* Parameter not included in our accreditation by ENAC.
Samples will be dispatched preferably on the Monday of the stated week.

POTABLE WATER



POTABLE WATER: PHYSICAL-CHEMICAL C /REF. 990003/

ROUND I

WEEK 6
7th February

Barium;
Beryllium;
Bicarbonates;
Calcium;
Total organic carbon (TOC)*;
Hardness;
Dry residue;
Vanadium.

ROUND II

WEEK 36
5th September

Anionic surfactants;
Boron;
Cobalt;
Total cyanides;
Total phosphorus;
Magnesium;
Kjeldahl nitrogen;
Silver;
Silica (Silicon dioxide).

Metals will be determined as "total metals".



POTABLE WATER: MICROBIOLOGY /REF. 990019/

ROUND I

WEEK 6
7th February

Clostridium perfringens;
Faecal coliforms;
Total coliforms;
Enterococci;
Escherichia coli;
Culturable
microorganisms at 22°C;
Culturable
microorganisms at 36°C;
Salmonella spp.

ROUND II

WEEK 21
23rd May

Clostridium perfringens;
Faecal coliforms;
Total coliforms;
Enterococci;
Escherichia coli;
Pseudomonas aeruginosa;
Culturable
microorganisms at 22°C;
Culturable
microorganisms at 36°C;
Faecal estreptococci.

ROUND III

WEEK 36
5th September

Sulphite-reducing clostridia;
Clostridium perfringens;
Total coliforms;
Enterococci;
Escherichia coli;
Pseudomonas aeruginosa;
Staphylococcus aureus;
Culturable
microorganisms at 22°C;
Culturable
microorganisms at 36°C.

* Parameter not included in our accreditation by ENAC.
Samples will be dispatched preferably on the Monday of the stated week.

CONTINENTAL WATER

Continental water can be defined as those that come from rivers, streams, ponds, pools, lakes, canals, reservoirs and other natural or artificial, fresh, brackish or salted, public or private water bodies found on land. Usually, permanent water bodies are found on the surface or underground.

Generally the tests performed in this type of matrix are ultimately aimed at establishing

a framework for the protection of such water so as stated in the Water Framework Directive (WFD, Directive 2000/60/EC) will enable the prevention of further deterioration and the protection and improvement of the related aquatic and terrestrial ecosystems; promote sustainable uses of water; enable the protection and improvement of the aquatic environment; reduce groundwater pollution and relieve the impact of floods and droughts.



CONTINENTAL WATER

RAW WATER /REF. 990018/

ROUND I

WEEK 18

2nd May

Acrylamide*;
Bromates*;
Bromides*;
Chlorates*;
Chlorites*;
Total organic carbon (TOC)*;
Geosmin*;
2-methylisoborneol (MIB)*;
Microcystines*.



CONTINENTAL WATER: MICROBIOLOGY /REF. 990022/

ROUND I

WEEK 7

14th February

Faecal coliforms;
Total coliforms;
Enterococci;
Escherichia coli;
Pseudomonas aeruginosa;
Salmonella spp.;
Staphylococcus aureus.

ROUND II

WEEK 22

30th May

Faecal coliforms;
Total coliforms;
Enterococci;
Escherichia coli;
Pseudomonas aeruginosa;
Salmonella spp.;
Staphylococcus aureus.

* Parameter not included in our accreditation by ENAC.

Samples will be dispatched preferably on the Monday of the stated week.

WASTE WATER

Waste water is water of varying composition from many sources: domestic, municipal, industrial, agricultural, etc. and for that reason it has been degraded or altered in its original quality.



The discharges in to the integrated sanitation system (ISS), in accordance with the Directive 91/271/CEE can be classified as follows:

- *Domestic waste water:* those from housing and general services areas, product of human metabolism and domestic activities.
- *Industrial waste waters:* all waste water discharged from places used for carrying on any trade or industry, other than domestic sewage or storm water runoff.
- *Urban waste water:* domestic wastewater or its mixture with industrial waste water and / or storm water runoff.

All of them are usually collected in a collecting system and sent through a terrestrial emissary to a WWTP (Waste Water Treatment Plant). The aforementioned Directive 91/271/CEE establishes the parameters, limits or the reduction level that the treatment process must achieve.

In discharge authorizations (either to sanitation systems or to public domain) the parameters and limits of application are defined, depending on the raw materials, production process and quality requirements of the receiving environment. It will take into account compliance with the limits for priority and preferential substances in Directive 2008/105/EC. These parameters include mainly organic substances, cyanides, fluorides and metals.

According to the normative which establishes the legal framework for the reuse of treated water, reclaimed water is defined as: *"The treated waste water that has undergone a treatment process additional or complementary that allows to achieve the quality for their intended use"*. This legislation establishes permitted uses, the frequency and quality criteria of this type of waste water.



WASTE WATER



WASTE WATER: PHYSICAL-CHEMICAL /REF. 990004/

ROUND I

WEEK 5
31st January

Aluminium;
Ammonium;
Chlorides;
Chromium;
Biological oxygen demand (BO₅D);
Chemical oxygen demand (COD);
Fluorides;
Nitrates;
Suspended solids;
Toxicity.

