Application quick reference guide



LAB WATER SOLUTIONS

VEOLIA

Aquariums

An aquarium is a vivarium consisting of at least one transparent side in which water-dwelling plants or animals are kept. Providing water of appropriate physical and chemical quality is probably the most important factor for the care and maintenance of captive fish.

The water quality and temperature should be optimized for the specific species of fish being used. Often purified water is used and nutrients etc. added. High purity is not needed but bacterial levels should be low. Type II pure water is sufficient.

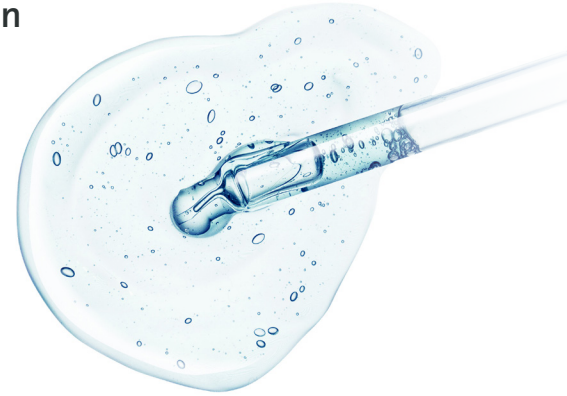


Market	Life Science
Products	Purelab® Chorus 2+

Atomic Absorption Spectroscopy (AAS)

AAS is a technique for the determination of the total concentrations of specific elements in a sample. It is used for trace analysis at ppm (mg/l) or ppb (ug/l) levels.

Analysis by AAS requires the use of high purity reagents and solvents to ensure the accuracy and precision of measurements, as well as to avoid contamination during sample preparation and calibration. Type I ultrapure water is sufficient for high sensitivity and Type II pure water for general AAS.



Market	Analytical
Products	Purelab® Classic, Purelab® flex, Purelab® Quest, Purelab® Chorus 1, Purelab® Chorus 1 Complete, Purelab® Chorus 2+,

Autoclaves

Autoclaves are used in sterilizing media and instruments, and in the treatment and sterilization of waste, such as pathogenic hospital waste.

Autoclaves utilize pressurized steam and superheated water. Only relatively small volumes of water are needed. High water purity is not essential. General laboratory grade Type II pure water would be satisfactory.



Market	Clinical Healthcare, Life Science, General Laboratory
Products	Biopure 200/300/600

Biochemical or Biological Oxygen Demand (BOD)

BOD provides a measure of the amount of biodegradable organic material present in wastewater, effluent and polluted waters. BOD measures the amount of dissolved oxygen consumed by bacteria while oxidizing these materials.It is a measure of the ecological impact that effluent water may have on the aqueous environment (river, lake, etc.).

This test is often required in discharge permits, as it is a means of assessing the degree of water pollution. Water should have medium to low levels of total organic carbon (<100 ppb). Type II pure water is sufficient.

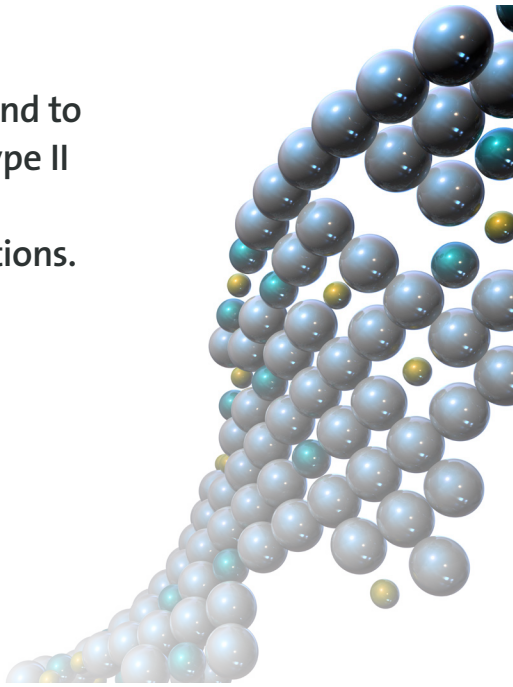


Market	Life Science
Products	Purelab® Chorus 2+

Capillary Electrophoresis (CE)

Capillary electrophoresis is a technique used to separate ionic species based on their size to charge ratio. It is used for small ions but has found a major role in proteomics.

In CE, water is used to prepare the buffers, blanks, standards, and to rinse the capillary. It is important to use Type I ultrapure and Type II pure water that is low in organic and inorganic contaminants. Water free from bioactive species is needed for protein separations. Apyrogenic Type I ultrapure water is preferred.

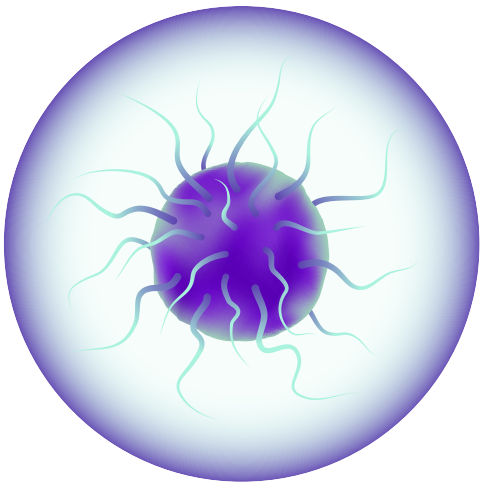


Market	Analytical
Products	Purelab® Classic, Purelab® Chorus 1, Purelab® Chorus 1 Complete, Purelab® Chorus 2+,

Cell or Tissue Culture

Cell culture is the process by which cells are grown under controlled conditions. Water is used in many steps of tissue or cell culture. It is the main component of buffers and media; it is used for the dissolution of additives and drugs, and for rinsing bioreactors, plastic ware and glassware.

