Sampling and analysis
ENVIRONMENTAL SERVICES

Because you care about consumers’ health
Our analytical capabilities build
A SAFER ENVIRONMENT
Mérieux NutriSciences’ global mission aims at safeguarding public health by operating in the testing sector, in the areas of environment, food, pharma, cosmetics and consumer goods.

Thanks to cutting-edge technologies, Mérieux NutriSciences is a reliable partner for companies both for performing routine tests and providing scientific solutions to the most complex issues.

Aware of the importance of minimizing the possibility of unforeseen events and errors, Mérieux NutriSciences offers a valid support in risk control through consultancy and accurate and timely analytical data.

Environmental services

The environmental department carries out a wide range of analytical tests on waste, water, soil and air to ensure an optimal level of protection of both the environment and health.

Our specialized environmental services include sampling and analyses of surface and ground water, leachates, soils, sediments, sludge, solid waste, liquid and gaseous effluents as well as stack emissions. Moreover, Mérieux NutriSciences gives support in the correct classification of waste abiding by the standards of environmental quality.

Mérieux NutriSciences laboratories count on a very high analytical quality and accreditations: thanks to the flexibility of the highly qualified staff meeting the specific needs of the market, the labs guarantee a defensible analytical result, with excellent performances in the ring-tests and in the several intercalibrations.
Our laboratories

Mérieux NutriSciences provides advanced testing solutions through over 100 accredited laboratories in more than 20 countries and thanks to 7,000 employees. The Italian center, where environmental laboratories of European importance are located, has:

- 8 accredited laboratories
- 14 operational offices
- 1,000 employees
- 22,000 mq di laboratories
- 2,000 sq. of laboratories
- more than 1,200 types of chemical, physical, microbiological, toxicological and ecotoxicological environmental analyses
- about 1000 environmental samples processed daily
- a system able to perform more than 5,000 data per hour

Accreditations and certifications: the guarantee of our technical skills and the correct management of our laboratories

- CEI EN ISO/IEC 17025:2005
- ISO 9001:2015
- ISO 14001:2015
- OHSAS 18001:2007
- DOD-ELAP
- Registration to the Register of Research Laboratories
- Registration in the list of research organizations through which French companies benefit from the Crédit d’Impôt Recherche (CIR)

With reference to field staff, Mérieux NutriSciences benefits from:

- Technical staff authorized to operate within limited spaces according to Presidential Decree no. 177/2011
- Technical staff qualified as “Asbestos Operator”
- Technical staff with environmental acoustic skills as per art. 2, para. 6, 7 and 8 of Italian Law no. 447/95

Certifications, acknowledgments and authorizations

Mérieux NutriSciences laboratories comply with CEI EN ISO/IEC 17025: 2005 standard. Italian laboratories are certified by Accredia, the Italian accreditation body.

The accreditations are recognized worldwide and are applied to test methods and sampling in the environmental field.
**Field activities**

Professionalism, continuous updating and accuracy are the main features of this sector.

The team dedicated to sampling and field activities is composed of more than 100 technicians who are regularly updated and trained in compliance with current regulations on sampling.

In the environmental sector, sampling is a **fundamental part of the analytical process** since a significant and representative sample is created rightly at this stage.

Mérieux NutriSciences performs sampling on all environmental matrices following national guidelines.

**Measurements and sampling**

- Emissions monitoring
- Industrial hygiene
- Acoustics
- Water, soil, waste

**Support to customers**

Analytical tests are the core service performed by Mérieux NutriSciences, however, they are always accompanied by assistance activities that can guide and support customers, especially in the choice of the analytical plan and for the needs that may arise during service implementation.

**Customer assistance is guaranteed by our Customer Care and Project Managers.**

**Customer Care**

The **Customer Care team dedicated to the environmental sector** is composed of highly specialized technicians and graduates in scientific subjects; they are dedicated to the relationship with customers. In this regard, Mérieux NutriSciences started the internal development project "**Customer Excellence**" which is based on the strengthening of excellence in personal relationships, moving from a purely technical attitude to a 360° focus on customer service.

The main activities of the Customer Care are the following:

- technical advice and drafting of analytical plans;
- reports with opinions (closing of test reports) and conformity assessments, interpretations and comments of test results in compliance with current regulations
- technical reports;
- general advice to public and private bodies in case of criminal proceedings, seizures, etc.