ROUND II

WEEK 19
9th May

Anionic surfactants;
Cadmium;
Total organic carbon (TOC);
Chromium VI;
Biological oxygen demand (BO₅D);
Chemical oxygen demand (COD);
Total phosphorus;
Orthophosphates;
Suspended solids;
Zinc.

ROUND III

WEEK 39
26th September

Boron;
Conductivity at 20°C;
Biological oxygen demand (BO₅D);
Chemical oxygen demand (COD);
Iron;
Kjeldahl nitrogen;
Total nitrogen;
pH;
Lead;
Suspended solids.



RECLAIMED WATER /REF. 990005/

ROUND I

WEEK 11
14th March

Boron;
Escherichia coli;
Legionella pneumophila;
Legionella spp.;
Intestinal nematodes;
Suspended solids;
Total phosphorus;
Turbidity*.

ROUND II

WEEK 38
19th September

Cadmium;
Escherichia coli;
Legionella pneumophila;
Legionella spp.;
Intestinal nematodes;
Nitrates;
Total nitrogen;
SAR* (Sodium Adsorption Ratio).

* Parameter not included in our accreditation by ENAC.
Samples will be dispatched preferably on the Monday of the stated week.

WASTE WATER



WASTE WATER: MICROBIOLOGY /REF. 990014/

ROUND I

WEEK 5
31st January

Clostridium perfringens;
Faecal coliforms;
Total coliforms;
Enterococci;
Escherichia coli;
Salmonella spp.

ROUND II

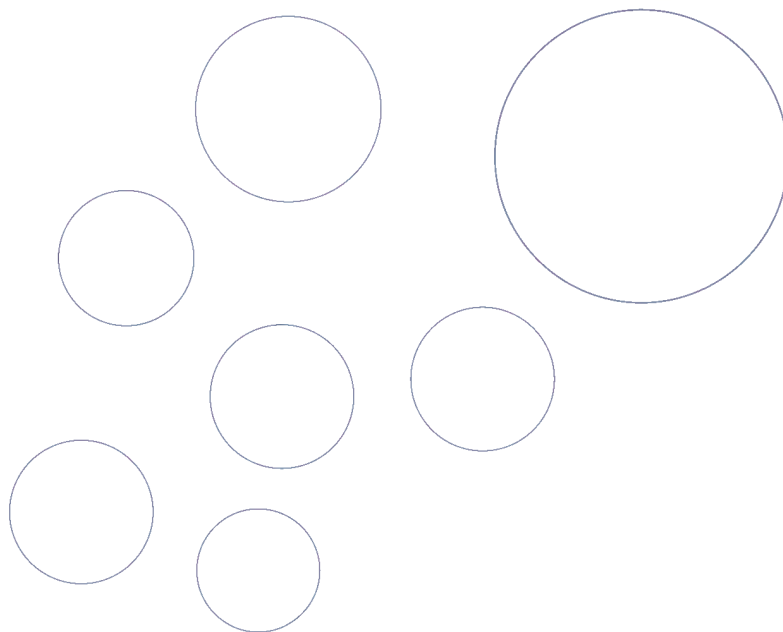
WEEK 19
9th May

Clostridium perfringens;
Faecal coliforms;
Total coliforms;
Enterococci;
Escherichia coli;
Salmonella spp.

ROUND III

WEEK 42
17th October

Clostridium perfringens;
Faecal coliforms;
Total coliforms;
Enterococci;
Escherichia coli;
Salmonella spp.



Samples will be dispatched preferably on the Monday of the stated week.

SEA WATER

Sea water is marine water, with a wide variety of minerals that confers a high saline percentage (between 35 and 38‰).

The sea water control is especially important in bathing areas. The Directive 2006/7/EC of February 15th, 2006 concerning the quality management of bathing water, collects the scientific and technical specifications and enables a more consistent legal framework both with the needs and the advances and the progress in recent years regarding bathing waters.

There are also various international networks focused on the Control and Quality Monitoring of Coastal Water whose main goal is to have an intervention tool, in order to provide information on the evolution of water and aquatic ecosystems quality by using of biological, hydromorphological and physical-chemical indicators, so that can achieve

the fundamental guiding documents can be achieved in order to:

- Plan and manage coastal marine aquatic ecosystems.
- Comply with the requirements of the Water Framework Directive by establishing a Community framework for the action in the field of water policy (characterization, typification and delimitation of water bodies).
- Meet different programs for the assessment and control of pollution in different regions.
- Generating information for European Directives relating to water quality.
- Meet different programs to reduce pollution.
- Provide support for scientific investigation.



SEA WATER /REF. 990000/

ROUND I

WEEK 24
13th June

Ammonium;
Arsenic;
Cadmium;
Total coliforms;
Enterococci;
Escherichia coli;
Nickel;
Nitrates;
pH;
Turbidity.

ROUND II

WEEK 35
29th August

Antimony;
Total coliforms;
Enterococci;
Escherichia coli;
Mercury;
Kjeldahl nitrogen;
Orthophosphates;
Lead;
Salinity.

Samples will be dispatched preferably on the Monday of the stated week.

ATMOSPHERIC POLLUTION

Industrial combustion and other kind of processes are susceptible to produce various contaminants which have been demonstrated or can be harmful to health and the environment.

At the request of environmental agencies and regulation bodies, industries must therefore measure emissions from its chimneys. Control of these emissions permits to manage its environmental impact, demonstrating compliance with established legislative limits and avoiding penalties and adverse publicity.

