sartorius stedim biotech

arium® Water Purification Systems

turning science into solutions

A Profile of Sartorius Stedim Biotech

Sartorius Stedim Biotech is a leading provider of cutting edge equipment and services for the development, quality assurance and production processes of the biopharmaceutical industry. Its integrated solutions covering fermentation, filtration, purification, fluid management and lab technologies support the biopharmaceutical industry around the world to develop and produce drugs safely, timely and economically.

Sartorius Stedim Biotech focuses on single-use technologies and value added services to meet the rapidly changing technology requirements of the industry it serves. Strongly rooted in the scientific community and closely allied with customers and technology partners, the company is dedicated to its philosophy of turning science into solutions.

Headquartered in Aubagne, France, Sartorius Stedim Biotech is listed on the Eurolist of Euronext Paris. With its own manufacturing and R&D sites in Europe, North America and Asia and a global network of sales companies, Sartorius Stedim Biotech enjoys a worldwide presence. Its key manufacturing and R&D site is in Germany.

Contents

In the biopharmaceutical industry, universities, and clinical institutes, it is increasingly important for our customers to use laboratory grade water for the various applications. More demanding requirements and increasingly sensitive analysis equipment set a benchmark to reach the required standard of high quality water.

However, with the range of purification technology available, it can often be difficult to select the right equipment to achieve the necessary water quality for your application. The feed water is also an important consideration.

The product overview on the rotary disk should help you find the right device for your applications. It also indicates recommended pre-treatment depending on the feed water. The disk provides a general first impression of the arium® family and how it can meet all of your scientific laboratory requirements, taking you from feed water through to ultrapure water. Of course, our specialists are also on hand for individual consultation.

ASTM type 1, type 2 or type 3 – Sartorius Stedim Biotech has the right device depending on the application and required water quality. This brochure gives an overview of all water systems with a focus on the new, upgraded versions of our ultrapure water systems: the arium® pro product line offerings.

The Benefits of the arium® Family at a Glance

All arium® systems are developed by experts, combining know-how with the highest quality standards. The arium® family has standardized features that make working with the devices as simple and efficient as possible.

A Higher Standard of Quality
The efficient removal of all possible contamination guarantees consistent water quality for optimal and reliable results in any application.

Cost Effective and Environmentally Friendly
Components and materials in the cartridges have been designed to complement each other resulting in a long service life and optimal purification making these units highly cost effective.

Easy to Use
All necessary information can be accessed instantly and easily on the practical touch display.

Maximum Flexibility
The diverse options for configuring the arium® systems in your laboratory based on your individual requirements means optimal flexibility during work and when dispensing water.

Solutions for Any Application – Overview of the Systems

Sartorius Stedim Biotech offers the right solution for every application and its required water quality, from the pretreatment of feed water in order to allow for efficient use of downstream cleaning steps, to the required polished product water.

Type 1 Water Quality
The newly developed arium® pro range produces ultrapure water for critical applications. There are four different systems to choose from depending upon your individual requirements. The systems are available both with and without an integrated TOC monitor. In addition, there is also the arium® basic model, a streamlined, cost effective alternative to the arium® pro DI with the most important product features.

arium® pro DI
arium® pro UV
arium® pro UF
arium® pro VF
arium® basic

Type 2 Water Quality
For the production of ASTM type 2* water quality, Sartorius Stedim Biotech offers the arium® 61215 EDI system for general applications. An alternative to this system is the arium® 615DI cartridges, which produce type 2* water when used for the secondary treatment of reverse osmosis water.

arium® 61215 EDI
arium® 615DI

* depending on feed water

Water Softening for Pretreating Water for arium® RO and EDI Systems
For particularly hard water, we recommend the arium® 615S water softener, used to pretreat the water in order to protect the device cartridges.

arium® 615S**

Complete Deionization Cartridges for Pretreating Water for arium® pro Systems
For saline water, we recommend the arium® 615DI deionization cartridges, used to produce completely deionized water as pretreatment for arium® pro ultrapure water systems.

arium® 615DI**

** For further information, request the data sheets for these products.

Type 3 Water Quality
The arium® reverse osmosis systems produces ASTM type 3* water quality. These systems are designed to meet water requirements for general laboratory applications, such as cleaning and rinsing laboratory equipment, as well as for water supplied to an entire building.

arium® 61316 – produces up to 16 l/hr
arium® 613L – produces up to 50–300 l/hr

* depending on feed water

arium® pro Ultrapure Water Systems for Critical Applications

The new Sartorius Stedim Biotech arium® pro ultrapure water systems reliably produces ASTM type 1 water (18.2 MΩ) and fulfill all requirements for reagent grade water for critical and routine applications.

❶ Cartridge Sets
For Producing Ultrapure Water
In ultrapure water systems, cartridge sets comprising a pretreatment and secondary treatment cartridge. The cartridges are designed for optimal crossflow of resins. The flow of water moves from the top to the bottom of the cartridges to achieve optimal cleaning motion and to prevent the medium inside the cartridges from mixing.

- contain granulated, catalytically-active, activated carbon of the highest quality
- contain high efficient mixed-bed ion exchange resins
- have the highest ion exchange capacity available in the industry and reduce operating costs

❷ Dual Wavelenght UV Lamp (185 | 254 nm)
For Removing Organic Substances
The UV lamp reliably removes organic substances (TOC or total organic carbon), effectively preventing bacterial growth. TOC content can also be monitored with an optional integrated TOC monitor in the arium® pro.

❸ Ultrafilter
For Removing Macromolecules
The ultrafilter separates bacterial endotoxins, pyrogens, DNA and RNA. The single-use, hollow-fiber ultrafilter achieves high flow rates and has a low adhesion to leachable substances.

4 Sterile Final Filter Sartopore® 2 150
Membrane Filter Capsules
The Sartopore® 2 150 membrane filter provides additional protection from particles and bacteria and impresses with its constant flow rate. The 0.45 + 0.2 µm polyether sulfone double membrane guarantees microbiological retention in compliance with HIMA and ASTM guidelines for sterile filters and is therefore particularly suited for critical applications.

5 Display
For Complete Control
The newly developed display with glass interface and touch screen function is simple to use with the integrated text support. All necessary information can be accessed instantly. A range of basic settings can be restricted to authorized users only by entering a PIN code. Colored warning and system messages provide modern convenience in day-to-day handling of the device.

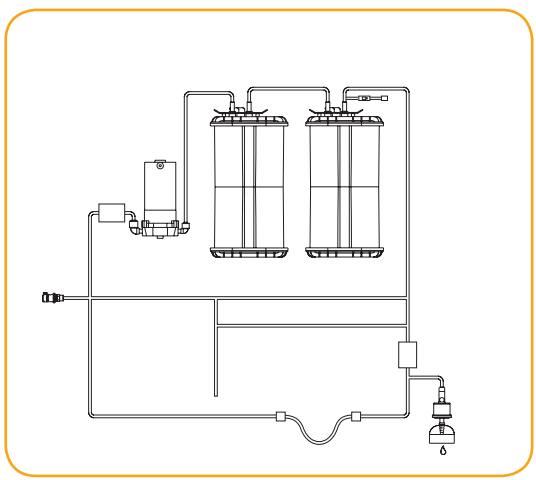
6 Water Dispensing
Manual, Volume, and Time Control
The slider on the display enables continuous manual water dispensing, during which the flow rate can be freely regulated between 0.5 and 2 l/min. The volume and time controlled dispensing facilitates precise proportioning and avoids waiting for water to be dispensed.

7 Conductivity Measurement
In Feed Water and Product Water
Measurement of both conductance values help prevents rapid wear of cartridge sets, where applicable.

8 Electronic Connections
For Data Storage
The newly developed arium® pro features various electronic connections and particularly stands out with its modern data storage option via SD card. It also has the option of transferring data to a printer or via a PC using an RS-232 serial interface.

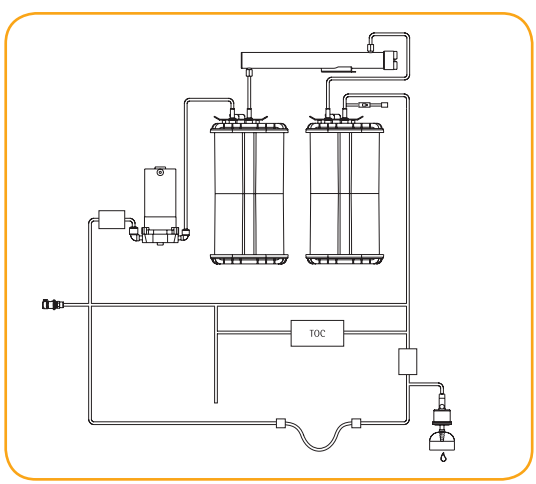
Optimal Purification with the arium® pro Family

The new arium® pro range comprises of four different models that can be specially customized to our customers' requirements. It provides optimal water quality for reliable analyses.



arium® pro DI
This standard system of the arium® pro range contains a cartridge set and sterile filter. The cartridge set is selected individually based on the feed water quality and intended application and comprises a pretreatment cartridge followed by a secondary treatment cartridge. All cartridges use patented Sartorius technology for the creation of ultrapure water that exceeds ASTM criteria for type 1* reagent grade water.

Applications:
- buffer and media production
- reagent manufacture
- rinsing of glass containers
- inorganic analytical methods: IC, AAS, ICP, ICP-M



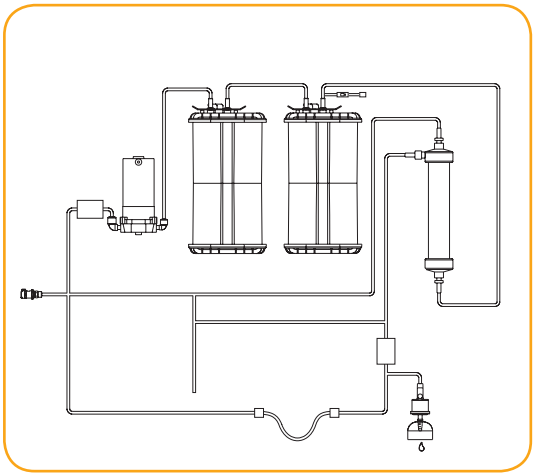
arium® pro UV (with Optional TOC Monitor)
Besides the purification cartridges, the arium® UV device also has a 185 | 254 nm dual wavelenght UV lamp to reliably remove organic substances (TOC). At the same time, the UV radiation inactivates microbial cells via the adsorption of the UV light. This facilitates a sterilized production of ultrapure water.