**Project Manager**

The **Project Managers** take care of specific orders and are a reference for both management and contractual aspects.

These are people with specific scientific training and long experience in the environmental sector dedicated to customers who need a thorough technical/legislative knowledge, as well as a high standing service, including the planning of field activities.

The Project manager can be seen as a real **consultant** who, by managing specific orders, understands the requests thoroughly and is able to respond to critical issues.
Water

Water is a fundamental element for the life of organisms and for all human activities. Current legislation specifies the chemical, physical and biological characteristics to abide by according to the final purpose of water: Mérieux NutriSciences performs water analysis to ensure the quality of surface, underground and waste water in full compliance of global standards. Mérieux NutriSciences performs sampling and tests on:

- **Potable Water** potable and mineral water, water in public bathing areas and spas, water for agricultural uses (such as irrigation of crops), and water used in industrial processes or urban and industrial effluents

- **Surface Water** streams, rivers, lakes, swamps, sea water and water treated for public supplies, bathing, fish farming or irrigation

- **Ground Water** which flows below earth surface, in soil or rock formations, among the pores of the sedimentary particles and the cracks of compact rocks

- **Waste water** industrial and domestic effluents (houses, municipal drains, crafts activities, etc.), agricultural and zootechnical effluents

Our specialized laboratories perform chemical analyses to determine contaminants and residues, including heavy metals, PCBs and dioxins and microbiological analyses to detect all potentially harmful bacteria. We also perform specific analyses to detect Legionella pneumophila and thus manage the risk of Legionellosis.

Mérieux NutriSciences performs radioactivity measurement in potable water and detects: tritium concentration, Indicative Dose (evaluable through total alpha and total beta activities) and radon concentration.

Mérieux NutriSciences therefore performs ecotoxicity assessment with the aim to predict the effects of pollution on biological organisms and preventing or remedying any harmful effects in the most efficient and effective way.
Soil, rocks and sediments

Mérieux NutriSciences performs a wide range of tests within the monitoring of contaminated areas.

Soil and sediment and surface water sampling and analysis are performed: analytical services include chemical analysis of organic and inorganic compounds including pesticides, heavy metals (such as zinc, cadmium, chromium, etc.), BTEX, PAH, phenols, PCDD/PCDF and PCB, as well as granulometric curve and soil geotechnical classification.

Contaminants alter the properties of soil and sediments, thus making them less suitable to host plants and animals and creating situations of danger for humans and other living organisms. Analytical surveys on soils, through high quality test protocols, allow decisions to be taken based on scientifically defensible data for the protection of the environment and the protection of citizens’ safety. The tests support the risk management and guarantee full comparability with the checks performed by relevant control bodies.

Mérieux NutriSciences performs soil analysis and sampling in contaminated sites to verify their degree of contamination and verify the possible reuse of the soil obtained by excavation works, in uncontaminated areas.

Soil analysis plays an extremely important role in environmental investigations aimed at the characterization of sites for commercial/industrial use but also for residential/public-private green areas, thus conditioning the construction of infrastructural works or the start-up of land reclamation or disposal activities.

Testing sediments is one of the best approaches to obtain historical information on the pollution of an area because they represent the environmental matrix that gathers both materials coming from the rocks in the emerged land and spilling into the environment caused by human activities.

The main soil analyses performed by Mérieux NutriSciences include:

- Analysis of excavated land and rocks
- Analysis on contaminated soils
- Sediment analysis
- Analysis on samples from surveys, trenches, excavation bottom
- Granulometric curves and soil geotechnical classification
- Evaluation of soil chemical aggression against concrete
- Analysis of sludge, residues and compost to be used in agriculture
- Measurement of radioactivity
Waste

Each production activity involves the production of solid and liquid waste that must be classified. Mérieux NutriSciences provides analyses and complete assistance for waste management programs.

We deal in particular with:

- supporting producers in waste characterization
- classifying waste according to local and international laws, thus defining its characteristics and the hazard class in the case of hazardous waste
- carrying out preliminary analyses to define the final destination of waste (disposal or recovery)
- carrying out product analyses on heterogeneous urban or industrial waste, according to official methods and aimed at assessing the suitability of the waste to be recycled
- detection and quantification of asbestos
- measurement of radioactivity

Mérieux NutriSciences supports producers in the characterization of waste and assists them in compiling the waste report and scheduling the sampling plan. Following the characterization, it is possible to identify the EWC code of the waste and choose the test plan to proceed with the classification.