European legislation (Directive 96/61/EC and 2008/1/EC version) states that emissions of static points as chimneys must be controlled

so as to prevent or reduce such emissions and analytical controls are intended to control these emissions.

The material used is similar to that usually found in laboratories for such tests and consists of two types of supports, filters and impinger solutions. In the first case, all possible contaminations related to particles are studied and in the impinger solutions those pollutants in gaseous state are collected.

The preparation and testing of the parameters are based on appropriate international standards which are periodically reviewed in order to provide rounds according to the needs of laboratories.



STACK EMISSIONS /REF. 990008/

ROUND I

WEEK 9
28th February

Filter:

Arsenic;
Cobalt;
Manganese;
Nickel;
Vanadium.

Impinger solution:

Hydrofluoric acid (HF);
Antimony;
Arsenic;
Cadmium;
Copper.

ROUND II

WEEK 20
16th May

Filter:

Antimony;
Cadmium;
Chromium;
Tin;
Mercury.

Impinger solution:

Hydrochloric acid (HCl);
Chromium;
Manganese;
Lead;
Vanadium.

ROUND III

WEEK 38
19th September

Filter:

Copper;
Lead;
Selenium;
Thallium;
Zinc.

Impinger solution:

Cobalt;
Sulphur dioxide (SO₂);
Thallium;
Nickel;
Zinc.

Samples will be dispatched preferably on the Monday of the stated week.

SOLIDS

Sludges and soils, with totally different physical-chemical characteristics are included in this group of schemes.

A sludge, also called mud, is defined as a semisolid residue which is produced, decanted or settled during a water treatment. They are generated in the septic tank of houses, shopping malls, offices or industries, or produced in a water treatment plant, as well as control units of atmospheric emissions.

A soil is the uppermost layer of Earth's crust, which results of the decomposition of rocks by sudden temperature changes and by the action of the water, wind and living beings. The

chemical composition and physical structure of the soil at a certain location are determined by the type of geological material that originates, by the vegetal cover, by the time that weathering has acted, by topography and by artificial changes resulting from human activities.



SOILS: PHYSICAL-CHEMICAL /REF. 990017/

ROUND I

WEEK 42
17th October

Arsenic;
Cadmium;
Calcium;
Conductivity at 20°C;
Copper;
Chromium;
Iron;
Magnesium;
Manganese;
Mercury;
Nickel;
Lead;
pH;
Potassium;
Total phosphorus;
Sodium;
Zinc.

Samples will be dispatched preferably on the Monday of the stated week.

SOLIDS



SLUDGES: PHYSICAL-CHEMICAL /REF. 990013/

ROUND I

WEEK 12
21st March

Arsenic;
Cadmium;
Copper;
Chromium;
Iron;
Kjeldahl nitrogen;
Manganese;
Mercury;
Nickel;
pH;
Lead;
Zinc.

ROUND II

WEEK 35
29th August

Aluminium;
Cadmium;
Copper;
Conductivity at 20°C;
Chromium;
Total phosphorus;
Total organic matter;
Mercury;
Nickel;
Lead;
Zinc.

SLUDGES: MICROBIOLOGY /REF. 990027/

ROUND I

WEEK 9
28th February

*Clostridium perfringens**;
Total coliforms*;
Enterococci*;
*Escherichia coli**;
Salmonella spp.*

* Parameter not included in our accreditation by ENAC.
Samples will be dispatched preferably on the Monday of the stated week.

SOLIDS



SOLIDS IN WASTE WATER /REF. 990016/

ROUND I

WEEK 7
14th February

Dissolved solids at 105°C*;
Suspended solids;
Fixed suspended solids*;
Volatile suspended solids*;
Settleable solids*;
Total solids at 105°C*;
Fixed total solids*;
Volatile total solids*.

ROUND II

WEEK 21
23rd May

Dissolved solids at 105°C*;
Suspended solids;
Fixed suspended solids*;
Volatile suspended solids*;
Settleable solids*;
Total solids at 105°C*;
Fixed total solids*;
Volatile total solids*.

* Parameter not included in our accreditation by ENAC.
Samples will be dispatched preferably on the Monday of the stated week.

LEGIONELLA

Of all the environmental pathogens, *Legionella* and particularly *Legionella pneumophila* species is one of the most studied organisms due to its impact in large communities, and therefore its importance for public health and the enormous social and economic impact.

In all current laws and regulations on legionellosis prevention, *Legionella* testing is contemplated as one of the most important preventive methods, establishing culture isolation based on the ISO 11731 standard as the reference method. **ielab's** *Legionella*-culture scheme simulates natural samples to be tested by these methods to assess the analytical performance of the laboratory and the recovery rate of the used method.

However, culture isolation presents different drawbacks

such as time-to-results that can be up to 10-12 days. But, in many cases, due to the need for rapid results, methods based on amplification of nucleic acids, primarily DNA amplification by the polymerase chain reaction (PCR) have been described as valid and useful tools for the *Legionella* detection.

The main advantages of PCR are its high speed, as it provides results in hours, its high specificity and sensitivity, low detection limit and the possibility of quantifying the level of organism investigated by "real-time" PCR (qPCR).



ielab's *Legionella*-PCR samples contain inactivated cells allowing assessing both the efficiency and performance in the analytical phases of concentration, DNA extraction / purification and amplification.



