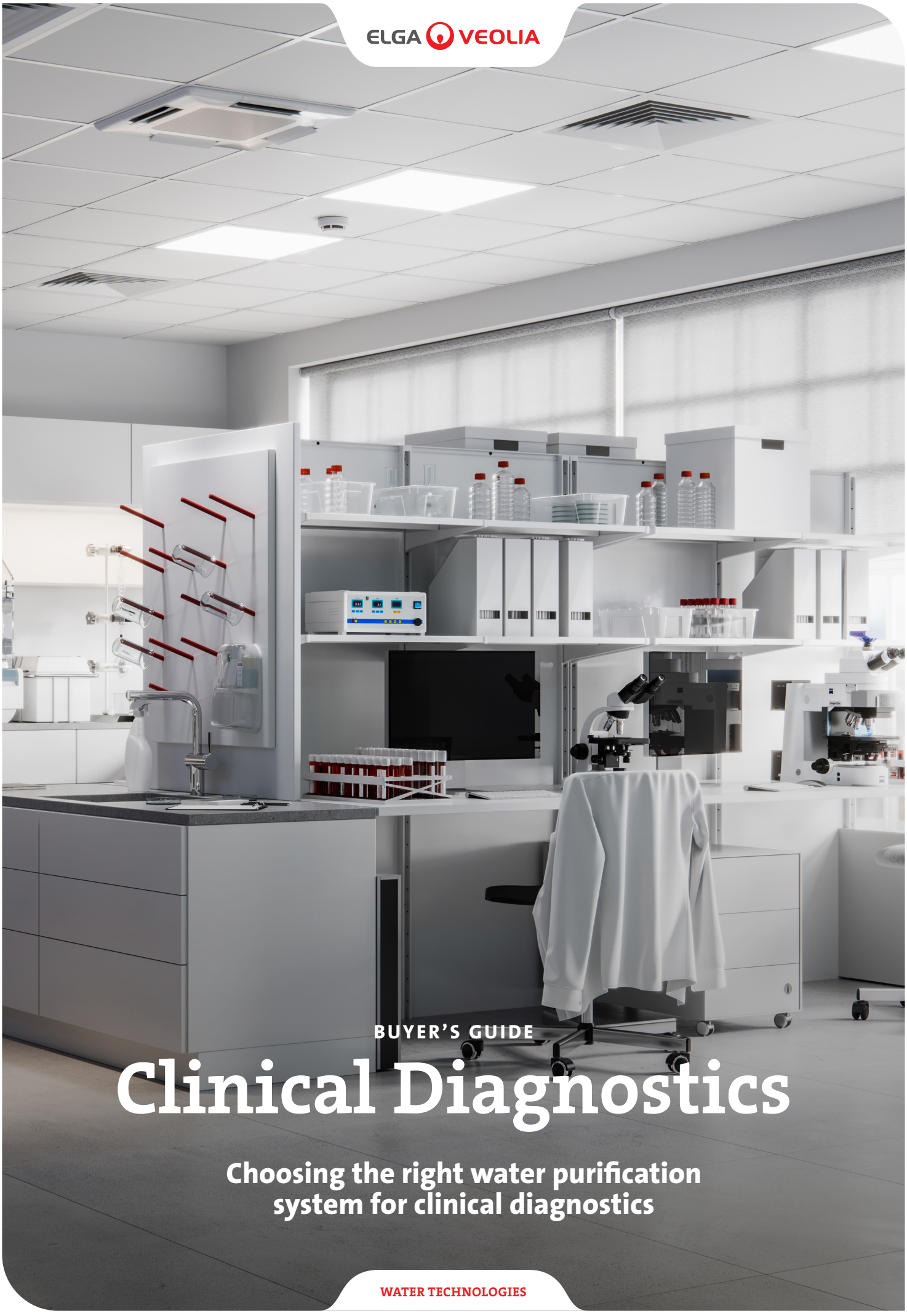
ELGA VEOLIA



BUYER'S GUIDE

Clinical Diagnostics

Choosing the right water purification system for clinical diagnostics

WATER TECHNOLOGIES

Choosing the right water purification system for clinical diagnostics

In a clinical environment, the lives of patients depend on accurate analysis; 70 % of all medical decisions are based on laboratory results[1] and there is no margin for error. Water quality is key to many of the methodologies and testing protocols performed in a clinical diagnostic lab.