Laboratory tests are also important for assessing the final destination of waste. Mérieux NutriSciences prepares and performs specific analytical plans to identify waste that will be disposed of or that can be recovered or by-products that can be recycled.

Mérieux NutriSciences therefore deals with training and consulting for the applicability of the ADR agreement with reference to the international transport of dangerous goods and in the management of packaging, labeling and storage.
Environmental investigations

Industrial activity can lead to **environmental pollution in working and living environments** due to chemical, physical or biological agents. Thanks to a team specialized in **industrial hygiene**, Mérieux NutriSciences performs the analysis of various environmental factors that are fundamental for the monitoring of the quality of the indoor/outdoor environment in the industrial context for the purposes of health protection and the well-being of workers and the population. All tests are accompanied by their reports: the team gathers the information obtained from the monitoring campaigns and put them into exhaustive reports that make the results readable and readily accessible.

**Working environment**
Mérieux NutriSciences monitors and analyzes air and pollution of indoor environments.

**Physical agents**
- Phonometric tests
- Mechanical vibrations
- Tests on the microclimate

**Biological agents**
- Determination of microbiological contamination (bacteria, fungi, Legionella, etc.)
- Detection of the airborne microbiological components
- Evaluation of the microbiological components on surfaces

**Chemical agents**
- Analysis of artificial mineral fibers and asbestos
- Sampling and analysis of organic contaminants (aromatic organic substances, chlorates, etc.) and inorganic contaminants (metals, acids, ammonia, aldehydes, etc.)
- Detection of odor concentration
- Environmental checks of possible pollution following remediation, fire, etc.

**Living environment**
In recent decades, air quality has been heavily influenced by industrial and civil activities that have caused a progressive deterioration: to curb it, international legislations have outlined targets of quality for pollutants, in relation to the protection of health, plants, and the ecosystem.

Mérieux NutriSciences performs sampling and analysis of **biological agents present in the air, odorigenic substances (olfactometric tests), acoustic impact, and chemical air contaminants**:
- PM 10 and PM 2.5
- Carbon monoxide, nitrogen oxide, sulfur dioxide
- Benzene (VOC)
- Ozone
- Metals (lead, arsenic, cadmium, mercury, nickel)
- Benzo(a)pyrene
Radioactivity

Mérieux NutriSciences determines the quantity of gamma-emitting radionuclides by a gamma spectrometer equipped with a germanium solid state detector (HPGe, High Purity Germanium Detector).

We carry out environmental air monitoring in areas at risk: in this case, samples of ambient air suction filters can be tested to protect the health of workers and the population.

Flux Chambers

Flux chambers are a really useful tool for estimating the flow of interstitial gases that spread in the air from contaminated sites. These measurements have assumed a very important value in the risk analysis and in the subsequent decision-making processes within the remediation activities: they allow the evaluation of the “vapor intrusion”, namely the process through which the pollutant chemical substances present in the soil or in the underground water can fill the unsaturated soil thus reaching the above environment and altering indoor and/or outdoor air quality, with potential risk to human health.

A flux chamber can isolate an area from external environmental conditions: the main microclimatic parameters that are monitored inside it are not bound to site weather conditions, especially wind.

The main substances that flow chambers can search are aromatic, aliphatic and organ-chloride hydrocarbons, nitrogenous and halogenated hydrocarbons, sulphurates, mercury, etc.

Mérieux NutriSciences owns several flow chambers and has a consolidated experience in their installation and management.
Canister

In recent years, the leading method for the sampling and subsequent analysis of volatile organic substances in indoor and outdoor air in concentrations lower than 5 ppm is Canister.

The Canister is well known for its simplicity because it allows to operate with a reduced chain of components; moreover, it allows the detection of a considerable number of volatile compounds, it reaches much higher sensitivity than traditional methods (GC-FID) and it can be easily transported.

The advantages of Canister:

- no alteration of the sample compared to collection conditions;
- no need to measure sample volume during collection;
- air analysis with no need of adsorptions and extractions;
- wide range of sampling time intervals (from a few seconds to a week);
- Canister internal surface is inert if compared to the pollutants present in the air sample;
- determination of many compounds, including thermo-labile ones;
- low-temperature sample transfer from the Canister to the testing tool;
- possibility of multiple tests and their repetition, thanks to the quantity of collectable samples;
- possibility to preserve the sample;
- high capacity for compounds separation/identification;
- reduced possibility of Canister breaking (during transport and use);
- few components that allow the reduction of measurement uncertainty.