LEGIONELLA



LEGIONELLA - CULTURE /REF. 990020/

ROUND I

WEEK 10
7th March

Sample A:
Legionella spp.;
Legionella pneumophila.

Sample B ⁽²⁾:
Legionella spp.;
Legionella pneumophila.

ROUND II

WEEK 20
16th May

Sample A:
Legionella spp.;
Legionella pneumophila.

Sample B ⁽²⁾:
Legionella spp.;
Legionella pneumophila;
Culturable
microorganisms
at 22°C.
Culturable
microorganisms
at 36°C.

ROUND III

WEEK 39
26th September

Sample A:
Legionella spp.;
Legionella pneumophila.

Sample B ⁽²⁾:
Legionella spp.;
Legionella pneumophila.

(2) Sample B will include natural matrix



LEGIONELLA - PCR /REF. 990012/

ROUND I

WEEK 10
7th March

Legionella spp.;
Legionella pneumophila.

3 Samples.

Samples will be dispatched preferably on the Monday of the stated week.

BACTERIOPHAGES

Historically, microbiological control has been mainly done through bacterial indicators, but currently viral indicators are trending in quality control of water, biosolids and food. The new European Directive (EU) 2020/2184 of December 16th, 2020 on the quality of water intended for human consumption includes the somatic coliphage parameter as an indicator to verify the effectiveness of treatment processes against microbiological risks.

Bacteriophages as viral indicators provide additional advantages to bacterial indicators, since they are present in the environment in a similar amount to bacterial indicators, usually persist longer and provide more information on viral pathogens which are not properly represented by studying only bacterial indicators.

Somatic coliphages are bacteriophages of enteric origin that can infect *Escherichia coli* through cell surface receptors.

F-specific coliphages, also named sexual coliphages or male-specific bacteriophages, infect bacteria through the sex pili.

The presence of both somatic and/or F-specific coliphages in water samples usually indicates pollution by human or animal faeces, or by sewage containing these excreta. Therefore, these coliphages provide a simple and relatively rapid method for the detection of faecal pollution, and their resistance in water and food tends to resemble that of human enteric virus more closely than faecal bacteria, commonly used as water or food quality indicators.

Both somatic and F-specific coliphages are included in water, wastewater, biosolids and food guidelines and regulations complementing the use of bacterial indicators such as *E. coli* and *Enterococci*.



BACTERIOPHAGES /REF. 992512/

ROUND I

WEEK 8
21st February

Somatic bacteriophages*;
F-specific bacteriophages*.

2 Samples. Matrix: Potable water.

ROUND II

WEEK 37
12th September

Somatic bacteriophages*;
F-specific bacteriophages*.

2 Samples. Matrix: Waste water.

* Parameter not included in our accreditation by ENAC.

BOTTLED WATER

This type of water is packed at the foot of the spring under aseptic conditions to protect its original purity and maintain its composition in minerals and its properties unchanged. For their classification as “Natural Mineral Water” they must pass a long administrative file and numerous analytical controls, in order to demonstrate that they meet the requirements

established for this type of water. In this sense, there are European Directives, complemented by national legislation regulating the quality of this type of water.

In this Proficiency Testing Scheme, the main indicators and microbiological pathogens used to evaluate the microbiological quality of this type of water are included.



BOTTLED WATER /REF. 990037/

ROUND I

WEEK 23
6th June

Total coliforms;
Enterococci;
Escherichia coli;
Sulphite-reducing clostridia;
Clostridium perfringens;
Culturable microorganisms
at 22°C;
Culturable microorganisms
at 37°C;
Pseudomonas aeruginosa.

Samples will be dispatched preferably on the Monday of the stated week.

SWIMMING POOL WATER

It is very important to preserve the quality of recreational water, such as swimming pools and water parks, as it is essential for public health. Maintaining the pool water in perfect conditions with proper treatment is essential, but it is also essential to perform a correct analysis. This type of water is susceptible to rapid changes in its properties, especially in the case of open pools, where they are influenced by weather changes. Rain or wind

with particles that fall into the pool, or days of high heat that produces a strong evaporation, can alter the quality of the water.

The technical-sanitary quality of swimming pools is regulated by different regulations in different countries. This Scheme includes the main indicators and microbiological pathogens used to control the quality of swimming pool water.



SWIMMING POOL WATER /REF. 990038/

ROUND I

WEEK 18
2nd May

Faecal coliforms;
Total coliforms;
Escherichia coli;
Faecal streptococci;
Pseudomonas aeruginosa;
Staphylococcus aureus.

Samples will be dispatched preferably on the Monday of the stated week.



SARS-CoV-2

Given the need to know the evolution of the pandemic worldwide, the performance of detection tests is being prioritized not only in patients but also in the environment that surrounds us.