Applications:
- chromatography
- standard HPLC
- analysis of trace elements
- photometric methods
- reagent manufacture
- mass spectrometry

* depending on feed water

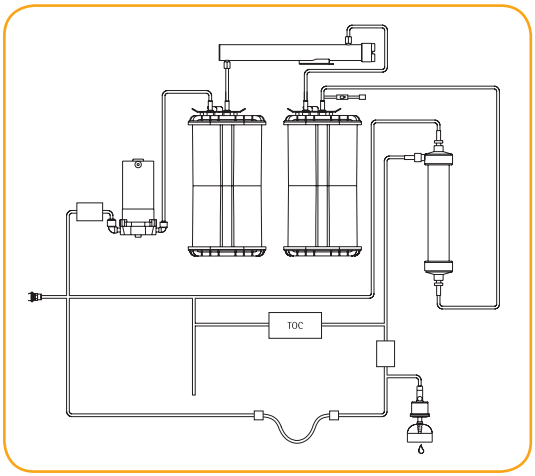
arium® pro UF
The arium® UF contains an ultrafilter for removing endotoxins, pyrogens, DNA, and RNA. A 5,000 MWCO (5 kDa) microporous membrane removes macromolecules from the water so that an endotoxin level of < 0.001 EU/ml is achieved.

Applications:
- cell cultivation
- DNA sequence analysis
- IVF (in vitro fertilization)
- general biochemical applications



arium® pro VF (with Optional TOC Monitor)
The arium® VF model combines the UV lamp and the ultrafilter in one device to produce water for particularly critical standards, cell cultivation, and chromatography applications.

Applications:
- chromatography
- electrophoresis
- HPLC
- IVF
- molecular biology
- cell cultivation
- RNA|DNA purification
- reagent manufacture
- PCR



Reliable Water Quality

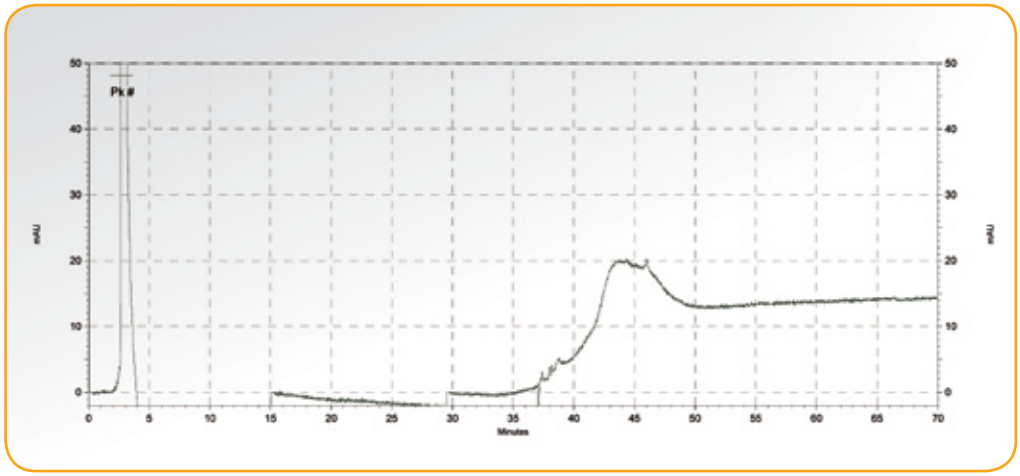
The arium® pro range produces laboratory grade water that meets the ASTM type 1* standard. With 18.2 MΩ × cm as well as the lowest TOC and endotoxin levels, optimal reliability in applications is guaranteed.

Product Water Quality	pro DI	pro UV	pro UF	pro VF
Specific resistance (MΩ × cm)	18.2	18.2	18.2	18.2
TOC content (ppb)[1] @ 25 °C	≤ 5	< 2	≤ 5	< 2
Endotoxins (EU/ml)	N/A	N/A	< 0.001	< 0.001
Particles (at 0.2 µm)	< 1/ml	< 1/ml	< 1/ml	< 1/ml
Bacteria (CFU/1000 ml)	< 1	< 1	< 1	< 1
Flow rate (l/min)[2]	up to 2	up to 2	up to 1.7	up to 1.7

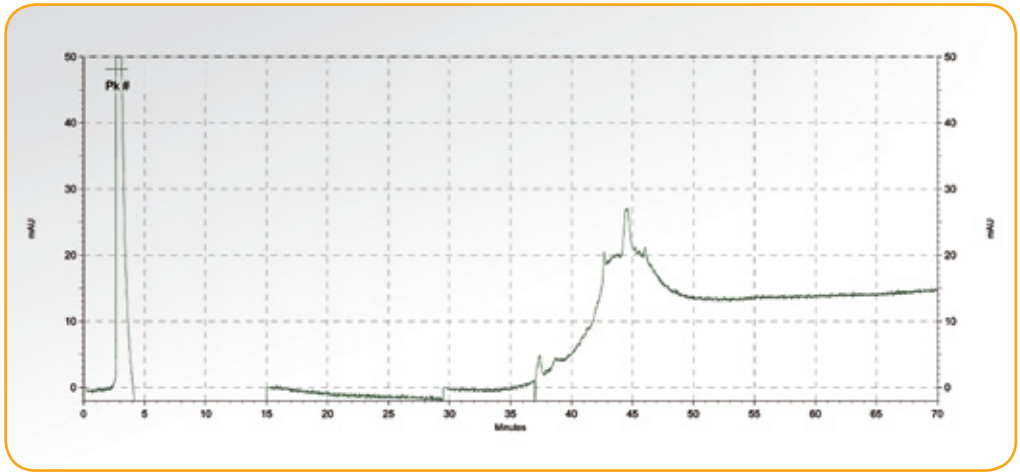
N/A = not applicable
[1] Values may vary depending on the quality of the feed water and the content of impurities in the feed water, as well as the type of cartridge used.
[2] At a pressure of 2 bar, without final filter

Ultrapure Water for Critical Applications
The arium® pro VF model produces RNase free and DNase free water with a TOC content of 1–2 and an endotoxin value of < 0.001 EU/ml.

arium® pro VF*



Competitor A*



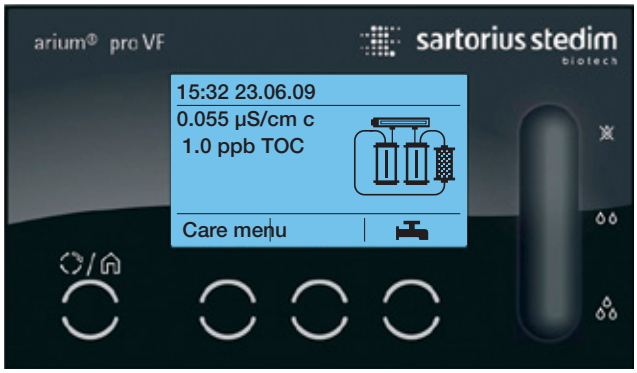
Laboratory Grade Ultrapure Water

The diagram illustrates how water quality fluctuates in freshly prepared ultrapure water. Only ultrapure water without peaks, like that produced with the arium® pro VF, guarantees the highest grade water for stringent requirements.

* HPLC application (reverse-phase chromatography) elution with acetonitrile and water

Work without Compromise with the arium® pro Family

The arium® pro family has been developed to tailor to the requirements of the user. The simple and intuitive glass interface enables each user to operate the system securely as well as having fast access to all relevant data. Thanks to the different options for water dispensing, working with the ultrapure water system is even more convenient.



Display
The new display with innovative glass interface features impressive operations. The intuitive menu navigation makes working with the system simple while the integrated output function can be directly controlled. Features include:

- setting limit values for conductivity of feed water and product water
- PIN-protected for basic settings (e.g., setting limit values)
- colored warning and alarm messages that indicate a required cartridge change, for example, and which are also emphasized by flashing graphic symbols
- constant control of the water and all important parameters visible via the display (e.g., display of system status, countdown for next cartridge or filter change)
- direct and continuous output of details, such as feed water and product water conductivity via a printer or PC, as well as data storage on an SD card

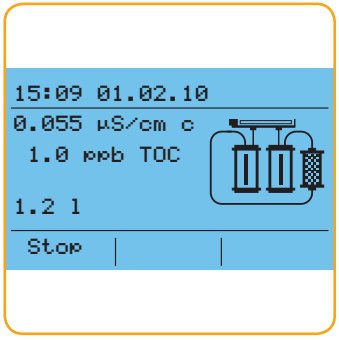
All illustrations refer to arium® pro systems with integrated TOC monitor.

Dispenser Unit
The new arium® pro allows users for manual, volume or time controlled water dispensing options via the display.

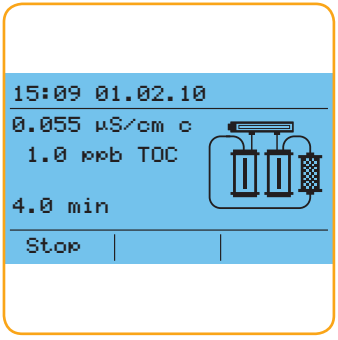
Manual Output (Slider)
- continuous transition from 0.5 to 2 l/min
- graphic support

Housing and System Setup
The compact design of the device enables you to save space when positioning the system. Its flat surface can accommodate containers or even a second device. The high quality and robust housing guarantees high practicality in your laboratory environment. The design of the units has:

- easy-to-open door provides faster access to consumables (time-saving cartridge changes)
- separation of customer and service areas in the system (no contact with electronics)



Volume Controlled Output
- 0.1 – 60 l
  - 0.1 – 2 l (in 100 ml increments)
  - 2 – 5 l (in 500 ml increments)
  - 5 – 60 l (in 1000 ml increments)
- display of remaining dispensing volume
- volume save function



Time Controlled Output
- output from 30 sec to 59 min
- display of remaining time
- time save function

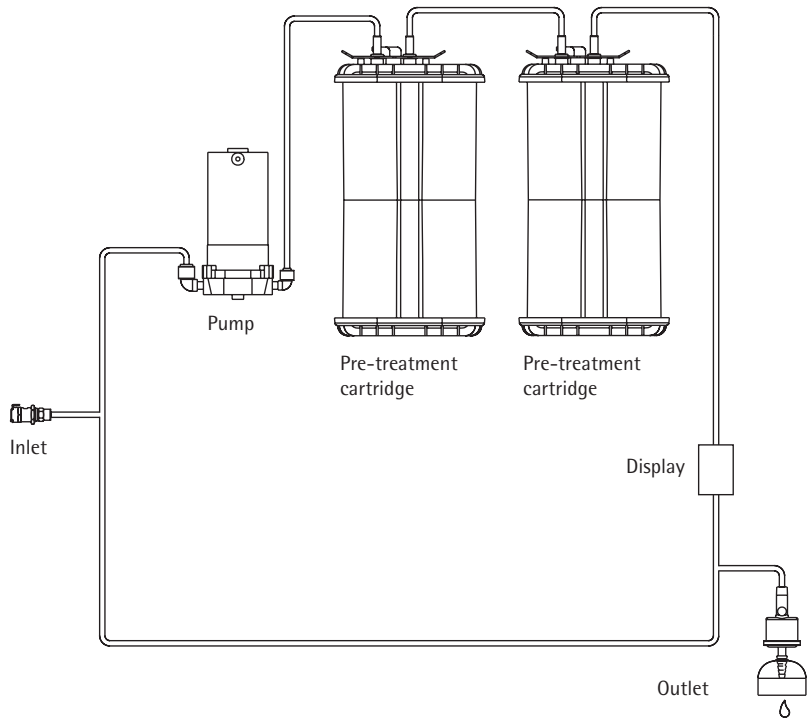
The arium® basic – A Cost Effective Alternative

The arium® basic standard system fulfills the fundamental requirements of an ultrapure water system. It produces ASTM type 1* water which can be used for both critical and routine applications. The arium® basic is a cost effective alternative. Only the most vital functions are included for meeting the requirements of ultrapure water production – streamlined without compromising quality.