Water quality plays an important role in cell culture experimental outcomes. Apyrogenic Type I ultrapure water is essential. For larger-scale facilities pharmaceutical Water for Injection is used.



Market	Life Science
Products	Purelab® Chorus 1, Purelab® Chorus 1 Complete, Purelab® flex

Chemical Oxygen Demand (COD)

The COD test is commonly used to indirectly measure the amount of organic compounds in water. Water is used in COD tests for blank preparation, sample dilutions and glassware rinsing.

The recommended water purity is high with low levels of TOC (<100 ppb) but type I ultrapure water is not required Type II pure water is sufficient.

Market	Life Science, General Laboratory, Analytical
Products	Purelab® Chorus 2, Purelab® Chorus 1, Purelab® flex



Colorimetric Testing

Colorimetry uses colours in the visible range of the light spectrum for a variety of measurements, typically of coloured complexes formed by metal ions.

General laboratory grade Type II pure water is usually suitable for colorimetry.

Market	General Laboratory
Products	Purelab® Chorus 2, Purelab® Chorus 2+



Denaturing High Performance Liquid Chromatography (DHPLC)

DHPLC uses reversed-phase HPLC, based on a solid phase which has differential affinity for single and double stranded DNA, to interrogate single nucleotide polymorphisms (SNPs). It is used in SNP genotyping, i.e. the measurement of genetic variations of SNPs between members of a species.

Pyrogenic Type I ultrapure water is needed to avoid the effects of biologically active species such as endotoxins and nucleases.

Market	Life Science
Products	Purelab® Classic, Purelab® Chorus 1, Purelab® Chorus 1 Complete, Purelab® flex



Dissolution Testing

Dissolution testing is a critical formulation tool in the process of drug discovery.

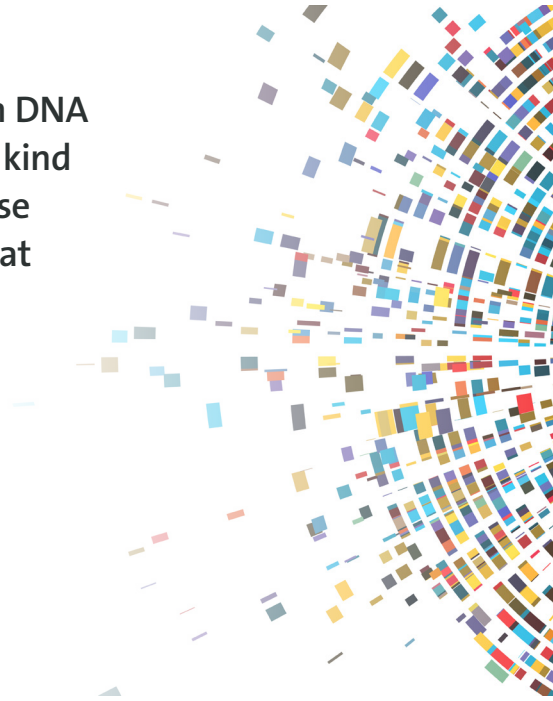
The purity of the water used in preparing the dissolution media is important since it is in direct contact with the drug product being tested. Impurities in the dissolution media may interfere with the drug itself or with some of the components of the dosage form. Type II pure water is sufficient.

Market	Clinical Healthcare, General Laboratory, Life Science
Products	Purelab® Chorus 2+, Purelab® Chorus 2



DNA Microarrays

DNA microarray is a multiplex technology used in molecular biology.
Purified water is used during the manufacturing process.



In order to perform the DNA microarray experiment, enough DNA or RNA needs to be available. It is usually obtained via some kind of PCR-based DNA amplification technique, requiring nuclease free Type I ultrapure water. This step also requires buffers that must be prepared with apyrogenic Type I ultrapure water.

Market	Life Science
Products	Purelab® Classic, Purelab® Chorus 1, Purelab® Chorus 1 Complete, Purelab® flex

DNA Sequencing

DNA sequencing refers to sequencing methods for determining the order of the nucleotide bases in a molecule of DNA. The generation of DNA fragments, generally by a PCR-based technique is followed by the separation of the fragments by capillary or regular agarose gel electrophoresis.

Apyrogenic Type I ultrapure water is needed.

Market	Life Science
Products	Purelab® Classic, Purelab® Chorus 1, Purelab® Chorus 2+, Purelab® flex



Electrochemistry

Electrochemistry covers the science of the interaction or interconversion of electrical and chemical phenomenon.

It is vital that the water used produces minimal interference due to background contamination. High purity water is needed. For general work, general grade laboratory water is adequate, for trace work Type I ultrapure water is required.