The European Commission, in its Recommendation (EU) 2021/472, urges member states to establish a systematic surveillance for SARS-CoV-2 and its variants in EU wastewater as a complementary tool for data collection and management of the COVID pandemic. It also establishes that to assure that sampling and analysis methods are comparable and reliable, Member States must ensure that laboratories participate in appropriate proficiency tests organized by accredited providers.

ielab organized in October 2020 a Proficiency Testing Scheme for the detection of SARS-CoV-2 using RT-qPCR, and in May 2021 it became **the first national provider of proficiency testing schemes for the detection and quantification of SARS-CoV-2 in wastewater.**

As for the samples to be tested, they may be of synthetic or natural origin and will contain RNA from various target genes of SARS-CoV-2, which will allow to evaluate the virus detection process after the concentration, extraction and amplification phases. Rounds I and III will include a natural wastewater matrix to evaluate all phases of the process: Concentration, extraction and amplification. The results can be reported both qualitatively (Detected / Not Detected) and quantitatively. The fields of application are: clinical/sanitary, environmental and surfaces.



ROUND I ⁽³⁾

WEEK 12
21st March

Sample A
Evaluation:
Extraction and
amplification.

Sample B
Evaluation:
Concentration,
extraction and
amplification.

ROUND II

WEEK 26
27th June

2 Samples
Evaluation:
Extraction and
amplification.

ROUND III ⁽³⁾

WEEK 40
3rd October

Sample A
Evaluation:
Extraction and
amplification.

Sample B
Evaluation:
Concentration,
extraction and
amplification.

(3) Rounds I and III will include waste water natural matrix.

IN SITU ANALYSIS

These are face-to-face schemes in which the participants attend to the location established by the organization to carry out several measurements in situ. Yearly, 2 rounds are offered, one located in Alicante and another in Madrid.

Each participant can use the method and equipment considered as appropriate, with no limitation by the side of the Organizer. *In situ* measurements are made for the parameters: conductivity, pH, dissolved oxygen, temperature and flow in three different matrices (wastewater, continental water and sea water).

The technical and statistical analysis is carried out according to the criteria established by the IUPAC and the “Selection, Use and Interpretation of Proficiency Testing (PT) Schemes by Laboratories (2021)” guide, so as to ensure the homogeneity and stability of the sample during the test. A detailed final report is prepared with the results and evaluation obtained by each participant. The deadline for publication of the report is approximately one month since the performance of the scheme.

The rounds of the *in situ* proficiency testing scheme may be cancelled if the weather at the corresponding headquarters does not allow it to be carried out, as well as due to other causes beyond the control of the Organizer.

For the round located in Alicante, in addition to the *in situ* analyses, a Sampling testing of physical-chemical parameters is carried out in the continental water and wastewater matrices. Each participant will take a single sampling for the required parameters (defined in the instructions).

All samples are collected by the Organizer and subsequently analysed by a single reference laboratory. Each participant may use the sampling system that he deems appropriate, with the preservatives and containers that he considers appropriate.

To learn more about sampling, you can refer to the publication made by Eurachem (English version 29th July 2020) on “Proficiency testing Schemes for sampling”.





IN SITU ANALYSIS AND SAMPLING: PHYSICAL-CHEMICAL /REF. 990023 y 990025/

ALICANTE

WEEK 20
19th May

IN SITU ANALYSIS

Continental water:

Conductivity at 20°C;
Dissolved oxygen;
pH;
Temperature.

Waste water:

Discharge*;
Conductivity at 20°C;
Dissolved oxygen;
pH;
Temperature.

Sea water:

Conductivity at 20°C;
Dissolved oxygen;
pH;
Temperature.

SAMPLING:
PHYSICAL-CHEMICAL*

MADRID

WEEK 43
20th October

Continental water

Conductivity at 20°C;
Dissolved oxygen;
pH;
Temperature.

Waste water:

Discharge*;
Conductivity at 20°C;
Dissolved oxygen;
pH;
Temperature.

* Parameter not included in our accreditation by ENAC.

NOTE: The matrices and parameters for the Sampling PT Scheme will be defined in the round instructions.

ielab PROFICIENCY TESTING SCHEMES: 2022 SCHEDULE

WEEKS >	February	March	April	May	June	July	August	September	October
POTABLE WATER: PHYSICAL-CHEMICAL A	5	8							
POTABLE WATER: PHYSICAL-CHEMICAL B	6	9							
POTABLE WATER: PHYSICAL-CHEMICAL C	7	10							
POTABLE WATER: MICROBIOLOGY	8	11							
RAW WATER	9	12							
CONTINENTAL WATER: MICROBIOLOGY	10	13							
WASTE WATER: PHYSICAL-CHEMICAL	11	14							
RECLAIMED WATER	12	15							
WASTE WATER: MICROBIOLOGY	13	16							
SEA WATER	14	17							
STACK EMISSIONS	15	18							
SOILS: PHYSICAL-CHEMICAL	16	19							
SLUDGES: MICROBIOLOGY	17	20							
SLUDGES: PHYSICAL-CHEMICAL	18	21							
SOLIDS IN WASTE WATER	19	22							
LEGIONELLA-CULTURE	20	23							
LEGIONELLA-PCR	21	24							
BACTERIOPHAGES	22	25							
BOTTLED WATER	23	26							
SWIMMING POOL WATER	24	27							
SARS-CoV2	25	28							
IN SITU/ANALYSIS AND SAMPLING: PHYSICAL-CHEMICAL - ALCANTAR	26	29							
IN SITU/ANALYSIS - MADRID	27	30							

FAQs / Frequently Asked Questions

1/ How can I register to ielab PTS?

The easiest and safest way to register in our PTS is through our website. By this way the confidentiality and agility on the data transfer is assured. Alternatively, you can also register by contacting us by *email*.