However, its ability to dissolve a range of compounds and gases makes it susceptible to contamination. A water supply that is below accepted quality standards can adversely affect the accuracy and reproducibility of results, damage laboratory equipment, and hinder patient diagnosis and management.

The importance of water purity

What's in my water?

Clinical analyzers frequently rely on a constant supply of **Clinical Laboratory Reagent Water (CLRW)**, regardless of the quality of the feedwater available. The CLRW guideline – set by the Clinical and Laboratory Standards Institute (CLSI) – is a widely adopted standard for in vitro diagnostics applications, and has been endorsed and reinforced by the College of American Pathologists (CAP), a globally-recognized organization.

CLRW specifications limit four key impurities in water: ions, particulates, organic contaminants and bacteria.

All of these contaminants can impact the performance of clinical analyzers, either directly – by interfering with the chemistry of tests – or by indirectly introducing errors in the measurements. For example, particles can clog needles and sample handling manifolds, and contamination encourages the formation of bacterial growth and biofilms, which can further impede the accuracy of sensitive test results. Limiting these impurities is essential to maintain an efficient laboratory workflow, minimize costs and ensure optimal patient services.

CLRW specification	
Bacteria	<10 CFU/ml
Inorganics (resistivity at 25°C)	>10 MΩ.cm
Total organic carbon (TOC)	<500 ppb
Particles	0.2 µm filtration or better

[1]*Facts & Figures. The British In Vitro Diagnostics Association (BIVDA). https://www.bivda.org.uk/The-IVD-Industry/Facts-Figures.*

The clinical risks of impurities

Using insufficiently pure water in clinical lab instrumentation can lead to a potentially catastrophic flow of events:

- reduced performance of the analyzers
- maintenance downtime, delaying results
- inconsistencies in results, arising from contaminants
- inconclusive results, leading to repeat tests and a loss of valuable time
- misdiagnosed patients, who could then be incorrectly treated
- potential litigation from that mistreatment

Organizational risks resulting from poor quality lab water

All laboratories are human systems, so water quality impacts much more than just diagnostic accuracy. Water impurities that adversely affect clinical outcomes can also have detrimental effects on operational efficiency, team morale, professional reputations, career progression, equipment longevity, servicing costs and – of course – patients' and clinicians' confidence in laboratory outputs. An effective water purification system therefore needs to integrate smoothly into clinical laboratory workflows.

Purification equipment in a clinical laboratory should produce water that consistently meets CLRW specifications, so that clinical assays can be run daily with minimal risk to the analyzer or the clinical test results. Aside from this requirement, the simplicity, reliability and adaptability of a water purification system are integral to the user experience it delivers. Several features of the product – including its durability, ease of use, simplicity of maintenance and environmental impact – will also affect the team working with the system. The best water purification systems should therefore offer quality that is beyond question, and be supported by a global service network.

Summary

A constant supply of high purity water from a purification system is essential to reach the purity specifications of your clinical analyzers, and to ensure that clinicians and their patients get the right information. The right water system will improve the productivity, efficiency, and accuracy of your lab's workflows.

The wrong system can result in lengthy and costly downtime from extensive cleaning and replacing of parts, as well as reagent wastage and unforeseen expenditure in the long run.

Whether you have access to tap or partially purified water, or if you need to feed analyzers on a small or large scale, ELGA has the system for you, offering:

- quality beyond question
- a user experience that supports your team
- a global service network to ensure that your purification equipment continues to serve your patients in the long term

Choosing your ideal clinical water purification system

What factors should you consider before choosing a water system for your lab?

There are several things to keep in mind when selecting the ideal water purification system for your clinical laboratory. We have developed a step-by-step guide to help you choose the water purification system that is best suited to your laboratory's needs.

Step one: consider what level of water purification you need.

What are the specifications of your clinical analyzers?
What is the source and quality of your feed water?

Challenge	Solution
The microbial and inorganic specifications of your clinical analyzers require water that meets CLRW standards. Your laboratory receives poor quality feed water that needs pre-treatment to achieve efficient purification.	Your water purification system should be constructed from the highest quality components to guarantee bacterial control and optimal purity. It should also provide recirculation through deionization (DI), ultraviolet purification (UV), microfiltration (MF) and ultrafiltration (UMF) steps to ensure that the highest quality water feeds your analyzers. An efficient water purification system should include all pre- and post-treatment steps in a single, compact package. Pre-filtration reduces the number of incoming particulates found in municipal water, protecting mechanical parts of the product from damage.