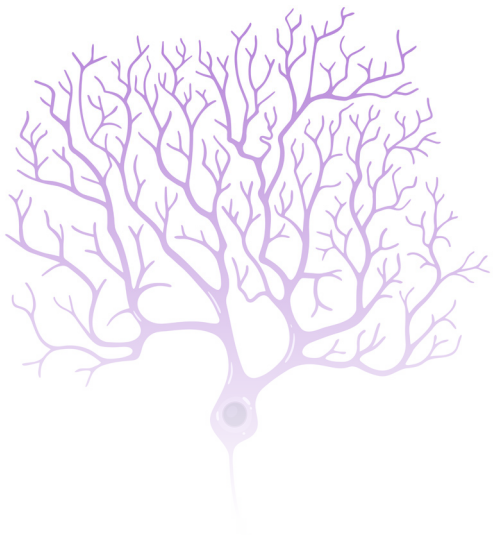
Market	General Laboratory, Analytical
Products	Purelab® flex, Purelab® Chorus 2+, Purelab® Chorus 2, Centra R

If trace ultrapure is needed, Chorus 1 and Chorus 1 Complete.

Electrophysiology

Electrophysiology investigates the electrical properties of biological cells and tissues, measuring voltage and current from ion channels to whole organs. Techniques such as patch-clamp recording require sterile, high-purity solutions, with water used for rinsing and preparing physiological buffers. Cells are bathed in an extracellular solution (ECS), while the recording pipette contains an intracellular solution (ICS).

The ionic composition, pH and osmolarity of these solutions must be carefully controlled. Apyrogenic Type I ultrapure water is needed.



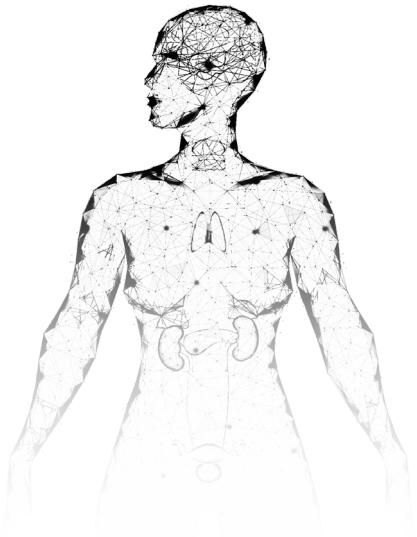
Market	Life Science, General Laboratory
Products	Purelab® Classic, Purelab® Chorus 1, Purelab® Chorus 1 Complete, Purelab® flex

Endocrine - Disrupter Analysis

Endocrine disruptors are exogenous substances that act like hormones in the endocrine system and disrupt the physiological function of endogenous hormones. They are measured in environmental samples and their effects also studied in the laboratory. All the test methods and trace analytical work require ultrapure water free of endocrine disrupters and other interferants.

Apyrogenic Type I ultrapure water is used, according to the technique employed, for making buffers and standards for the production of the cell culture media.

Market	Life Science, General Laboratory
Products	Purelab® Chorus 1, Purelab® Classic, Purelab® flex



Feed to Stills

Stills produce purified water by evaporating and then condensing the feed water. Extra stages are required to minimise carry-over and collection of volatiles.

Partially purified feed water is needed to operate viably. Low ionic feed water for a still reduces excessive build-up of deposits which would require frequent cleaning and minimises carry over. Reverse osmosis permeate or deionised water is often used. Type III RO water is sufficient.

Market	General Laboratory
Products	Purelab® Chorus 2, Purelab® Chorus 3



Feed to Ultrapure Water Systems

Type I ultrapure water is widely used in laboratories. It is often conveniently prepared in two stages: a source of prepurified water followed by a “polisher” to achieve the highest purity water.

The pre-purified water is produced by reverse osmosis with possibly, ion exchange or electrodeionisation and stored in a reservoir before polishing. The quality of this pre- treated water affects the performance of the system and cartridge life. Type III RO or Type II pure water is sufficient.



Market	General Laboratory
Products	Purelab® Chorus 3, Purelab® Chorus 2+, Purelab® Chorus 2, Centra R

Flame Atomic Absorption Spectroscopy (FAAS)

FAAS is a widely used technique for determining metals and metalloids in solution at ppb or ppm levels. Metal ions are converted to the atomic state by nebulisation into a high temperature flame. Light of the appropriate wavelength is shone through the flame and the amount of light absorbed is measured against a standard curve.

Analysis by AA requires the use of analytical grade reagents and solvents to ensure the accuracy and precision of measurements. Type II pure water with a resistivity greater than 5 Mohm.cm is usually suitable.

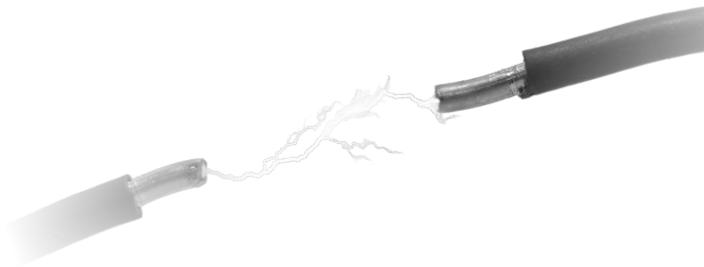


Market	Analytical, General Laboratory
Products	Purelab® flex, Purelab® Chorus 2, Purelab® Chorus 2+, Centra R

Fuel Cells

Fuel cells are electrochemical cells that convert chemical energy from the reaction of a fuel (usually hydrogen) with an oxidising agent (usually oxygen from air) directly into electrical energy. Various combinations of fuel and oxidant are possible.

Where water is used it must be sufficiently pure to avoid contaminating the electrodes etc. Type II pure water is usually satisfactory.