The current prices can be consulted in the specific rates document and also when you make your registration through the website. The registration fee includes sample preparation, access to the website for data submission and for downloading results reports and any other document related to the rounds such as the certificate of participation. Any additional tax or fee will be added before the confirmation of the purchase order, whenever necessary.

2/ How often should I participate in a Proficiency Testing Scheme?

The frequency of participation depends on several specific factors related to the characteristics of each laboratory, as well as other aspects of quality control. The number of samples tested, and the risk associated with the tests are very important issues to be considered. Therefore, each laboratory should establish its own frequency of participation.

Accreditation bodies often offer guidelines about frequency of participation, such as in the documents "EA-4/18 TA. Guidance on the level and frequency of proficiency testing participation" of EA (European co-operation for Accreditation) or in EURACHEM Guide "Selection, use and interpretation of Proficiency Testing Schemes".

3/ When are the samples dispatched?

Samples will be sent to participants by express courier according to the previously established calendar; Samples are preferably sent on Monday. In case that the calendar, planning or any of the previously agreed terms cannot be fulfilled, the participants will be informed in writing with the adopted solutions. Participants will be notified in writing about any change of planning or schedule.

If the number of registrations for a PTS round does not reach the minimum required to carry it out, the organization may cancel or delay this round, refunding participants or replacement the registration, and will be notified in writing about this decision beforehand.

4/ What happens if samples do not arrive to me on the expected day?

Samples are prepared and preserved to maintain their properties in good conditions during the shipment period. In some cases, such as microbiology rounds, samples may be analyzed one week after the sending date, however we strongly advise to analyze them as soon as they reach you.

For most physical-chemical parameters the analysis period is extended until the results submission deadline. If any parameter couldn't be tested like this, in the round instructions you will find the recommended dates.

5) Can I request extra sample volume in case my analytical method requires it?

The volume of sample sent by **ielab** is considered enough to analyze in triplicate any parameter according to the most commonly used methodologies. It may happen that your laboratory requires more sample volume; In this case, **ielab** can provide you with an "extra sample" at your request with an additional charge. You can check this cost by contacting us via *email* at comercial@ielab.es.

6/ How are samples affected by transport time and temperature?

The materials used are stable in the delivery conditions and during the habitual shipment period.

Stability studies are made simulating shipping conditions and during the whole period of analyses. In those rounds with microbiological parameters, a duplicate of the samples is delivered to one of the participants, who returns them to **ielab** for their verification.

7) What is the origin of the samples that are sent?

ielab will prepare natural samples if possible. If any element or microorganism is not present in the natural sample, the appropriate analytes or microorganisms relevant to investigation will be added/spiked, or a synthetic sample will be prepared. This information is detailed in the round instructions and it is available for customers through request. The corresponding homogeneity and stability studies of the samples will be performed according to IUPAC (International Union of Pure and Applied Chemistry) and to the ISO 13528 standard.

8/ How are the samples shipped?

The materials used in the PT Schemes are packaged complying with the legal requirements regarding transport and under conditions that allow preserving their content. In general, most of the samples from **ielab**'s proficiency testing schemes are sent at room temperature. If any sample must be kept refrigerated after reception, it will be detailed in the round instructions document for each round. Express courier systems are used, and the samples are accompanied by all transport documentation required by international regulations. However, in some countries, we recommend participants to obtain information in advance about the import documents or taxes that may be needed. It is recommended that the final participant be informed of possible import procedures and notify **ielab** any additional instruction or document required in their country regarding these procedures. **ielab** declines the responsibility of the shipment status if it has been retained at the customs office of the destination country.

9/ How should ielab PTS samples be preserved or manipulated?

ielab provides participants in advanced detailed instructions that clearly specify how each sample should be preserved and / or handled. **ielab** has designed and planned its rounds so that the handling of the samples is a quick and simple process. Sometimes, it is also include a workflow diagram in the instructions to make the handling easier. This information is also available on our website.

10/ How long do I have to submit the analytical results?

Deadline of each round is detailed in the instructions provided and all details are also available on our website. Usually, the deadline to submit results is three weeks after samples are dispatched. Please consider that after the established deadline, results cannot be recorded in the website anymore.

11/ Is it compulsory to analyze all the parameters of each sample?

No. Each participant can analyze the parameters he/she considers. For any analysed parameter it is necessary to submit the number of replicates detailed in the round instructions, as well as any other requested information. Please follow carefully the detailed guidelines included in the instructions of each round.

12/ Is there any mandatory method to be used or I can use the one I usually apply in my lab?

As a provider of PT Schemes, **ielab** does not recommend any method of analysis. One of the objectives of proficiency testing is to determine the effectiveness of a laboratory in terms of tests or measurements that are usually performed, so that participants can analyze PT Schemes samples using the method they want. It is important for participants to inform about the method used and the technical specifications as we often also assess the results in relation to the methods used.

13/ How can the analytical results be submitted?

You can submit results by logging with your usual username and password and selecting the "Open Proficiency Tests / Results submission" section; the results bulletin will open automatically. In case you are participating in several rounds in progress simultaneously, a drop-down will appear where you can choose the round.