Step two: consider your laboratory's throughput and water demands.

Is the purification system delivering water to a single or multiple clinical analyzer(s)?
How much pure water is required per hour?
How quickly must the water be delivered to your clinical analyzer(s)?

Challenge	Solution
An efficient water purification system needs to meet lab volume requirements, while keeping stored water free from microbial contamination.	Your water purification system should include a storage reservoir with a composite vent filter (CVF) to protect stored water from airborne CO2 and bacteria, guaranteeing a supply of quality water in volumes that your analyzers need to deliver laboratory productivity.

Step three: consider your laboratory's budget, focusing on value rather than cost.

What will the cost of ownership be over five years?
How often do consumables need to be replaced?

Challenge	Solution
You operate with and adhere to a tight annual budget, so you want the lowest cost of ownership and predictable running costs.	To avoid any surprises, choose a supplier that offers a pre-installation site survey and provides realistic information on the cost of ownership. In addition, select an instrument that incorporates built-in technologies like Electrodeionization (EDI) to significantly reduce running costs and consumable requirements. This will minimize the cost of purified water over the lifetime of the unit. For example, ELGA's consumables calculator can provide you with an estimate of your predictable running costs using its systems.

Step four: consider the available space in your laboratory.

Where will the system be located in your lab?
What is the overall footprint of the purification system(s) and its components?

Challenge	Solution
Lab space is at a premium and only a small area is available for a water purification unit	Compact water purification systems have a built-in wrap-around reservoir and flexible design, so they can be installed under benches or mounted on the wall to minimize their footprints.

Step five: consider your laboratory's uptime requirements.

What quality guarantee does the water purification provider offer?
What kind of warranty and maintenance service is available?
How will your laboratory manage in the event of instrument downtime?

Challenge	Solution
Your clinical analyzers operate 24/7 and therefore you need a high performing water purification system that lasts. You need reliability and ease of use, while demanding schedules limit the time you can spend on water unit maintenance. It is essential that your clinical analyzers do not experience downtime.	To prolong the longevity of your equipment, choose a water purification system that incorporates preventive steps – such as EDI or degassing systems – to reduce the ionic load on downstream technologies. The most efficient water purification systems monitor water purity right up to the point of use, and alert you when components are nearing the end of their life cycle to minimize disruption to laboratory processes. Look for an instrument with an easy-to-read display screen, so that you can easily check the quality of your water. It is important to choose reliable equipment with long warranties as standard, and good service and support to back it up. Look for a supplier that offers a remote monitoring service, to ensure a preemptive response if any downtime is anticipated. In addition, look for a solution with an emergency bypass system, which will divert water through the purification technologies and allow you to finish your tests in the event of unexpected downtime.

Step six: consider your laboratory's operations, now and in the future.

Can the system be expanded if demand increases?
Do the systems meet your sustainability targets?

Challenge	Solution
You want the ability to increase your pure water output as demand on your laboratory grows. You need a sustainable water purification system to save energy and future-proof your laboratory.	Look for water purification systems with a modular design, so that you can add additional capacity without expanding the footprint if your demands for pure water increase. Water purification is a resource-intensive process, so choose products designed to have the lowest possible impact on the environment. Your equipment should save you water and energy, reduce plastic use and chemical waste, and eliminate mercury.

What can you expect from ELGA?

Absolute focus on water purification:
The quality of ELGA water is guaranteed to the very last drop, so you can be confident that your clinical analyzers are receiving consistent (and guaranteed) water purity.

Proven efficacy:
ELGA is a trusted name and supplier with proven efficacy in helping to progress a wide range of scientific disciplines worldwide.