Market	Analytical
Products	Purelab® Chorus 2, Purelab® Chorus 2+ Purenergy

Gas Chromatography (GC) and Gas Chromatography – Mass Spectrophotrometry (GC-MS)

GC and GC-MS are the most sensitive and widely used techniques for the separation and determination of the components of mixtures of volatile or semi-volatile compounds. Samples are volatilized and separated on a column. The technique is especially powerful when a mass spectrometer is used as a detector as individual components can then be characterized and identified directly.

Type I ultrapure water is used mainly in sample preparation. Low TOC (typically <5ppb) is essential.



Market	Analytical
Products	Purelab® flex, Purelab® Chorus 1, Purelab® Chorus 1 Complete, Purelab® Classic, Centra R

General Chemistry

General scientific work such as in schools and general industry.

Requires Type II pure water to get reliable results. Most applications are at ppm levels or higher and water purity requirements are not high. Reverse osmosis alone is not adequate but Type II general laboratory grade water with resistivity >1 Mohm.cm and TOC < 100 ppb is suitable.

Market	General Laboratory
Products	Purelab® flex, Purelab® Chorus 2+, Purelab® Chorus 2, Centra R



Graphite furnace atomic absorption spectrophotometry (GF-AAS)

GF-AAS is a variant of AAS which uses a small carbon tube rather than a flame to atomize the sample. It is a very sensitive method suitable for the measurement of ultra-trace levels of elements. The detection limits for many elements are well below 1ppb.

Water is used to prepare blanks, standards, sample preparation and needs to be extremely low in relevant impurities. Type I ultrapure water is required.

Market	General Laboratory
Products	Purelab® flex, Purelab® Chorus 1, Purelab® Chorus 1 Complete, Centra R



Glassware Washing

Glassware washing is a universal laboratory activity and a major use for purified water, principally for the final rinse stages to avoid the staining and build-up of deposits from tap water. The purity of water required depends on the applications of the items being washed.

General purpose Type II pure water is usually suitable. Water contaminants can interfere with detergents. Therefore, softened or purified water is also usually recommended for the washing step of the process.

Market	Analytical, Life Science, General Laboratory
Products	Purelab® Chorus 2, Purelab® Chorus 2+, Centra R



Histology

Histology is the study of the microscopic anatomy of cells and tissues of plants and animals, performed by examining a thin slice (section) of tissue under a light microscope or electron microscope. Histopathology, the microscopic study of diseased tissue, is an important tool in the diagnosis of cancer and other diseases.

General grade Type II pure water, low in bacteria and particles is suitable.

Market	Analytical, Life Science, General Laboratory
Products	Purelab® Chorus 2, Purelab® Chorus 2+, Purelab® flex, Centra R

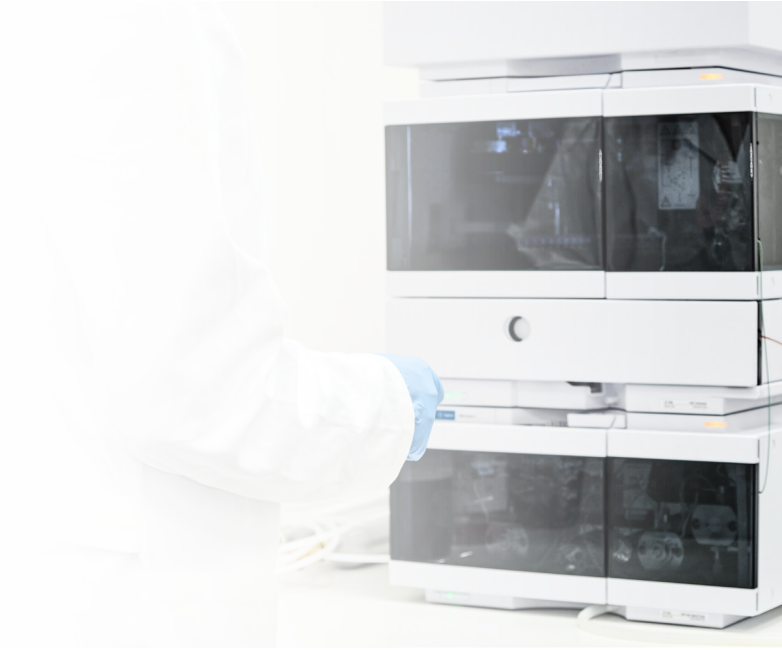


High Performance Liquid Chromatography (HPLC) or simply Liquid Chromatography (LC)

HPLC can separate a mixture of compounds and is used in biochemistry and analytical chemistry to identify, quantify and purify the individual components of the mixture. It is one of the most powerful tools in analytical chemistry. It has become a very common laboratory instrument. With suitable choice of methodology, HPLC has the ability to separate, identify, and quantiatify most compounds present in any sample that can be dissolved in a liquid. Today, compounds in trace concentrations as low as parts per trillion may be identified with the appropriate detector.

Type I ultrapure water with typical TOC less than 5 ppb is needed for the more demanding applications.

Market	Analytical
Products	Purelab® flex, Purelab® Classic, Purelab® Chorus 1, Purelab® Chorus 1 Complete, Centra R



Hydrogen Generators

Hydrogen generators use electrolytic dissociation of water to generate a continuous supply of high purity hydrogen suitable to feed a range of analytical applications including mass spectrometry and GC.

Type II pure water (distilled or deionized quality) is needed as water purity is important for optimal performance and to minimise maintenance.

Market	Analytical
Products	Purelab® flex, Purelab® Chorus 2, Purelab® Chorus 2+, Purenergy



Hydroponics

Cultivation of plants in nutrient solution rather than in soil. Terrestrial plants may be grown with their roots in the mineral nutrient solution only or in an inert medium.