After filling out the bulletin, you must press the "Save" button. You should verify that you receive an automatic confirmation *email* at the address listed in our database. Once the results are saved, they will be available if you re-enter with your username and password. You can add or modify them as many times as you wish.

If you make any changes, you should “save” again, and you will receive a confirmation *email* again. The results bulletin will be available for editing until the established deadline of the round. Once this period is expired, the bulletin of results will be blocked, and no modifications can be made. Alternatively, there are other options to submit results and you can acquire this service when you register by selecting (“Paper Management Service”). By submitting the results, the participant authorizes **ielab** to use those results for the commercialization of reference materials.

14/ How should the results submitted be expressed?

The results reported should be expressed in the units indicated in the PT Schemes’ round instructions for each parameter and following their guidelines. Decimal numbers must be typed according to the settings of each participant’s computer, without using any symbol to separate thousands positions. In some cases, the instructions of each round indicate the maximum number of decimal places that should be used to express the results.

15/ Which statistical study is applied to results?

The technical and statistical study is carried out according to the IUPAC criteria and to the ISO 13528 standard. For each parameter, its consensus value, its standard deviation and its uncertainty is calculated (without outliers or statistically failed results). In addition, in case of added analytes, the known value and the uncertainty can be given. The laboratories are evaluated by the z-score criteria, using as “Standard Deviation for Proficiency Assessment (SDPA)” the current regulation values, or if not existing, based on international standards or using the Horwitz function modified by Thompson. For microbiology, the SDPA will be obtained based on historical rounds results. The SDPA value can also be fixed by ielab.

16/ What is the type of file of the sent reports?

The reports developed by **ielab** are sent to the participants in pdf file including detailed information regarding all steps of the round. Reports include information regarding to the preparation of the samples, homogeneity and stability studies, and values of the standard deviation for proficiency assessment for each parameter. Also, reports show the results of the statistical study developed for each parameter are detailed.

17/ What information is detailed in the reports?

For each round a detailed report, including the sample preparation results (homogeneity and stability), tables with the results of all participants, the applied methods (identified with the method number), the statistical analysis and the corresponding graphics is prepared. The report will be available in a term of 15 working days after the results submission deadline. Customized extra reports for each participant to the comparison of its own results will be prepared. Moreover, specific reports with the agreement of the customer could be prepared on demand and they will have an additional charge. In case that the number of results for a parameter does not reach the minimum required (10 available results to start the statistical study), this parameter will be identified as “out of scope of ENAC Accreditation” in the results report.

18/ How and when will I receive the results report?

The reports of results is sent to the participants by *email* in pdf file and within 15 working days after the closing date of the round. There is the option to request reports printed. Consult the existing charges for this method of sending the report (“Paper Management Service”).

19/ How can ielab help me if I have doubts regarding my results or evaluation?

In case of doubts with any result, you can contact us and ielab will give you individualized support by studying your issue in order to provide you the most appropriate answer to your circumstances.

20/ How is confidentiality guaranteed?

Participation codes are automatically assigned by the software at the time of registration.

Each participant has a 4 digit code that can be changed and that allows you to identify your results in the round report. In this way the identity is protected against other participants and also to the Organization. The code can be changed at any time by the customer. In the results report only this code is mentioned neither including the name or other information from the participant in any case, nor the data included in the observations field of the results bulletin.

21/ Can the results be falsified?

ielab pays special attention to avoid situations of collusion between participants and treats confidentially both the identity of the participants and their results. **ielab** does not publish the names of the laboratories or transfer any type of information from one participant to another, in order to minimize opportunities for connivance and falsification of results.

In the case that **ielab** had well-founded suspicions and evidence about the connivance or falsification of results, it will eliminate the results of the participants involved in the statistical study and these results will not be evaluated with a z-score.

ielab considers that the participants themselves are responsible for avoiding this type of situations of collusion, connivance and / or falsification of results.

22/ Are ielab PTS accredited?

Our quality system is based on the ISO / IEC 17043 standard, being accredited by ENAC no. 2 / PPI007. The accreditation document, as well as its scope, can be consulted on the ielab website (www.ielab.es) and on the ENAC website (www.enac.es).

23/ What are the participation costs?

You can check the round prices in the section "price list" of our website and at the time of registration. For any questions or queries, you can contact us.

24/ Claims and Complaints

In case that a laboratory does not agree with the evaluation of its results, **ielab** has a process addressed to facilitate participants' appeal against the assessment of their performance in a proficiency testing schemes, which is available for participants.

Moreover, if the laboratory wants to claim for any of the services provided by **ielab**, he can contact **ielab** by the usual way, preferably by *email*.

25/ Subcontractors

The activities related to the analytical processes for homogeneity and stability verification of the samples are subcontracted with a laboratory accredited under ISO 17025. Therefore, the requirements of ISO 17043 for proficiency testing schemes providers are fulfilled. The preparation of nematode samples is also subcontracted to a Public Entity with recognized experience in this field.