* depending on feed water

Common Applications:
- atomic absorption (AA)
- ion chromatography
- inductively coupled plasma mass spectrometry (ICP-MS)
- rinsing of glass containers
- preparation of buffers and media
- reagent manufacture

Design and Features of the arium® basic System:
- innovative glass interface with touch screen function
- time controlled dispensing
- manual, freely adjustable flow rates up to 2 l/min
- conductivity measurement for product water
- simple menu navigation with integrated text support
- data storage via Ethernet or printer
- PIN-protected access to basic settings and service
- service and alarm functions supported by graphic displays
- intelligent alarm system



Uniform Technology
The arium® basic system comes with all of the important features for the production of ultrapure water, including the same high quality cartridge sets as with the arium® pro devices, and achieves the same superior water quality as the arium® pro DI.

arium® pro and basic – Equipment and Specifications

Function | Equipment	basic	pro DI	pro UV	pro UF	pro VF
Manual dispensing (adjustable via slider)	○	○	○	○	○
Volume controlled dispensing		○	○	○	○
Time controlled dispensing	○	○	○	○	○
Monitoring of inlet conductivity		○	○	○	○
Dispensed water display		○	○	○	○
Temperature monitoring		○	○	○	○
Ethernet (not yet available)		○	○	○	○
Data backup via (optional) printer	○	○	○	○	○
Data backup on SD card		○	○	○	○
Connection for remote dispenser		○	○	○	○
Sanitization port		○	○	○	○
Drainport		○	○	○	○
UV lamp			○		○
Ultrafilter				○	○
Options					
TOC			○		○
Foot switch		○	○	○	○
Level sensors (2 pcs.)		○	○	○	○
Remote dispenser		○	○	○	○
Versions					
Benchtop system	○	○	○	○	○
Wall-mounted system	○	○	○	○	○
Below-bench unit		○	○	○	○

Product Water Quality	basic	pro DI	pro UV	pro UF	pro VF
Specific resistance (MΩ × cm):	18.2	18.2	18.2	18.2	18.2
Conductivity (µS/cm):	0.055	0.055	0.055	0.055	0.055
TOC content (ppb)[1] @ 25 °C:	≤ 5	≤ 5	< 2	≤ 5	< 2
Endotoxin content (EU/ml):	N/A	N/A	N/A	< 0.001	< 0.001
Particles (at 0.2 µm):	< 1/ml	< 1/ml	< 1/ml	< 1/ml	< 1/ml
Bacteria (CFU/1000 ml):	< 1	< 1	< 1	< 1	< 1
Flow rate (l/min)[2]:	up to 2	up to 2	up to 2	up to 1.7	up to 1.7
Empty weight:	17 kg	17 kg	18 kg	18 kg	18 kg
Operating weight:	27 kg	27 kg	28 kg	28 kg	28 kg
Operating weight with integrated TOC monitor:	N/A	N/A	29 kg	N/A	29 kg

Specifications

Dimensions (W × H × D):	35 × 49.2 × 45.1 cm
Interfaces:	SD card (for arium® pro devices only) RS-232
Power supply:	100–240 V AC (± 10%) 50–60 Hz, 80 W (max.) 130 VA (max.)

Feed Water Requirements for arium® pro and basic

Minimum inlet pressure:	depressurized
Maximum inlet pressure:	6.9 bar
Specific conductance	
RO water:	100 µS/cm
Distilled water:	4 µS/cm
Deionized water:	20 µS/cm
TOC:	< 50 ppb
Turbidity:	< 1 NTU
Silica:	< 1000 ppm

[1] Values may vary depending on the quality of the feed water and the content of impurities in the feed water, as well as the type of cartridge used.
[2] At a pressure of 2 bar, without final filter

arium® EDI 61215 – ASTM Type 2* Pure Water System

The Sartorius Stedim Biotech arium® EDI 61215 pure water system fulfills all requirements for modern water purification systems. The arium® EDI 61215 consistently and reliably produces ASTM type 2* water in accordance with the specific standards – for successful work in the laboratory.

* depending on feed water

Quick and Simple at a Glance
The display provides all information necessary for a pure water system. Simple and clear menu navigation makes it easy to work with the system. If the limit values entered are exceeded, the service and alarm functions signal the breach. All important parameters can be accessed quickly and easily at the push of a button.

- display of conductance for feed water and product water
- rejection rate
- tank level
- temperature

Pure Water Quality for General Laboratory Applications
The arium® 61215 EDI system guarantees the removal of all contamination in tap water. As well as pretreatment and purification via the reverse osmosis module, the device also performs softening and electronic | chemical deionization. This procedure guarantees high water quality.

Common Areas of Application:
- preparation of microbiological media and buffers
- reagent manufacture
- pharmaceutical applications
- electrophoresis
- general biotechnological applications
- feed water for ultrapure water systems
- feed water for laboratory devices, such as autoclaves and purification machines

arium® 61215 EDI
System Design

Pretreatment Cartridge

For Protection of the Reverse Osmosis Module

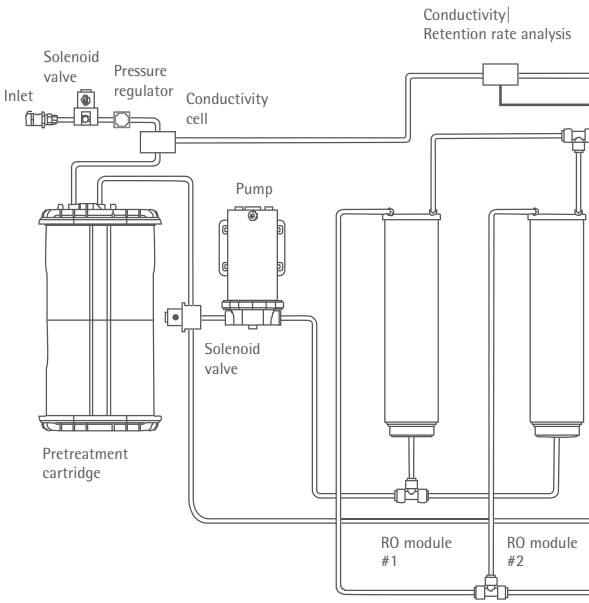
In the first stage, coarse contamination is removed from the water to protect the reverse osmosis membrane.

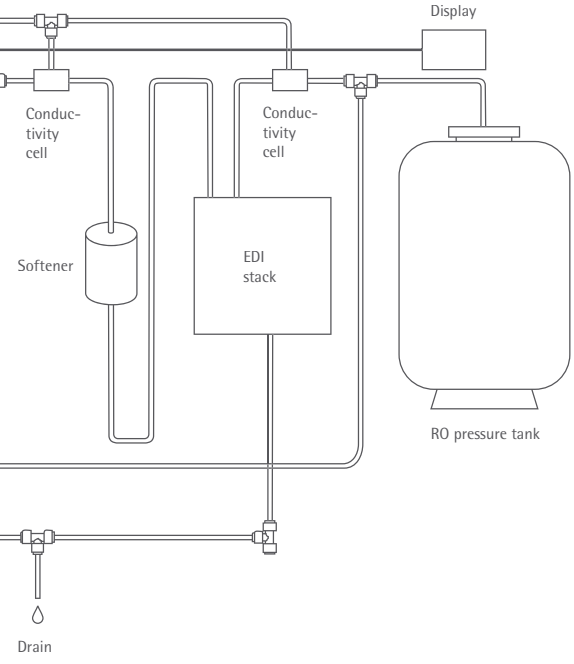
- activated carbon filter for the removal of chlorine and organic substances
- 5 µm particle filter to prevent blockage of the module and to extend service life

Reverse Osmosis Module

For Effective Removal of Contamination

Reverse osmosis removes all contaminates to a certain degree. The reverse osmosis module filters out 98–99% of charged ions and 99% of all dissolved substances as well as particles and microorganisms. The constant flow rate also guarantees consistent crossflow of the membrane, ensuring optimal water purification.



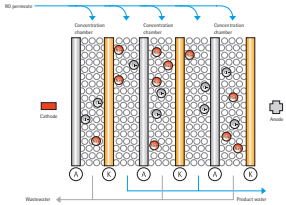


Softener

Reduces Calcium Carbonate

The softener cartridge removes remaining calcium residues from the water, ensuring optimal water quality for further processing via electronic | chemical deionization.

- effective removal of calcium residues
- increases service life of the EDI module



EDI Module

Ion Removal via Ionpure® EDI Technology

Electronic | chemical deionization removes remaining ions from the water in the third purification stage.

- Continuous regeneration of the ion exchange resins ensures constant quality and long service life

Pressure Tank (30 l, 50 l, 70 l, and 100 l)

Secure Storage of Water

The completely sealed pressure tanks consist of an FDA-approved, double-butyl membrane capable of storing up to 100 l of pure water. Filling the tank creates an internal pressure of up to 2.5 bar. This removes the necessity for an additional pump for distributing the product water to the point of use.