Nutrients solutions are prepared using purified water which can be a general laboratory grade. Type II pure water is sufficient.

Market	Life Science
Products	Purelab® Chorus 2, Purelab® Chorus 2+



Inductively coupled plasma atomic (or optical) emission spectrometry (ICP-AES/ICP-OES)

ICP-AES or ICP-OES is an analytical technique used for multi element analysis.
It has a wide linear range and is used for concentrations from ppb to g/l.

Quality sub-ppb levels of metallic impurities are important in the Type I ultrapure water used to prepare blanks, standards etc of trace metals.

Market	Analytical
Products	Purelab® flex, Purelab® Classic, Purelab® Chorus 1, Purelab® Chorus 1 Complete



Inductively Coupled Plasma Mass Spectrometry (ICP-MS)

ICP-MS uses a high temperature source and a mass spectrometer to provide the most sensitive method for general analysis of elements in solution with detection limits below 1 ppt for many elements. Clean room conditions are preferred.

Water is extensively used for sample preparation, standards and blanks. Extremely ultrapure Type I water free from elemental impurities is essential to avoid contamination. Low levels of organics are also desirable.

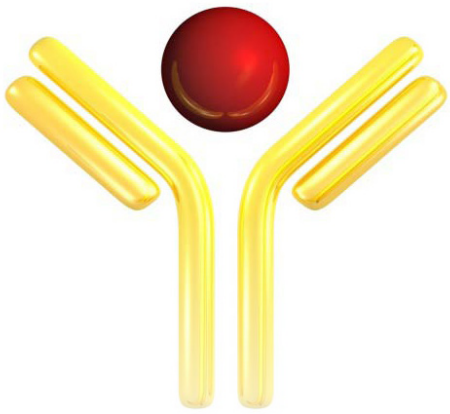


Market	Analytical
Products	Purelab® Chorus 1

Immunohistochemistry

Immunohistology refers to the process of localizing antigens in cells of a tissue section exploiting the principle of antibodies binding specifically to antigens in biological tissues. Water is ubiquitous in histology laboratories. It is used in water baths, floatation baths, and in most of the automated instruments present in the laboratory.

Poor quality water may generate hard deposits or bacterial bio films. Apyrogenic Type I ultrapure water is needed if it comes into contact with the materials under test.



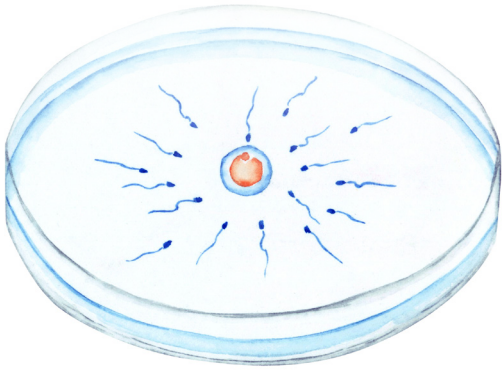
Market	Life Science
Products	Purelab® flex, Purelab® Classic, Purelab® Chorus 1, Purelab® Chorus 2, Centra R

In Vitro Fertilization (IVF)

IVF is a laboratory procedure in which typically sperm are placed with an unfertilized egg in a Petri dish to achieve fertilization. The success of the procedure depends critically on the absence of bio-active contaminants such as endotoxins.

Apyrogenic Type I ultrapure water is used.

Market	Life Science
Products	Purelab® flex, Purelab® Classic, Purelab® Chorus 1

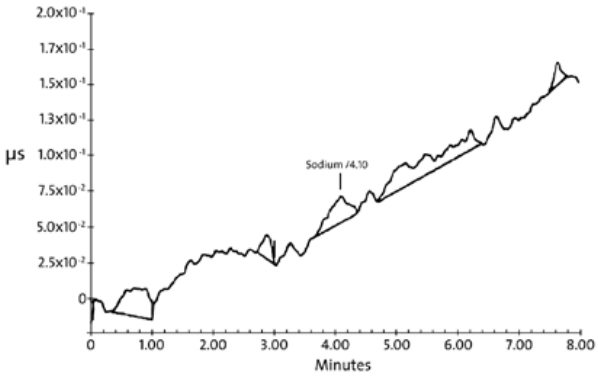


Ion Chromatography (IC)

IC is a chromatographic technique that allows the separation of ions and polar molecules based on their interaction with a column of ion-exchange media.. It can be used for almost any kind of charged molecule including large proteins, small nucleotides and amino acids. It is very widely used for determining inorganic and organic cations and especially anions. With pre-concentration low-ppt concentrations may be measured.

Type I ultrapure water is needed for blanks, standards, to prepare samples and for eluents.

Market	Life Science
Products	Purelab® flex, Purelab® Classic, Purelab® Chorus 1, Centra R



Kjeldahl Analysis

The method measures the total nitrogen in the forms of organically-bound nitrogen, ammonia and ammonium. The substance is decomposed with sulfuric acid to convert the nitrogen to ammonium ions which are subsequently released as ammonia, then absorbed and titrated. It is used to determine protein levels in food and nitrogen in soils, effluent and wastewater.

Water is used in the preparation of the reagents, standards and samples, and for rinsing the glassware and the apparatus. Water may also be used to generate steam for the distillation step of the analysis and for cooling (in condensers, etc.). General laboratory grade Type II pure water is suitable.