Parameters Index:

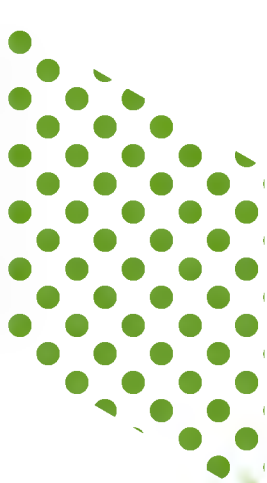
Parameters list in alphabetical order and the page/s where they can be found:

1,1,1-trichloroethane: 16	Chlorites: 19
1,2- dichloroethane: 16	Chloroform: 16
2-Methylisoborneol: 19	Chromium VI: 21
4,4'-DDE: 16	Chromium: 15; 16; 21; 24; 25; 26
Acrylamide: 19	Culturable microorganisms at 22°C: 17; 29; 31
Aldrin: 16	Culturable microorganisms at 36°C: 17; 29; 31
Alfa-endosulfan: 16	Dibromochloromethane: 16
Aluminium: 15; 16; 21; 26	Dieldrin: 16
Ametryn: 16	Discharge (in situ): 35
Ammonium: 15; 16; 21; 23	Dissolved oxygen (mg/L y %) (in situ): 35
Anionic surfactants: 17; 21	Dissolved solids at 105°C: 27
Antimony: 15; 16; 23; 24	Dry residue: 17
Arsenic: 15; 16; 23; 24; 25; 26	Enterococci: 17; 19; 22; 23; 26; 31
Atrazine: 16	<i>Escherichia coli</i> : 17; 19; 21; 22; 23; 26; 31; 32
Barium: 17	Ethylbenzene: 16
Benzene: 16	F-specific bacteriophages: 30
Benzo-a-pyrene: 16	Faecal coliforms: 17; 19; 22; 32
Benzo-b-fluoranthene: 16	Faecal estreptococci: 17; 32
Benzo-g,h,i-perylene: 16	Fixed suspended solids: 27
Benzo-k-fluoranthene: 16	Fixed total solids: 27
Beryllium: 17	Fluoranthene: 16
Beta-endosulfan: 16	Fluorides: 15; 16; 21
Bicarbonates: 15; 16; 17	Geosmin: 19
Biological oxygen demand: 21	Hardness: 17
BOD5: 21	Heptachlor epoxide: 16
Boron: 17; 21	Heptachlor: 16
Bromates: 19	Hydrochloric acid (HCl): 24
Bromides: 19	Hydrofluoric acid (HF): 24
Bromoform: 16	Indeno-1,2,3-c,d-pyrene: 16
Cadmium: 15; 16; 21; 23; 24; 25; 26	Intestinal nematodes: 21
Calcium: 15; 16; 17; 25	Iron: 15; 16; 21; 25; 26
<i>Clostridium perfringens</i> : 17; 22; 26; 31	Kjeldahl nitrogen: 17; 21; 23; 26
Cobalt: 17; 24	Lead: 15; 16; 21; 23; 24; 25; 26
COD: 21	<i>Legionella pneumophila</i> : 21; 29
Colour: 15; 16	<i>Legionella</i> spp.: 21; 29
Combined Chlorine: 15; 16	Magnesium: 15; 16; 17; 25
Conductivity at 20°C (in situ): 35	Manganese: 15; 16; 24; 25; 26
Conductivity at 20°C: 15; 16	Mercury: 15; 16; 23; 24; 25; 26
Copper: 15; 16; 24; 25; 26	MIB: 19
Chemical oxygen demand: 21	Microcystines: 19
Chlorates: 19	Nickel: 15; 16; 23; 24; 25; 26
Chlorides: 15; 16; 21	Nitrates: 15; 16; 21; 23

Nitrites: 15; 16
 o-Xylene: 16
 Orthophosphates: 21; 23
 Oxidability: 15; 16
 pH (in situ): 35
 pH: 15; 16; 21; 23; 25; 26
 Potassium: 15; 16; 25
 Propazine: 16
Pseudomonas aeruginosa: 17; 19; 31
 Residual Chlorine: 15; 16
 Salinity: 23
Salmonella spp.: 17; 19; 22; 26
 Sampling: 35
 SAR (Sodium Adsorption Ratio): 21
 Selenium: 15; 16; 24
 Settleable solids: 27
 Silica: 17
 Silver: 17
 Simazine: 16
 Sodium: 15; 16; 25
 Somatic bacteriophages: 30
Staphylococcus aureus: 17; 19; 32
 Sulphates: 15; 16
 Sulphite-reducing clostridia: 17; 31
 Sulphur dioxide (SO₂): 24
 Suspended solids: 23; 27
 Temperature (in situ): 35
 Terbutylazine: 16
 Tetrachloroethene: 16
 Thallium: 24
 Tin: 24
 TOC: 19; 21
 Toluene: 16
 Total coliforms: 17; 19; 22; 23; 26; 31; 32
 Total cyanides: 17
 Total Chlorine: 15; 16
 Total nitrogen: 21
 Total organic carbon (TOC): 19; 21
 Total Organic Matter: 26
 Total phosphorus: 17; 21; 25; 26
 Total solids at 105°C: 27
 Toxicity: 21
 Trichloroethene: 16
 Turbidity: 15; 16; 21; 23
 Vanadium: 17; 24
 Vinyl Chloride: 16
 Volatile suspended solids: 27
 Volatile total solids: 27
 Zinc: 15; 16; 21; 24; 25; 26

Notes

[illegible]



Making quality control easy

C/ Dracma 7
Pol Ind. Las Atalayas
03114 Alicante / **Spain**

T. +34 966 10 55 01
comercial@ielab.es

www.ielab.es