- reduction of contamination through microbes and gases
- space-saving setup in desired locations
- transfer of product water with up to 2.5 bar to the point of use

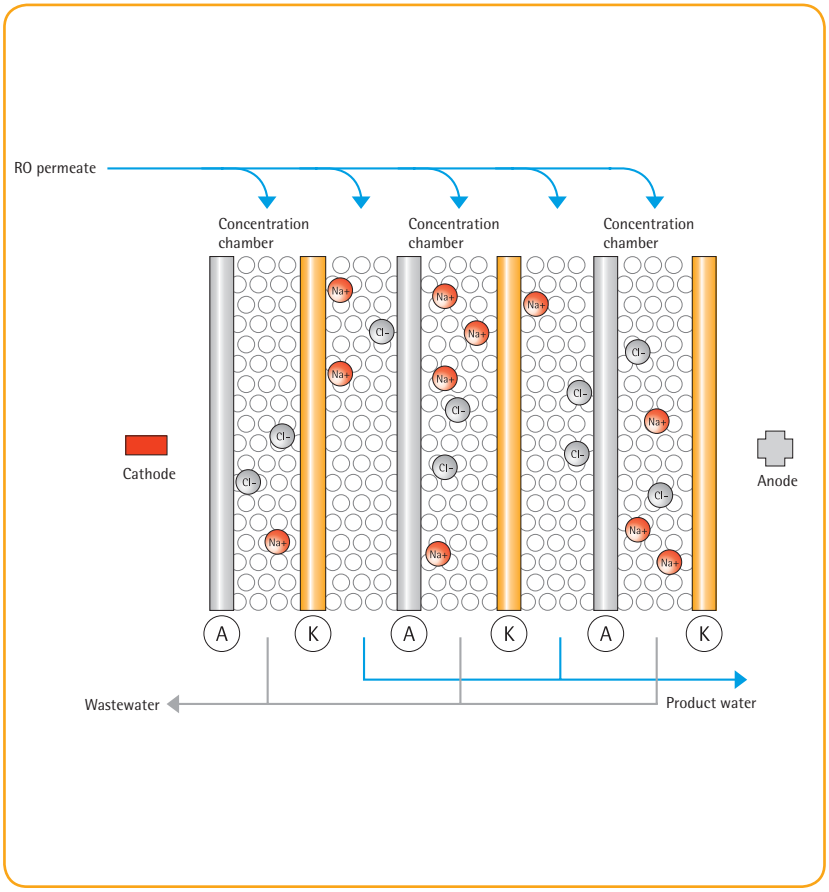
Functionality of EDI Technology

The core of the arium® 61215 EDI system is an EDI module with Ionpure® technology. RO water is fed through the module at right angles to an applied voltage and, thus water gets deionized.

The EDI technology is based upon the principle that ions move towards the electrodes in an electrical field. The ions are only allowed to pass through in one direction. The negatively charged anions move towards the anode and the positively charged cations towards the cathode. On their way, the ions pass through ion-selective membranes, the anions through an anion-selective membrane and the cations through a cation-selective membrane. This creates areas with increased ion concentration, known as concentration chambers, and areas with reduced ion concentration, or cleaning chambers.

So that this process can proceed without turbulence and back-mixing, the areas are filled with ion exchange resin. The ions are bound to the ion exchange resin and move on its surface to the concentrate areas. Through the dissociation of the water into OH- and H+ ions, this resin continues to regenerate and is capable of further ion exchange. No chemicals are required for regeneration.

The concentrate areas are sprayed with a low volume flow to transport the ions away. Thus, the inflow is split into a low salt "diluate flow" and a concentration flow (waste water).



arium® 61215 EDI – Specifications

Water Quality Achieved	
Conductivity (µS/cm)*:	0.2–0.07
Resistance (MΩ × cm)*:	5–15
TOC*:	< 30 ppb
Bacteria**:	< 1 CFU/1000 ml
Particles**:	< 1/ml

Specifications	
Flow rate capacity (± 20% at 25°C)*:	15 l/hr
Dimensions (W × H × D):	43 × 48 × 33.4 cm
Empty weight:	20 kg
Operating weight:	25 kg
Power supply:	100–240 V AC, 50–60 Hz, single-phase

Feed Water Requirements	
Minimum inlet pressure:	1.2 bar
Maximum inlet pressure:	6.9 bar
Maximum conductance***:	< 1000 µS/cm
Temperature:	5–35°C
Max. total hardness (max. $CaCO_3$):	360 ppm
Fouling index (SDI):	< 5
Free chlorine:	0.1 ppm
Turbidity:	< 1 NTU
Iron (evaluated as total Fe content):	< 0.1 ppm

* Values may vary depending on the temperature and quality of the feed water and | or amount of impurities contained in the feed water.
** When using a Sartopore® 2 150 final filter
*** In the absence of CO_2

arium® 61316
Reverse Osmosis System

The Sartorius Stedim Biotech arium® 61316 reverse osmosis system is the modern solution for reliable production of up to 16 l/hr ASTM type 3* water.

Pure Water Quality for General Laboratory Applications
The arium® 61316 reverse osmosis system is guaranteed to produce pure water for general laboratory applications thanks to a 99% rejection rate of ions, organic components, bacteria, and viruses.

Common Areas of Application:
- feed water for glassware machines, autoclaves, and air humidifiers
- feed water for ultrapure water systems
- rinsing of glass and laboratory containers
- general laboratory applications

* depending on feed water

Cost Effective Use of Technology
The coarse contamination initially contained in the tap water is removed by the pretreatment cartridge to protect the delicate reverse osmosis module.
The high performance membranes reliably produce good water quality and reduce water consumption.
The modules are optimally protected from deposits via automatic membrane backflushing with permeate.

Simple Data Access
This device provides all information necessary for a pure water system. As with the EDI system, the arium® 61316 reverse osmosis system comes with professional menu navigation, enabling work to be structured in a convenient and user-friendly manner. The clear system information and text supported service functions make the device easy to understand and facilitates intuitive operation for the user.

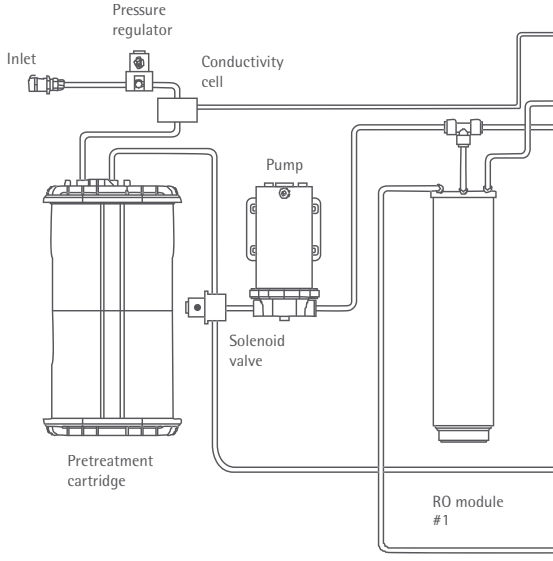
- display of conductance for feed water and product water
- rejection rate as a %
- tank fill level indicator
- temperature in °C or °F

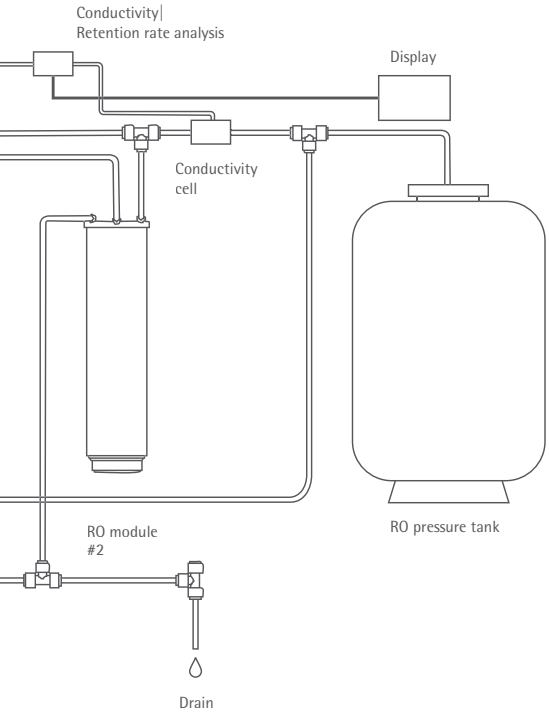
The arium® 61316
Reverse Osmosis System Step by Step

Pretreatment Cartridge
For Protection of the Reverse Osmosis Module
In the first stage, coarse contamination is removed from the water to protect the reverse osmosis membrane.

- activated carbon filter for the removal of chlorine and organic substances
- 5 µm particle filter to prevent blockage of the module and to extend service life

Reverse Osmosis Module
For Effective Removal of Contamination
Reverse osmosis removes all contamination to a certain degree. The reverse osmosis module filters out 98–99% of charged ions and 99% of all dissolved substances as well as particles and microorganisms. The constant flow rate also guarantees consistent crossflow of the membrane, ensuring optimal water purification.





Conductivity Measurement

For Controlling the Rejection Rate

The integrated conductivity measuring cells measure feed water and product water to display the resulting rejection rate.

The RO membranes are also rinsed with RO permeate to increase the service life of the module.

Pressure Tank (30 l, 50 l, 70 l, and 100 l)

Secure Storage of Water

The completely sealed pressure tanks consist of an FDA-approved, double-butyl membrane capable of storing up to 100 l of pure water. Filling the tank creates an internal pressure of up to 2.5 bar. This removes the necessity for an additional pump for distributing the product water to the point of use.

- reduction of contamination through microbes and gases
- space-saving setup in desired locations
- transfer of product water with up to 2.5 bar to the point of use

arium® 61316 – Specifications

Water Quality Achieved	
Conductivity (µS/cm)*:	< 20
Resistance (MΩ × cm)*:	> 0.05
Bacteria**:	< 1 CFU/1000 ml
Particles**:	< 1/ml

Rejection Rates	
Monovalent ions:	up to 98%
Polyvalent ions:	up to 99%
Particles:	> 99%
Microorganisms:	> 99%
Dissolved organic substances (MW > 300):	> 99%

Specifications	
Flow rate capacity (± 20% at 25°C)*:	16 l/hr
Dimensions (W × H × D):	43 × 48 × 33.4 cm
Empty weight:	14 kg
Operating weight:	20 kg
Power supply:	100–240 V AC, 50–60 Hz, single-phase

Feed Water Requirements	
Minimum inlet pressure:	1.2 bar
Maximum inlet pressure:	6.9 bar
Maximum conductance:	< 1500 µS/cm
Temperature:	5–35°C
Max. total hardness (max. $CaCO_3$):	360 ppm
Fouling index (SDI):	< 5
Free chlorine:	0.1 ppm
Turbidity:	< 1 NTU
Iron (evaluated as total Fe content):	< 0.1 ppm

* Values may vary depending on the temperature and quality of the feed water and/or amount of impurities contained in the feed water.
** When using a Sartopore® 2 150 final filter

arium® 613L
Reverse Osmosis System

The Sartorius Stedim Biotech arium® 613L reverse osmosis system reliably produces ASTM type 3* water and is ideally suited for applications with high water consumption. The complete supply to buildings or individual floors is ensured centrally from roof or basement level.