Market	Analytical
Products	Purelab® Chorus 2, Purelab® Chorus 2 +

Liquid Chromatography Mass Spectrometry (LC-MS)

LC-MS is an increasingly widespread analytical technique that combines the physical separation capabilities of liquid chromatography with the mass analysis and characterization capabilities of mass spectrometry. LC-MS is a powerful technique with very high sensitivity and very useful for analysing complex mixtures.

Water contaminants may impact on both the chromatography and the mass spectrometry. Type I ultrapure water with a TOC of less than 5 ppb is recommended.



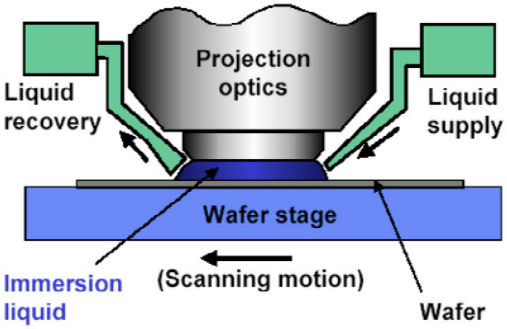
Market	Analytical
Products	Purelab® flex, Purelab® Classic, Purelab® Chorus 1, Purelab® Chorus 1 Complete

Lithography

Immersion lithography is a photolithography resolution enhancement technique that replaces the usual air gap between the final lens and the wafer surface with a liquid medium that has a refractive index greater than one. The resolution is increased by a factor equal to the refractive index of the liquid.

Current immersion lithography tools use highly purified water for this liquid, achieving feature sizes below 45 nanometers. Particle-free Type I ultrapure water is recommended.

Market	General Laboratory
Products	Purelab® flex, Purelab® Chorus 1 Complete



Matrix-Assisted Laser Desorption/Ionization (MALDI)

Matrix-assisted laser desorption/ionization (MALDI) is a soft ionization technique used in mass spectrometry, allowing the analysis of bio molecules (biopolymers such as proteins, peptides and sugars) and large organic molecules, which tend to be fragile and fragment when ionized by more conventional ionization methods.

Although MALDI is more tolerant to contamination than other ionization methods, it is important to use reagents (e.g., matrix) and solvents of the highest purity so as to avoid making the analysis of the mass spectra more challenging than it already is. Type I ultrapure water with TOC < 5 ppb is recommended.

Market	Life Science
Products	Purelab® flex, Purelab® Classic, Purelab® Chorus 1



Microbiological Media

Growth media are routinely required in a wide range of microbiological, hospital and bioscience laboratories where cells are cultured.

Water used for the preparation of growth media is usually of general laboratory grade as high inorganic and organic purity is not required. Media are generally autoclaved before use. For further studies on microorganisms, including genetics, PCR-based techniques, microarrays, protein analysis or others, please refer to the corresponding sections. Type I ultrapure water is recommended.

Market	Life Science, General Laboratory
Products	Purelab® flex, Purelab® Classic, Purelab® Chorus 1, Purelab® Chorus 1 Complete, Centra R



Northern & Southern Blotting

The Southern blot is a method routinely used in molecular biology for detection of a specific DNA sequence in DNA samples. The Northern blot is a technique used to study gene expression by detection of RNA in a sample.

Apyrogenic Type I ultrapure water is used for many steps of blotting: sample, buffer, gels and rinsing solutions preparation. Prior to blotting itself, either for Southern or Northern blotting, the sample preparation requires the highest purity of water to protect the raw material DNA or RNA.

Market	Life Science
Products	Purelab® flex, Purelab® Chorus 1, Purelab® Chorus 1 Complete, Centra R

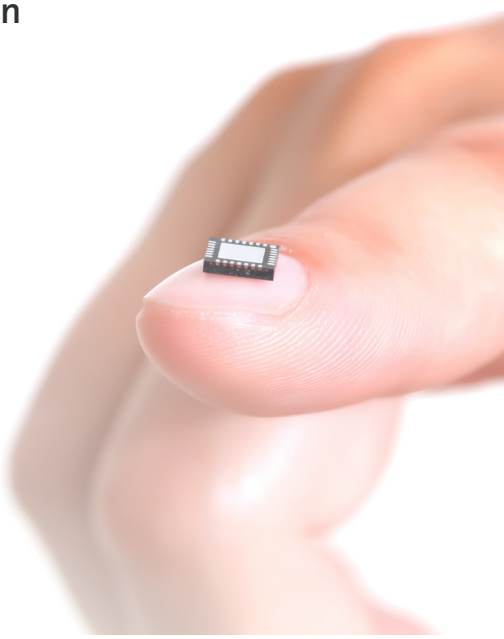


Particle Analyzers

Particle analysis is used in many applications ranging from sub-micron measurements in water for micro-electronics.

The absence of contaminating particles in the water is key. Water purity itself is not usually critical. 0.2 um filtration is often adequate but this can be extended to 0.05um or lower. Type II pure water is recommended for general sensitivity and Type I ultrapure water should be used for more critical sensitivity.