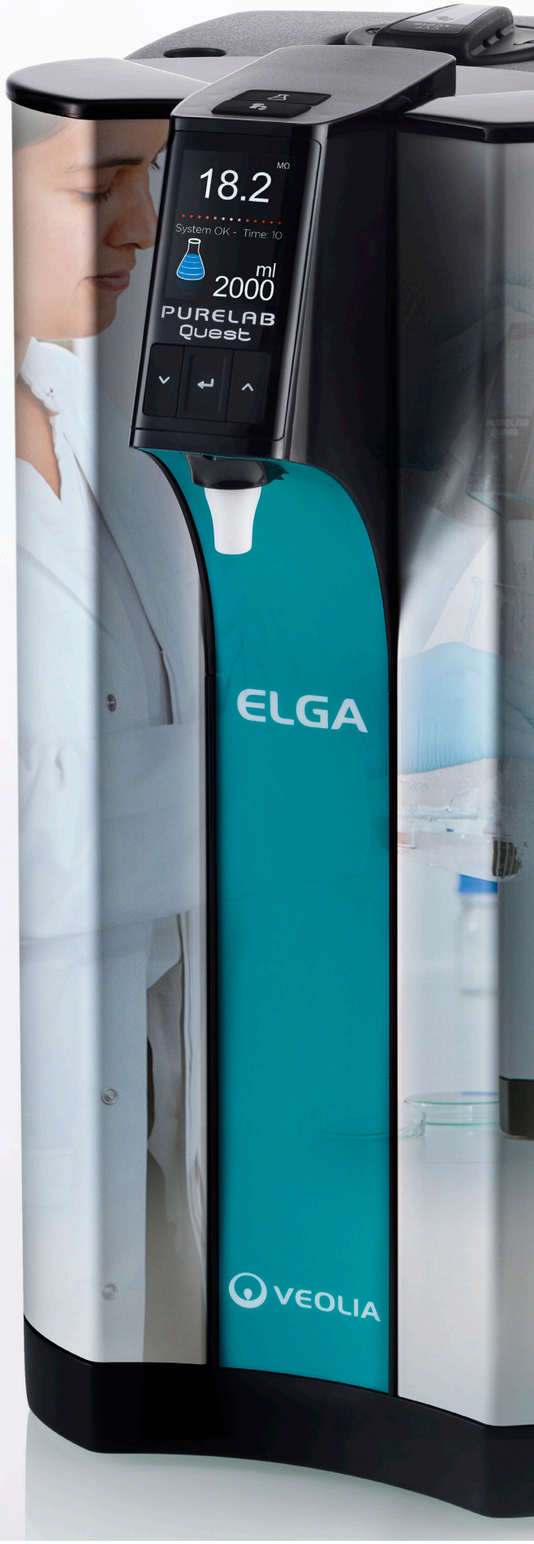
Smart and simple design:
ELGA water purification systems fit seamlessly into the lab without taking up valuable bench space.

Ease of use and simplicity:
Minimal training is required to quickly get your teams using ELGA products efficiently. Ease of use also minimizes the risk of user error.

Equipment that is easy to self-maintain:
Any minor issues can be resolved quickly, without interruptions to your workflow.

Maximal uptime:
Ordering consumables and ensuring uptime is easy through ELGA's smart technology.

Access to a global network of water technologists:
ELGA is part of Veolia, the largest environmental management agency in the world.



ELGA LabWater: dedicated to discovery

ELGA has been innovating water purification technologies and working in partnership with major clinical diagnostics suppliers and laboratories since 1937. We understand that running a clinical lab is a non-stop task, and we designed the MEDICA® range to give you peace of mind that your water purity is in good hands.

Introducing Medica®

MEDICA® Clinical Water Purification Systems are engineered for simplicity of use, operation and maintenance, and designed to provide a constant and reliable supply of high quality water to your clinical analyzers. Our efficient purification units include:

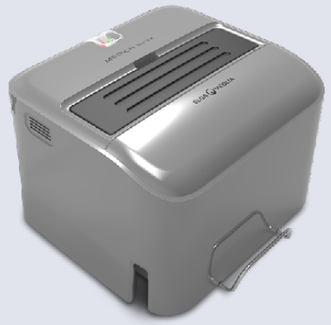
- proven technology to maximize analyzer uptime
- an ergonomic modular design to fit seamlessly into your lab
- a 200 m recirculation loop to ensure quality to CLRW standards
- high volume pure water flow of up to 200 liters/hour
- predictable ownership costs
- a reliable far-reaching service network