* depending on feed water

The arium® 613L reverse osmosis system can produce up to 300 l/hr and features an integrated 100 l tank as well as a transport pump capable of supplying different laboratories or several floors. Where larger water volumes are required, the optional tank systems (200 l, 600 l, or 1,000 l) offer a convenient solution. Different output points such as ultrapure water systems, laboratory devices, or direct output options can be connected effortlessly.

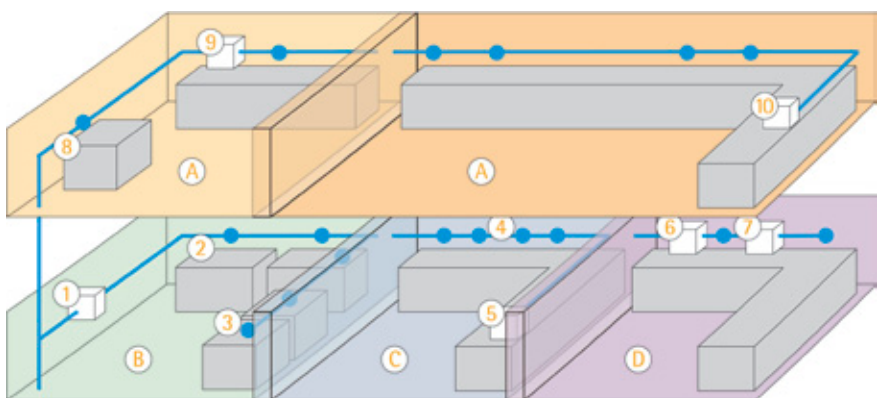
- integrated pressure booster pump guarantees constant pressure and flow rate
- permeate transport pump distributes the product water with up to 2 m^3/h at 3.7 bar to the point of use

Central Water System for Large Volumes of Pure Water

The arium® 613L reverse osmosis system guarantees the removal of all contamination contained in tap water via the 5 µm particle filter to additionally protect the RO module. The systems have been specially developed for applications with a high daily requirement of RO water. In order to meet future increases in water consumption, the arium® 613L can be upgraded cost-effectively in increments of 50 liters per hour up to a total capacity of 300 l/hr.

Common Areas of Application:

- feed water for glassware machines, autoclaves, and air humidifiers
- feed water for ultrapure water systems
- general laboratory applications



Ⓐ = Research and development
Ⓑ = Scullery
Ⓒ = HPLC laboratory
Ⓓ = Cell culture laboratory

① = arium® pro DI
② = Glassware machines I and II
③ = Autoclaves I and II
④ = Direct dispensing (faucet)
⑤ = arium® pro UV
⑥ = arium® pro UF
⑦ = arium® pro VF
⑧ = Autoclave
⑨ = arium® pro VF
⑩ = arium® pro VF

arium® 613L Reverse Osmosis System Specifications

Water Quality Achieved

Conductivity:	< 20 µS/cm*
Resistance:	> 0.05 MΩ × cm*

Rejection Rates

Monovalent ions:	up to 98%
Polyvalent ions:	up to 99%
Particles:	> 99%
Microorganisms:	> 99%
Dissolved organic substances (MW > 300):	> 99%

Specifications

Flow rate capacity (± 20% at 25°C)*:	50, 100, 150, 200, 250, 300 l/hr
Max. recovery rate*:	approx. 40–80%
Dimensions (W × H × D):	58 × 81 × 58 cm

Systems	613L050	613L100	613L150	613L200	613L250	613L300
Capacity [l/h]**	50	100	150	200	250	300
Tank [l]	100	100	100	100	100	100
Electrical connection [V]	230	230	230	230	230	230
Power consumption [kW/h]	1.3	1.3	1.3	1.3	1.3	1.3
Power frequency [Hz]	50	50	50	50	50	50
Max. water temperature	25°C	25°C	25°C	25°C	25°C	25°C
Max. inlet pressure	7 bar	7 bar	7 bar	7 bar	7 bar	7 bar
Min. inlet pressure	2 bar	2 bar	2 bar	2 bar	2 bar	2 bar
Weight (full)	150 kg	151 kg	152 kg	153 kg	154 kg	155 kg
Bacteria (CFU/1000 ml)	< 1	< 1	< 1	< 1		
Number of membranes	1	2	3	4	5	6

* Depending on feed water quality and temperature
** Potable water quality at 10°C, 3 bar, max. 500 mg/l total salt content ± 5% flow rate

Intelligent Design: Flexibility in the Laboratory

In terms of flexibility, the new arium® pro and basic series as well as the arium® 61215 EDI and arium® 61316 RO system leaves nothing to be desired. Individually adaptable to the laboratory conditions, the height adjustable displays allow space saving installation of the systems as benchtop, under-the-bench, or even wall-mounted systems.

Benchtop Unit
arium® benchtop units with head-side integrated display unit are an ideal, space saving solution for standard installation in the laboratory. The top-mounted head assembly enables optimal visibility of the display as well as an ideal position for operating the menu. arium® pro | basic systems are also equipped with integrated stowage space on the top of the system. The horizontal surface therefore provides additional space for accommodating sample containers or sampling chambers, for example.

Below-bench Unit
Space is a vital commodity in the laboratory. To ensure the highest degree of flexibility with limited space conditions, the systems can also be integrated into the laboratory furniture. The display and dispensing unit can be located up to 2.8 m from the device while still remaining convenient to use.

Wall mounted System
A further space saving solution is the wall mounted version of the arium® devices. The supplied wall bracket enables the device to be easily positioned above the relevant work area. Thanks to the flexible installation options of the display with the dispensing unit, the operating comfort is maintained without restrictions.

Remote Dispenser Accessory
The arium® remote dispenser is the solution for greater flexibility in the laboratory. The arium® remote dispenser is an ergonomic, easy-to-handle dispensing unit which, thanks to its different designs, can be used for dispensing both pure and ultrapure water. The variants are available as benchtop units with stand foot or as a wall mounted system depending on space requirements. Thanks to the extended tube guide, the work area for dispensing is extended to up to three meters. Furthermore, the height adjustable stand foot enables optimal adjustment to different sizes of sampling chamber. The stand foot is also optionally available for the display | dispensing unit.

Water Monitor Accessory
The arium® water monitor provides additional security by identifying water leaks early and guaranteeing optimal protection in the laboratory.

Environmentally Friendly Use and Quality Assurance

Environmentally Friendly Technology

Eco Mode
The arium® models have an automatic eco mode, whose start time can be set individually. The device goes into a standby mode to facilitate energy efficiency when not in use.

Cartridges
Thanks to the high performance cartridges inserted into the device combined with state-of-the-art technology, such as electronic|chemical deionization, the service life of the filters is increased considerably, which reduces environmental impact.

Quality Assurance and Certification
Our devices are subjected to constant quality controls during manufacture. The produced water quality is also rigorously tested with regard to observing international standards and regulations. This includes ensuring that the water complies with the following requirements:

- ASTM, American Society for Testing and Materials
- ISO 3696, International Organization for Standardization; Water for analytical laboratory use
- Pharmacopeia, specified materials, including water for medical applications

Overview of Regulations and Standards

Regulation | Standard	arium® pro DI | basic	arium® pro UF	arium® pro UV	arium® pro VF	61316 RO	61512 EDI
ASTM type I	+	+	+	+	–	–
ASTM type II	+	+	+	+	–	+
ISO 3696 type I	+	+	+	+	–	–
ISO 3696 type II	+	+	+	+	+*	+
NCCLS	+	+	+	+	+*	–
CAP	+	+	+	+	+*	–
Aqua purificata EU	+****	+****	+****	+****	+****	+****
Aqua purificata USP	+****	+****	+****	+****	–	+****
Highly purified water EU*	–	+	–	+	–	–
WFI EU**	–	–	–	–	–	–
WFI USP***	–	+****	–	+****	–	–

+*: depends on feed water quality
WFI EU**: validation necessary, distillation necessary
WFI USP***: validation necessary
+****: validation necessary

Technical Service and Support

Our application and service specialists undergo special training and understand our customers' applications, keeping in mind all legal requirements for the industry. Our employees have impressive experience in diverse sectors of the pharmaceutical | biotech, chemical, and food and drink industries in which the highest grade water is indispensable. First class service in installation, validation, and maintenance, as well as individual consultation are a standard for us.

Take Advantage of the Range of Offers from Our Service Department

- Needs analysis
- Installation and startup
- Technical support
- Equipment qualification (IQ, OQ) and validation
- Preventive maintenance service and service agreements
- Corrective maintenance and spare part service
- Customer specific user training