Market	Life Science, General Laboratory
Products	Purelab® flex, Purelab® Classic, Purelab® Chorus 1, Purelab® Chorus 1 Complete, Purelab® Chorus 2+

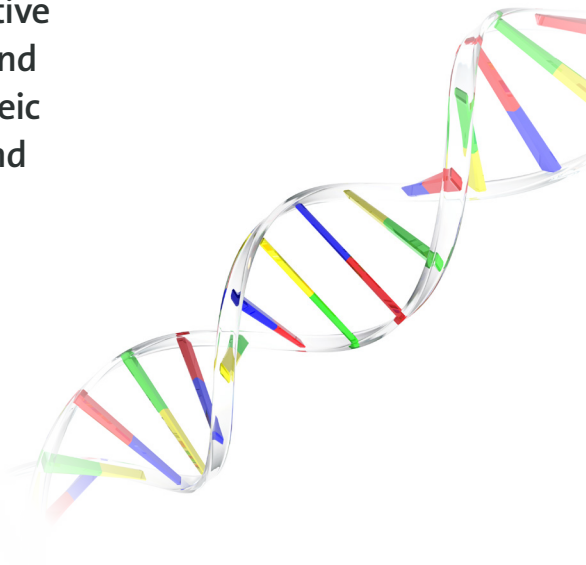


Polymerase Chain Reaction (PCR)

PCR is a technique in molecular biology to amplify a single or few copies of a piece of DNA by several orders of magnitude, generating thousands to millions of copies of a particular DNA sequence.

PCR and related PCR-based techniques, including quantitative PCR and reverse transcriptase PCR, require nuclease-free and endotoxin-free water to avoid the degradation of the nucleic acid. Water should also be free of specific ions, organics and bacteria. Apyrogenic Type I ultrapure water is essential.

Market	Life Science
Products	Purelab® Classic, Purelab® Chorus 1, Purelab® Chorus 1 Complete, Centra R



pH Measurement

pH is a measure of the acidity or basicity of a solution. It is quick and easy to determine and is important in many applications.

The water used to prepare pH standards should be devoid of significant concentrations of acids or bases and free of other substances that can modify the pH of the solutions. General grade Type II pure water is adequate.

Market	General Laboratory
Products	Purelab® Chorus 2, Purelab® Chorus 2+

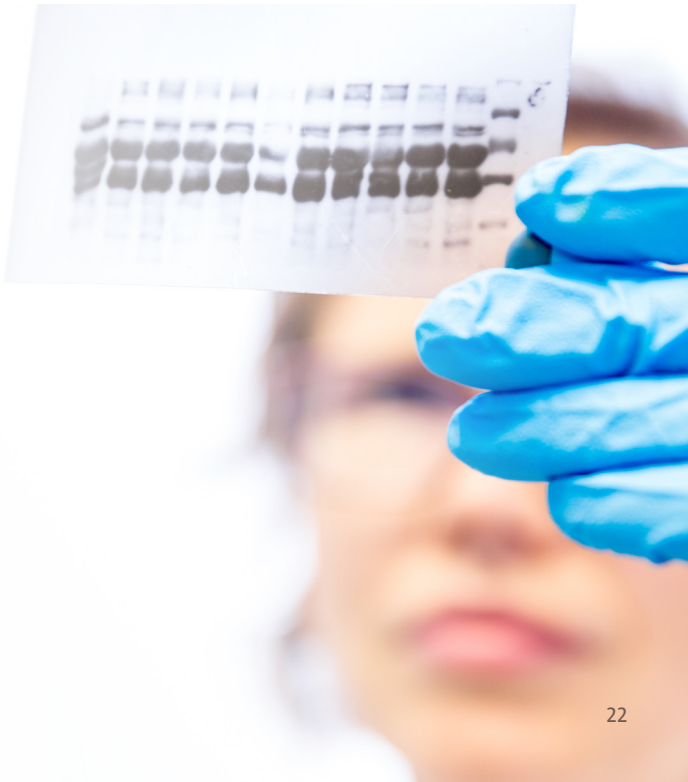


Protein Electrophoresis

Protein electrophoresis enables the separation of mixtures of proteins by means of gel electrophoresis, mainly in blood serum.

Apyrogenic type I ultrapure water is needed to avoid contamination by bacteria, nucleases, proteases and endotoxins. High concentrations of ions may alter the ionic strength of electrophoresis solutions.

Market	Life Science
Products	Purelab® flex, Purelab® Chorus 1, Purelab® Classic



Sample Dilution & Reagent Preparation

The water required for diluting samples, blanks, reagents and standards must be of sufficient purity that subsequent analyses are not affected.

The water required for diluting samples, blanks, reagents and standards must be of sufficient purity that subsequent analyses are not affected. These can range from ppb to ppt levels. Type II pure water is recommended.

Market	General Laboratory
Products	Purelab® flex, Purelab® Chorus 2, Purelab® Chorus 2+, Purelab® Chorus 3, Centra R



Solid Phase Extraction (SPE)

SPE is a semi-automated separation and concentration process by which compounds that are dissolved or suspended in a liquid mixture are taken up on a solid substrate and subsequently eluted before analysis.

For trace analysis water of the highest organic purity is needed to prepare blanks and standards and to rinse the solid phase. Type I ultrapure water with a TOC of less than 5 ppb is needed.

Market	General Laboratory
Products	Purelab® flex, Purelab® Classic, Purelab® Chorus 1, Centra R



Spectrophotometry

Water is used to prepare samples, to prepare standards and as a blank and to rinse the cuvettes.

Water purity is dependent on the sensitivity of the methods being used. General laboratory grade Type II pure water is generally satisfactory.

Market	Analytical
Products	Purelab® Chorus 2, Purelab® Chorus 2+



Stability Tests

Chambers with controlled humidity require a source of purified water. Humidification of chamber air is achieved by water vapour injection. Some systems have a built-in water purification system, including a UV lamp to reduce bacterial contamination. The water is then recycled.

General laboratory grade Type II pure water is adequate.