The Medica Range

	MEDICA® R/D 7/15	MEDICA® EDI 15/30	MEDICA® PRO EDI 60/120	MEDICA® RO-R/RE 60/120	MEDICA® Pro LPS	MEDICA® R-200
						
Inorganics (resistivity at 25°C)	>10 MΩ.cm	>10 MΩ.cm	>10 MΩ.cm	>10 MΩ.cm	>10 MΩ.cm	>10 MΩ.cm*
TOC	<30 ppb	<30 ppb	<30 ppb	<30 ppb	<30 ppb	<30 ppb*
Bacteria	<1 CFU/ml	<1 CFU/ml**	<1 CFU/ml**	<1 CFU/ml	<1 CFU/ml	<10 CFU/ml**
Particles	0.2 µm filter	0.2 µm filter	0.05 µm filter	0.05 µm filter	0.05 µm filter	0.2 µm filter
Silica	<0.05 mg/l	<0.05 mg/l	<0.05 mg/l	<0.05 mg/l	<0.05 mg/l	<0.05 mg/l
Feedwater quality	Potable water***	Potable water***	Potable water***	Potable water***	Potable water***	Potable water***
Water purity	CLRW grade water Reliable and economical supply for low usage	CLRW grade water Reliable and economical supply for analyzers that require higher volumes of water	CLRW grade water High volume and high purity for high usage with more predictable running costs	CLRW grade water High volume and high purity for high usage	CLRW grade water Variable water specifications across a laboratory	CLRW grade water High purity for the highest usage
Make up flow rate	7 or 15 liters/hour	15 or 30 liters/hour	60 or 120 liters/hour	30, 60 or 120 liters/hour	130 liters/hour	200 liters/hour
Delivery flow rate	Up to 1.8 liters/minute	Up to 1.5 liters/minute	Up to 2.5 liters/minute	Up to 4 liters/minute @ 14 psi (1 bar)	Up to 4 liters/minute	18-21 liters/minute
Integrated storage				Integrated wrap-around 50 liter reservoir	Integrated wrap-around 50 liter reservoir	Integrated wrap-around 350 liter reservoir
Typical applications	Single clinical analyzers	Single or multiple clinical analyzers	Large clinical analyzers or linked multiple analyzers	Large clinical analyzers or linked multiple analyzers	Multiple clinical analyzers installed into a lab with low quality feed water	Large clinical labs with multiple linked analyzers or standalone analyzers in different labs and on different floors

** With ion-exchange cylinder installed (Nuclear or Hypex grade resin)*
*** Subject to correct operating and maintenance procedures*
**** The quality of potable water can vary dependent on location. Feed water specifications can be found in the operators manual and the data sheet of the product*

Additions to the MEDICA® range



MEDICA BIOX

A fluid waste treatment system designed to control the levels of biohazards and specific organic compounds, and adjust the pH of the liquid waste produced by clinical analyzers.

HUBGRADE

An online equipment reporting and management service designed to digitally connect ELGA water systems for the lab of the future.

We'll deal with the details, so you can make the breakthroughs!

Water quality is extremely important in a clinical environment. It is essential that your laboratory has access to a reliable supply of high purity water to ensure accurate and reproducible results, prevent misdiagnosis and optimize the uptime of your clinical analyzers. MEDICA® Clinical Water Purification Systems are designed to eliminate water impurities to CLRW standards, so that you can confidently continue your diagnostic work, without interruption.

ELGA VEOLIA

Dedicated to Discovery

info@elgalabwater.com / www.elgalabwater.com

ELGA Labwater are specialists in the engineering, service & support of water purification systems.

Unrivalled product design has achieved international recognition and awards.

Worldwide technical service teams support science & healthcare globally with specialist expertise.

Global digital performance monitoring from Hubgrade ensures laboratory work is uninterrupted.

A global supply chain supports clients from regional centres on every continent.

To discover how ELGA can benefit your QC applications, please contact our team of experts. ELGA offices and distributors are located in more than 60 countries and are fully trained in all ELGA systems.

To find your nearest ELGA representative, go to *www.elgalabwater.com* and select your country for contact details.

Elga Global Operations Centre.
tel: +44 (0) 203 567 7300
fax: +44 (0) 203 567 7205

GIT INNOVATIONS AWARD 2010 — 2nd PLACE

reddot design award winner 2011

GOOD DESIGN AWARD 2021

Design Award Gold 2015 TBO

Hubgrade

OVER 80 INTERNATIONAL PATENTS