For further information, visit
www.sartorius-stedim.com/instrument-services

Ordering Information

arium® pro Ultrapure Water Systems	Order Number arium® H2O pro without TOC Monitor	Order Number arium® H2O pro with Integrated TOC Monitor	Description
	H2Opro-DI-B	–	arium® pro DI wall-mounted system for producing ultrapure water for standard applications with front bottom-mounted display | dispenser unit and integrated wall bracket for the system
	H2Opro-DI-T	–	arium® pro DI benchtop system for producing ultrapure water for standard applications with front top-mounted display | dispenser unit
	H2Opro-DI-D	–	arium® pro DI built-in system for producing ultrapure water for standard applications, including wall-mounting kit for the display | dispenser unit that can be installed up to 2.8 meters from the system
	H2Opro-UF-B	–	arium® pro UF wall-mounted system for producing ultrapure water for cell culture applications with front bottom-mounted display | dispenser unit and integrated wall bracket for the system
	H2Opro-UF-T	–	arium® pro UF benchtop system for producing ultrapure water for cell culture applications with front top-mounted display | dispenser unit
	H2Opro-UF-D	–	arium® pro UF built-in system for producing ultrapure water for cell culture applications, including wall-mounting kit for the display | dispenser unit that can be installed up to 2.8 meters from the system
	H2Opro-UV-B	H2Opro-UV-B-TOC	arium® pro UV wall-mounted system for producing ultrapure water for chromato-graphy applications with front bottom-mounted display | dispenser unit and integrated wall bracket for the system
	H2Opro-UV-T	H2Opro-UV-T-TOC	arium® pro UV benchtop system for producing ultrapure water for chromato-graphy applications with front top-mounted display | dispenser unit
	H2Opro-UV-D	H2Opro-UV-D-TOC	arium® pro UV built-in system for producing ultrapure water for cell chromato-graphy applications, including wall-mounting kit for the display | dispenser unit that can be installed up to 2.8 meters from the system
	H2Opro-VF-B	H2Opro-VF-B-TOC	arium® pro VF wall-mounted system for producing ultrapure water for standard, cell culture, and chromatography applications with front bottom-mounted display | dispenser unit and integrated wall bracket for the system
	H2Opro-VF-T	H2Opro-VF-T-TOC	arium® pro VF benchtop system for producing ultrapure water for standard, cell culture, and chromatography applications with front top-mounted display | dispenser unit
	H2Opro-VF-D	H2Opro-VF-D-TOC	arium® pro UV built-in system for producing ultrapure water for standard, cell culture, and chromatography applications, including wall-mounting kit for the display | dispenser unit that can be installed up to 2.8 meters from the system

arium® basic Ultrapure Water System

Order Number	Description
H20 basic-B	arium® basic wall-mounted system for producing ultrapure water for standard applications with front bottom-mounted display | dispenser unit and integrated wall bracket for the system
H20 basic-T	arium® basic benchtop system for producing ultrapure water for standard applications with front top-mounted display | dispenser unit

Cartridge sets for arium® pro, arium® basic and arium® 611 systems

Order Number	Product Name	Description
H2O-A-PACK	Analytical Kit	Cartridge set for arium® VF or UV ultrapure water systems
H2O-B-PACK	Biological Kit	Cartridge set for arium® UF ultrapure water systems
H2O-E-PACK	Elemental Kit	Cartridge set for arium® basic and DI ultrapure water systems
H2O-U-PACK	Universal Kit *	Cartridge set for arium® ultrapure water systems with tap water feed

* Tap water cartridges should be used only after the feed water specifications have been checked and following consultation with the responsible Sartorius application specialist.

arium® pro Consumables

Order Number	Description
611CDU5	Ultrafilter
611CEL1	UV lamp
611CDS2	Sanitization kit (with 2 syringes)
611CDS6	Sanitization kit (with 6 syringes)
5441307H4--CE--B	Sartopore® 2 150 sterile final filters, pore size: 0.2 µm (5 pcs.)

arium® pro Accessories

Order Number	Description
H2Opro-AMDG1	Remote dispenser including height-adjustable stand foot
H2Opro-AMDG2	Remote dispenser including wall mounting kit
H2Opro-ADM1	Display mounting kit including height-adjustable stand foot
611APR1	Dot matrix printer for data logging
610AWGI	Water monitor
H2O-AFS1	Foot switch for water dispensing
H2O-ALS1	Two level sensors for connection to an open tank system

arium® 61215 Systems

Order Number arium® 61215 Benchtop Unit	Order Number arium® 61215 Built-in Unit	Description
61215030F05M1A	61215030F05M1D	Complete arium® EDI 61215 ASTM type 2 water system with 30-liter storage tank* (equipment supplied: arium® EDI 61215, water storage tank, 2× reverse osmosis modules, 4× softener cartridges, 2 pre-treatment cartridges + disinfection syringes for the reverse osmosis modules and water storage tank).
61215050F05M1A	61215050F05M1D	Complete arium® EDI 61215 ASTM type 2 water system with 50-liter storage tank* (equipment supplied: arium® EDI 61215, water storage tank, 2× reverse osmosis modules, 4× softener cartridges, 2 pre-treatment cartridges + disinfection syringes for the reverse osmosis modules and water storage tank).
61215070F05M1A	61215070F05M1D	Complete arium® EDI 61215 ASTM type 2 water system with 70-liter storage tank* (equipment supplied: arium® EDI 61215, water storage tank, 2× reverse osmosis modules, 4× softener cartridges, 2 pre-treatment cartridges + disinfection syringes for the reverse osmosis modules and water storage tank).
61215100F05M1A	61215100F05M1D	Complete arium® EDI 61215 ASTM type 2 water system with 100-liter storage tank* (equipment supplied: arium® EDI 61215, water storage tank, 2× reverse osmosis modules, 4× softener cartridges, 2 pre-treatment cartridges + disinfection syringes for the reverse osmosis modules and water storage tank).

arium® 61215 Consumables

Order Number	Description
613CPF05-------V	2× pre-treatment cartridges
612CPS1--------A	4× softener cartridges
613CPM4-------V	2× RO modules
611CDS2	Disinfection set for the tank (2 syringes)
612CDS2	Disinfection set for the RO modules (2 syringes)

arium® 61215 Accessories

Order Number	Description
613-AMDG1	Remote dispenser for 613APV pressure tank, including height-adjustable stand foot
613-AMDG2	Remote dispenser for 613APV pressure tank, including wall-mounting kit
613APV31	30-liter tank*
613APV50	50-liter tank*
613APV70	70-liter tank*
613APV100	100-liter tank*

* With tank pressure of 2.5 bar

arium® 61316 Reverse Osmosis System	Order Number arium® 61316 Benchtop Unit	Order Number arium® 61316 Built-in Unit	Description
	61316030F05M1A	61316030F05M1D	Complete reverse osmosis system with a 30-liter storage tank* (equipment included: arium® 61316, water storage tank, 2× reverse osmosis modules, 2 pre-treatment cartridges + disinfection syringes for the reverse osmosis modules and water storage tank).
	61316050F05M1A	61316050F05M1D	Complete reverse osmosis system with a 50-liter storage tank* (equipment included: arium® 61316, water storage tank, 2× reverse osmosis modules, 2 pre-treatment cartridges + disinfection syringes for the reverse osmosis modules and water storage tank).
	61316070F05M1A	61316070F05M1D	Complete reverse osmosis system with a 70-liter storage tank* (equipment included: arium® 61316, water storage tank, 2× reverse osmosis modules, 2 pre-treatment cartridges + disinfection syringes for the reverse osmosis modules and water storage tank).
	61316100F05M1A	61316100F05M1D	Complete reverse osmosis system with a 100-liter storage tank* (equipment included: arium® 61316, water storage tank, 2× reverse osmosis modules, 2 pre-treatment cartridges + disinfection syringes for the reverse osmosis modules and water storage tank).

arium® 61316 Consumables	Order Number	Description
	613CPF05-------V	2× pre-treatment cartridges
	613CPM4-------V	2× RO modules
	611CDS2	Disinfection set for the tank (2 syringes)
	612CDS2	Disinfection set for the RO modules (2 syringes)

arium® 61316 Accessories	Order Number	Description
	613-AMDG1	Remote dispenser for 613APV pressure tank, including height-adjustable stand foot
	613-AMDG2	Remote dispenser for 613APV pressure tank, including wall-mounting kit
	613APV31	30-liter tank*
	613APV50	50-liter tank*
	613APV70	70-liter tank*
	613APV100	100-liter tank*

* With tank pressure of 2.5 bar

arium® 613L Reverse Osmosis System

Order Number	Description
613L050	Complete arium® RO system with distribution pump, 50 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, RO membrane and 100-l tank
613L050D	Complete arium® RO system without distribution pump (in conjunction with an external tank system) 50 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, RO membrane
613L100	Complete arium® RO system with distribution pump, 100 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, 2× RO membranes and 100-l tank
613L100D	Complete arium® RO system without distribution pump (in conjunction with an external tank system) 100 l/h, 230 Volt, 50 Hz, including 5 µm prefilter and 2× RO membranes
613L150	Complete arium® RO system with distribution pump, 150 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, 3× RO membranes and 100-l tank
613L150D	Complete arium® RO system without distribution pump (in conjunction with an external tank system) 150 l/h, 230 Volt, 50 Hz, including 5 µm prefilter and 3× RO membranes
613L200	Complete arium® RO system with distribution pump, 200 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, 4× RO membranes and 100-l tank
613L200D	Complete arium® RO system without distribution pump (in conjunction with an external tank system) 200 l/h, 230 Volt, 50 Hz, including 5 µm prefilter and 4× RO membranes
613L250	Complete arium® RO system with distribution pump, 250 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, 5× RO membranes and 100-l tank
613L250D	Complete arium® RO system without distribution pump (in conjunction with an external tank system) 250 l/h, 230 Volt, 50 Hz, including 5 µm prefilter and 5× RO membranes
613L300	Complete arium® RO system with distribution pump, 300 l/h, 230 Volt, 50 Hz, including 5 µm prefilter, 6× RO membranes and 100-l tank
613L300D	Complete arium® RO system without distribution pump (in conjunction with an external tank system) 300 l/h, 230 Volt, 50 Hz, including 5 µm prefilter and 6× RO membranes

arium® 613L Consumables

Order Number	Description
613L-AE002	Conductivity meter
613L-AE002	UV lamp with housing
613L-CH001	5 µm prefilter
613L-CH002	RO membrane

arium® 613L Accessories

Order Number	Description
613AOV200	Standard 200-l tank with system-controlled distribution pump (for RO 613L050D, 613L100D, 613L150D, 613L200D, 613L250D, & 613L300D systems)
613AOV600	Standard 600-l tank with system-controlled distribution pump (for RO 613L050D, 613L100D, 613L150D, 613L200D, 613L250D, & 613L300D systems)
613AOV1000	Standard 1000-l tank with system-controlled distribution pump (for RO 613L050D, 613L100D, 613L150D, 613L200D, 613L250D, & 613L300D systems)

arium® 615S Water Softening System

Order Number	Description
615S004	arium® 615S water softening system for up to 400 l, time-controlled regeneration and 25 kg salt, ready-to-use
615S006	arium® 615S water softening system for up to 600 l, time-controlled regeneration and 25 kg salt, ready-to-use
615S012	arium® 615S water softening system for up to 1200 l, time-controlled regeneration and 25 kg salt, ready-to-use

arium® 615S Consumables

Order Number	Description
615SC001	25 kg salt tablets for regeneration

arium® 615DI Complete Deionization Cartridges

Order Number	Description
615DI004	arium® complete deionization cartridge including hose connection set, capacity up to 420 l at 20° dH
615DI007	arium® complete deionization cartridge including hose connection set, capacity up to 650 l at 20° dH
615DI010	arium® complete deionization cartridge including hose connection set, capacity up to 1050 l at 20° dH
615DI014	arium® complete deionization cartridge including hose connection set, capacity up to 1400 l at 20° dH

arium® 615DI Consumables

Order Number	Description
615DIC01	arium® refill pack for complete deionization cartridges, ion exchange resin mix in 25 l PE bag

arium® 615DI Accessories

Order Number	Description
615ALC1	arium® conductivity analyzer for complete deionization cartridges with LED display (red > 20 µS/cm & green < 20 µS/cm)
615ADC1	arium® conductivity analyzer for complete deionization cartridges with digital measurement value display, conductivity measurement range 0.056–200 µS/cm