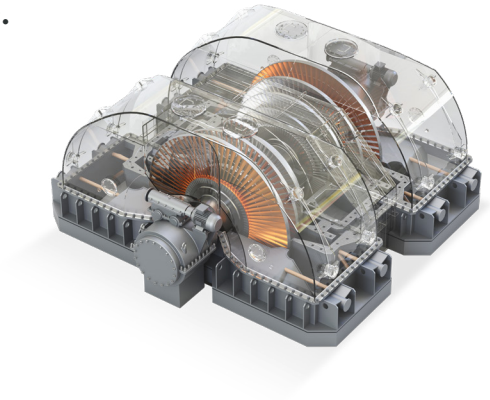
Market	General Laboratory
Products	Purelab® Chorus 2, Purelab® flex, Centra R



Steam Generation

A steam generator is a device used to boil water to create steam.

In the same way as stills, steam generators benefit from pre-treatment of the water supply to avoid build up, precipitation or contamination in order to reduce maintenance, improve performance and enhance hygiene level. General laboratory grade Type II pure water is adequate.



Market	Life Science
Products	Purelab® Chorus 2+ Purelab® Chorus 2, Purelab® flex, Centra R

Surface Tension Experiments

Surface tension is a property of the surface of a liquid caused by cohesion of like molecules, which is responsible for much of the behaviours of liquids.

Surface tension is strongly affected by water purity and Type I Ultrapure water is often needed for these experiments.



Market	Analytical
Products	Purelab® Chorus 1 Purelab® Chorus 1 Complete, Purelab® flex, Purelab® Classic

Titrators

Titration is a common laboratory method of quantitative chemical analysis for specific components at medium to high concentrations. Water is used for the preparation of standard solutions and titration solutions (such as buffers, reagents). It is also used for washing the electrodes and the vessels in which the reaction occurs.

Type II pure water is recommended.

Market	General Laboratory, Life Science, Analytical
Products	Purelab® Chorus 2, Purelab® Chorus 2+



Total Organic Carbon (TOC)

TOC is the amount of carbon bound in organic compounds, for example, in an aqueous solution. It is often used as a non-specific indicator of the level of organic contamination in water or cleanliness of pharmaceutical manufacturing equipment.

Water is used to prepare the standards necessary for the instrument calibration, to run the blanks, and in to clean up or rinse the instrument. In order to optimize the performances of TOC analysis, in particular in the concentration range below 1 ppm, it is important to have water with very low TOC (typically <20ppb).

Market	General Laboratory
Products	Purelab® Chorus 2+, Purelab® flex, Centra R



Trace Metal Detection

Trace metal detection may be carried out by a variety of methods. Due to its extremely high sensitivity and specificity ICP-MS has become very popular. ICP- AES is still widely used for multi-element analysis and AAS provides a cheaper alternative when less elements are being determined. Spectrophotometric and electrochemical detection have advantages in specific cases.

Water purity requirements depend on the sensitivity needed. Type I ultrapure water is generally recommended.

Market	Analytical
Products	Purelab® Chorus 1, Purelab® Chorus 1 Complete, Purelab® Classic, Centra R

Ultra High Performance Liquid Chromatography (UHPLC)

UHPLC is a variant of HPLC using smaller particles to enhance chromatographic performance. Higher pressures are needed. The water contaminants that affect HPLC also impact UHPLC, but due to greater sensitivity, this can be to a more significant extent in some cases. Also, columns filled with very small particles are more susceptible to premature plugging by particulates compared to their HPLC column counterparts with larger particles.

Type I ultrapure water with a TOC of less than 5ppb is essential.

Market	Analytical
Products	Purelab® Chorus 1, Purelab® Chorus 1 Complete, Purelab® flex, Purelab® Classic



Volatile Organic Compounds (VOC) Determination

VOC are determined by GC or GC-MS after preconcentration using purge and trap.
Water may be used to rinse the sample containers, in the various sample preparation steps, as well as in the preparation of standards and blanks for the analysis.

Type I ultrapure water with very high sensitivity is possible and with typical TOC below 5ppb is needed.



Market	General Laboratory
Products	Purelab® Chorus 1, Purelab® Chorus 1 Complete, Purelab® Classic, Purelab® flex, Centra R

Water Analysis

Water analysis is the determination of the physical, chemical, and biological characteristics of water, typically for potable use. Such analysis usually involves four kinds of examination: bacterial, chemical, microscopic, and physical.

Type I ultrapure or Type II pure water can be used for reagents, blanks etc. should have impurities at low ppb levels - a resistivity greater than 5 Mohm.cm.



Market	General Laboratory, Analytical, Life Science
Products	Purelab® Chorus 2, Purelab® Chorus 2+, Purelab® Chorus 3, Purelab® flex, Purelab® Chorus 1, Purelab® Chorus 1 Complete

Western Blotting

The western blot is an analytical technique used to detect specific proteins in a given sample of tissue homogenate or extract. It uses gel electrophoresis to separate native or denatured proteins by the length of the polypeptide (denaturing conditions) or by the 3-D structure of the protein (native/ non-denaturing conditions).

In Western blotting, water is used to prepare the transfer buffer, buffers used to prepare the blocking solution, primary and secondary antibodies, and the wash solutions. It is critical to use water that is free of contaminants that are biologically active and could interfere. Apyrogenic type I ultrapure water is essential.



Market	General Laboratory, Life Science
Products	Purelab® Chorus 1, Purelab® Chorus 1 Complete, Purelab® Classic, Purelab® flex,



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