Interstitial gases

Interstitial gases or "soil gases" are gases and vapors that are present in the intergranular spaces of the subsoil; they are generated by microbiological or geological phenomena or by an environmental contamination.

Mérieux NutriSciences has specific soil gas probes to be used for active sampling: they are placed in the unsaturated soil to extract gases by means of vacuum pumps. Gas analysis can be performed directly on site through colorimetric kits, portable flame ionization detectors (FID), photoionization detectors (PID), and infrared detectors (IR). If laboratory tests are carried out for more complex investigations, the sample is collected by Canister or adsorbent support, such as activated carbon.

The sampling and analyses of interstitial gases (also referred to as “soil atmosphere”) are usually carried out near contaminated areas to assess gas migration, in support of reclamation activities or in the assessment of the risk of inhalation of vapors; this activity is also used to better define the extent of the source of contamination or to verify the effectiveness of remediation technologies.
Stack emissions

Stack emissions are one of the main environmental aspects that manufacturing companies take into consideration.

The team of Mérieux NutriSciences is composed of specialists that operate in multifold scenarios: from the analysis of emissions of medium and small companies subject to self-controlled companies (such as paper mills, foundries, painting plants, cement factories, etc.), and emissions of large industrial plants, such as incineration/co-incineration plants, large combustion plants (≥ 50 MW), steel plants, refineries and petrochemical industries.

Big plants have emission monitoring systems called AMSs (Automatic Measuring Systems) and must provide the competent authorities with continuous emissions data of parameters such as dust, CO, CO2, SO2, NOx, O2, COT, HCl, HF, CH4, NH3, humidity, etc.

The quality of the data provided by Automatic Measuring Systems must be guaranteed by carrying out checks and inspections according to UNI EN 14181 standard through QAL and AST procedures.

Besides the evaluation in accordance with the procedures described in UNI EN 14181 standard, the laboratory can perform the verification of Relative Accuracy Index, Linearity of the response over the whole measurement range, Calibration of indirect measurement systems (determination of the curve linking the instrumental answer and a standardized reference system).

The team dedicated to emissions boasts thirty years of experience and is composed of highly specialized technicians. The team avails of constantly updated latest generation materials and sampling lines complying with the requirements of technical specifications and the UNI EN ISO IEC 17025.

From the point of view of sampling and testing techniques, the field of application covers a wide variety of situations: from the monitoring of macro-pollutants with equipped vehicles to more complex sampling of organic micro-pollutants (dioxins, furans and PCBs) and the verification of emission monitoring systems.
Mobile labs

As happens in special surveys, Mérieux NutriSciences owns several vehicles that are differently equipped according to the monitoring to perform during field activities.

Mobile air monitoring labs

They can be used to monitor the main parameters related to air pollution such as **fine dust**, **volatile organic compounds**, **nitrogen oxides**, **sulphurates**, **mercaptans**, **ozone**, **carbon oxides**, **hydrocarbons**, etc. in any situation or place - zoning campaigns, temporary sites, environmental impact studies in specific areas. They are a **versatile** station able to directly manage all the information and deliver them in real time.

Mobile emissions labs

The vehicles of Mérieux NutriSciences are equipped with **AMSs (Automatic Measuring Systems)** equipped with:

- a Non-Dispersive Infrared (NDIR) analyzer for NOx and CO analyses;
- a paramagnetic sensor for O2 measurements.

The sampling system consists of a probe with a **particulate filter**, a **probe that is heated above the dew point**, a dual-stage **cooling gas conditioning system** (for water removal with continuous self-drainage of the condensate), a **sampling pump and a catalytic converter of NOx into NO**. The survey can be controlled remotely for the direct management of the data.

Mobile labs

They are real itinerant laboratories that allow field analysis and post-sampling rapid results: they are **duly equipped to house testing tools** and equipment for sample management. They are used in particular for **reclamation activities for the first classification of the waste material** (soil) and to control the soil at the bottom of the dig and on the excavation walls. They can be also useful for the analyses of excavated water produced during reclamation operations to characterize the organic component addressed for disposal.