Application | System Overview

Application	arium® pro DI | basic	arium® pro UF	arium® pro UV	arium® pro VF	arium® 61215 EDI	arium® 61316	arium® 613L
General laboratory applications							
Feed water for glassware machines, autoclaves, air humidifiers					××	×××	×××
Feed water for ultrapure water systems					×	×××	×××
Rinsing of glass and laboratory containers	××					×××	×××
Steam generation					×××	××	××
Preparation microbiological media and buffers	×××				××		
Reagent manufacture	×××	×××	×××	×××	××		
General media preparation	××	××	××	××			
Biological applications							
Microbiology		××		×××			
Molecular biology		×××	×	×××			
Biotechnological applications: cell biology, biochemistry, genetics, DNA/RNA applications, medical diagnostics, tissue production, biomolecular procedures, biotech, and life sciences		××		×××			
DNA sequence analysis		×××		×××			
IVF (in vitro fertilization)		×××		×××			
Cell culture media		×××		×××			
Protein | Enzyme manufacture		×		××			
Biochemical applications, general		×××	××	××			
Biochemical applications, PCR				×××			
Drug discovery	××	××	××	××			

Application	arium® pro DI | basic	arium® pro UF	arium® pro UV	arium® pro VF	arium® 61215 EDI	arium® 61316	arium® 613L
Analytical applications							
Inorganic analytical methods: IC, AAS, ICP, ICP-MS	×××	××	×××	××			
Electrochemistry	×××	××	×××	×			
Chromatography	×	×	×××	×××			
HPLC	××	××	×××	×××			
HPLC with low TOC content			×××	×××			
Analysis of trace elements (HPLC, IC, TOC)	××	××	×××	×××			
Photometric methods: filter photometer, UV, UV-VIS Chromatography detectors	××	×××	×××				
Mass spectrometry	×	×	×××	×			
Electrophoresis Film and gel technology		×		×××			
Electrophoresis	×	×	××	×××			
Nanotechnology	××	××	××	××			

The table shows recommendations for various applications and can be used as a guideline. For help finding a device that meets your special requirements, please contact us directly.

× = suitable to a limited extent
×× = suitable
××× = optimal

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For further contacts, visit www.sartorius-stedim.com

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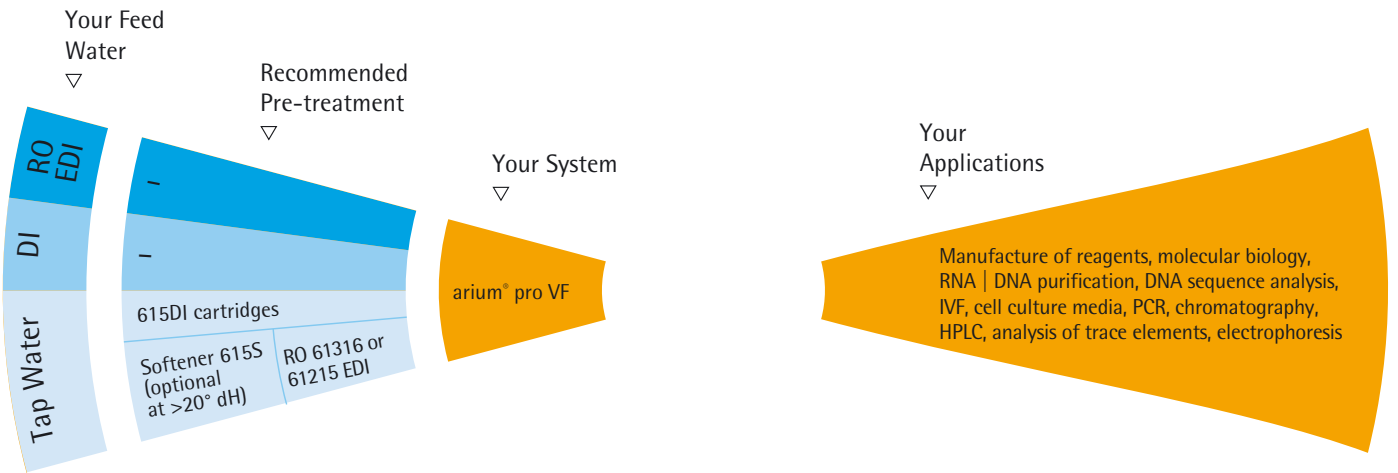
Fax +65.6778.2494

Type 1 Water

△
Your Required ASTM
Water Quality

Turn the disk to the water quality and applications you require and see which system meets your requirements. You can also view the recommended pre-treatments.



Type 1

arium® pro
(1.7–2 l/min)

Type 2

61215 EDI
system (15 l/h)

Type 3

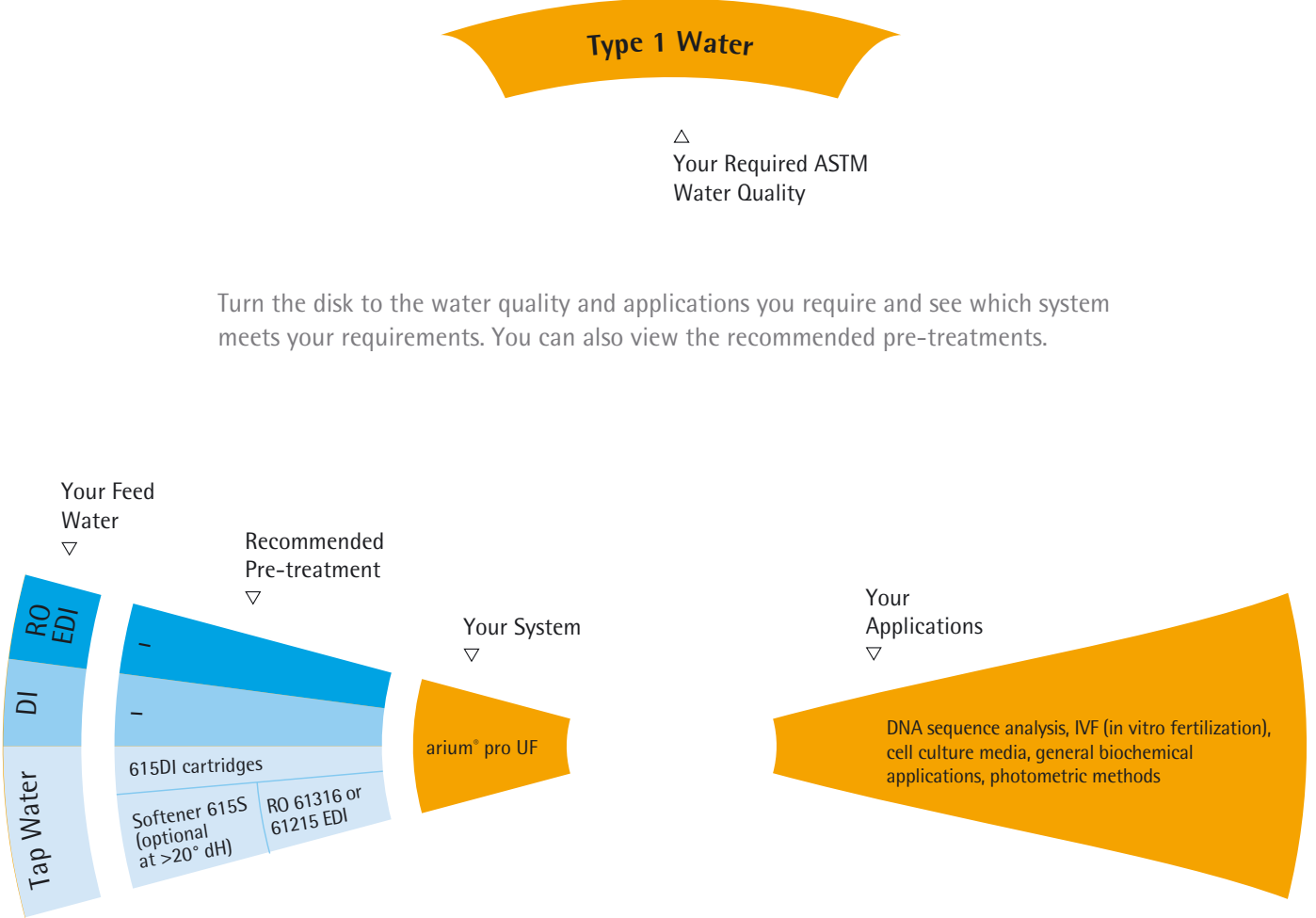
Reverse osmosis systems
61316 (16 l/h)

Type 3

613L (50–300 l/h)

Softener 615S

Deionization
cartridges 615DI



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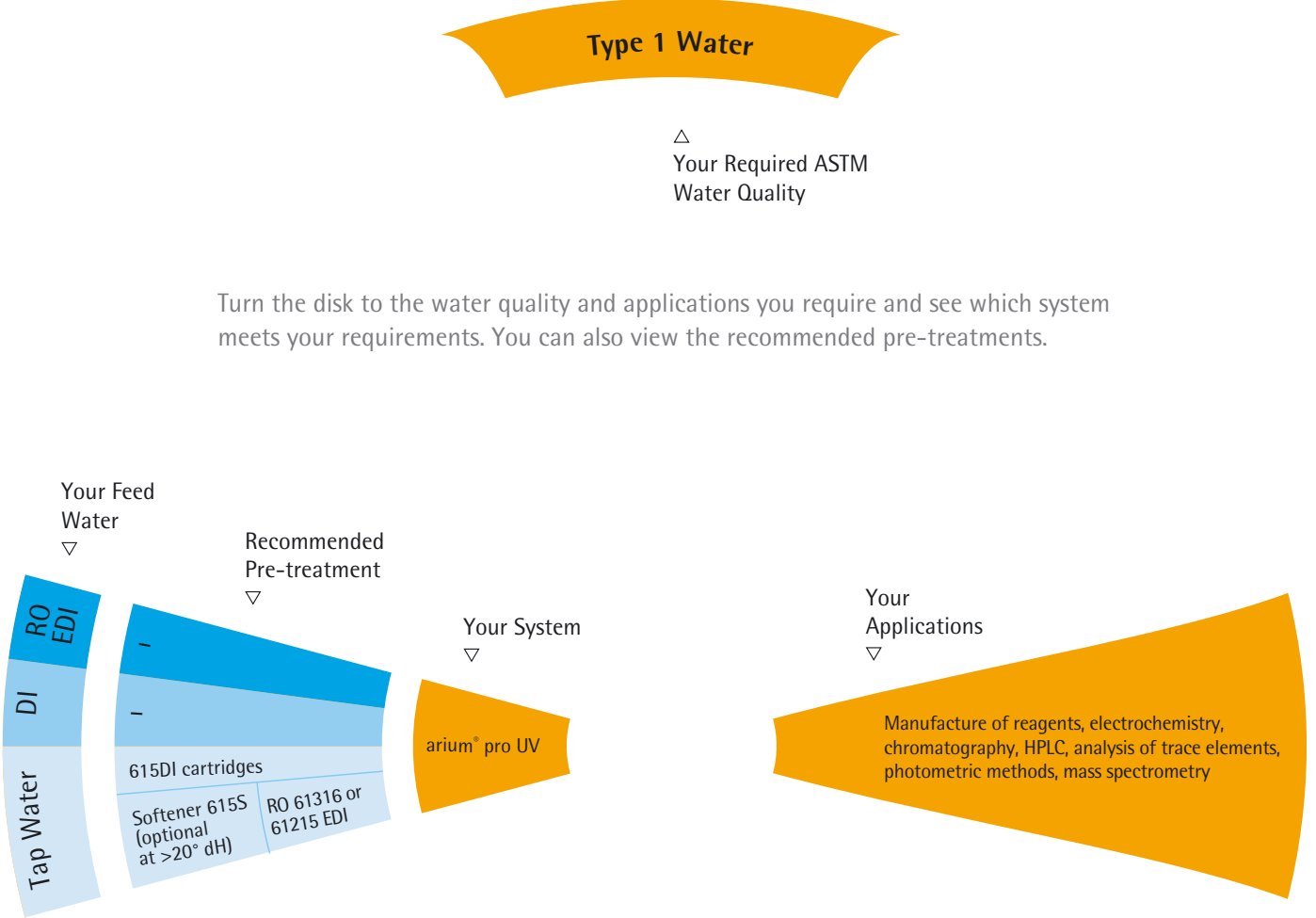

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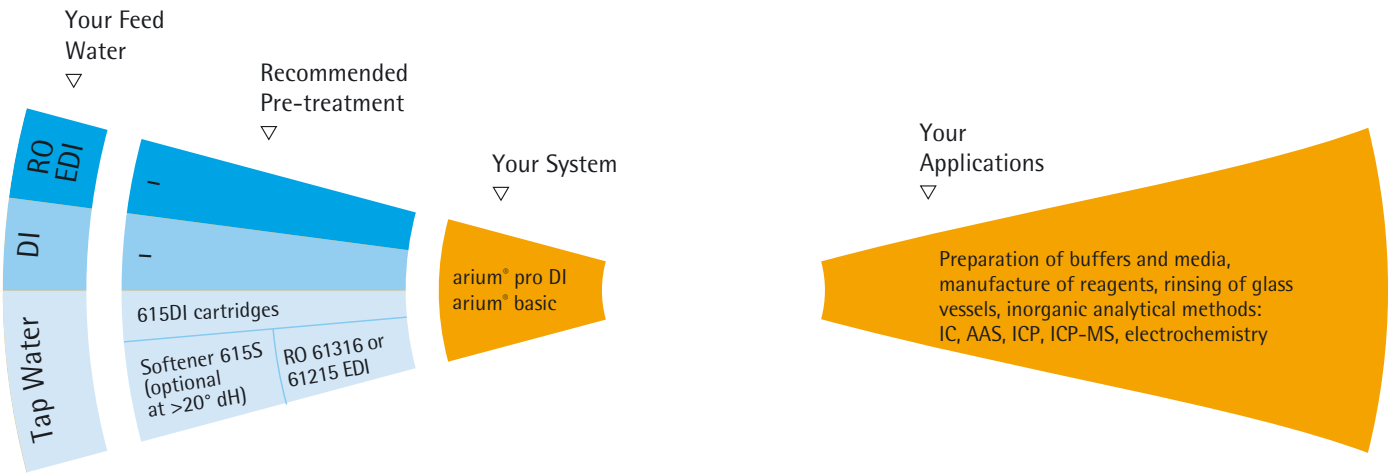

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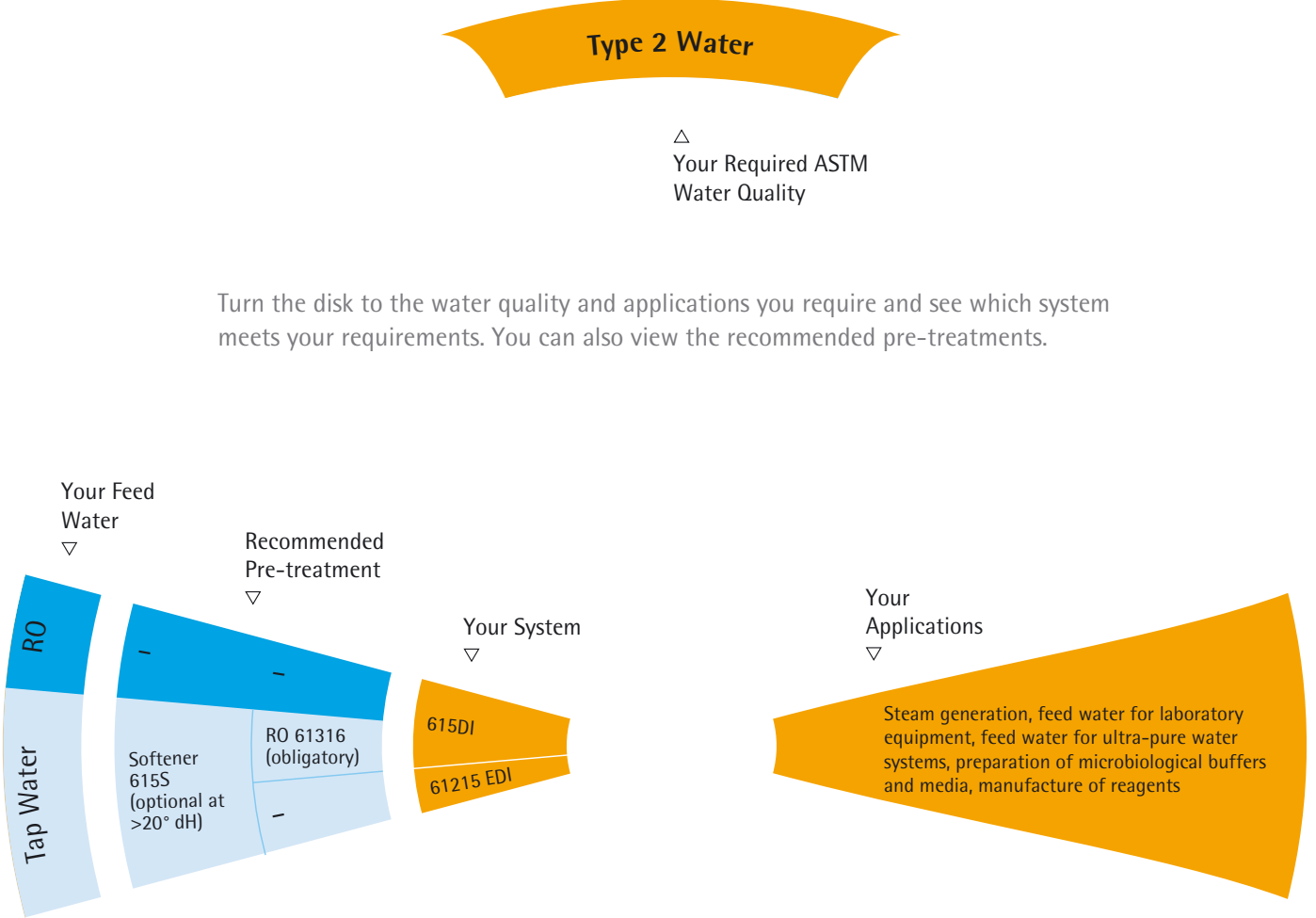

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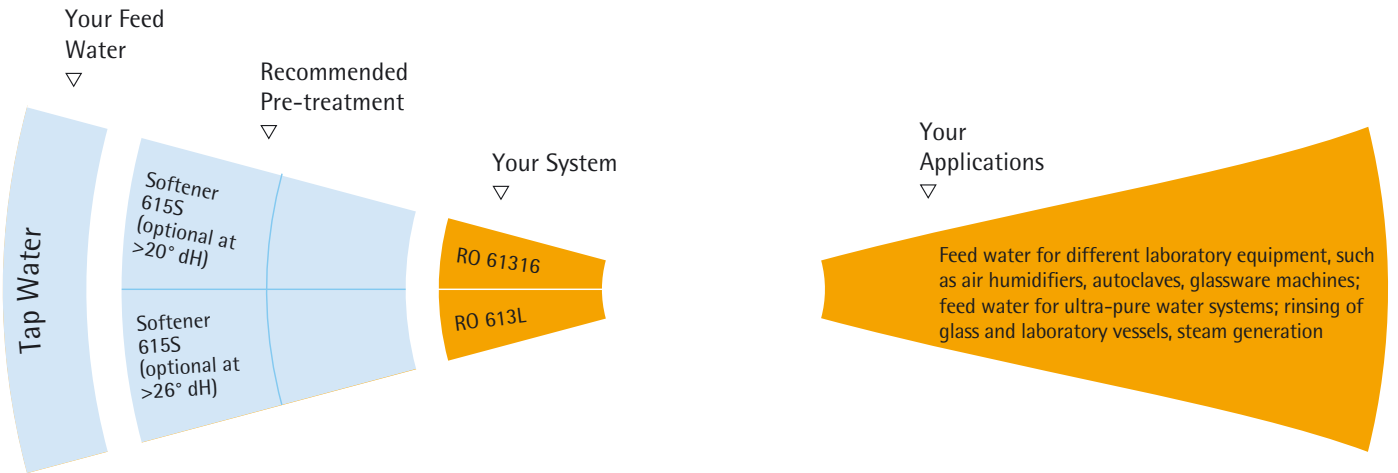

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The arium® Family at a Glance

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