

# VWR® ultrapure water systems

01. TYPE 1 WATER PRODUCTION RATE UP TO 120 L/H 02. MULTIPLE DISPENSERS FOR 1 LAB WATER SYSTEM 03. 20 CM LARGE GLOVE-FRIENDLY TOUCH SCREEN MONITOR





## Water is the most basic and yet the most critical component of any experiment

While tap water may be good enough to drink, laboratory methods are more sensitive than human physiology! VWR water purification systems remove the impurities that threaten your results, from simple glass rinsing to solution production or instrument feeds. These are some of the challenges managed seamlessly by the VWR Puranity range.

Table 1 shows there are 2 major classes of impurities in water; dissolved and/or undissolved impurities.

**Dissolved impurities** include inorganic ions, small organic molecules and bigger, more complex molecules like nucleases, bacterial endotoxins and pyrogens as well as gases.

**Undissolved impurities** are suspended particles like sand or rust or microorganisms (bacteria, fungi, algae and viruses) and colloids that can cause indefinable results in some applications.

Application	Particulates	Colloids	lons	Dissolved gases	Organics	Nucleases	Pyrogens
General laboratory							
Autoclave	•	•	•				
Humidification	•	•	•				
Glassware washing/rinsing	•	•	•				
Media preparation	•	•	•				
Analytical laboratory							
Ion chromatography (IC)	•	•	•	•			
Atomic absorption (AA)	•	•	•	•			
High performance liquid chromatography (HPLC)	•	•	•	•	•		
Inductively coupled plasma spectroscopy (ICP)	•	•	•	•	•		
Mass spectroscopy (MS)	•	•	•	•	•		
Gas chromatography (GC)	•	•	•	•	•		
Total organic carbon (TOC)	•	•	•	•	•		
Life science laboratory							
Genomics (e.g. PCR, mutagenesis)	•	•	•	•	•	•	•
Proteomics (e.g. crystallography, electrophoresis)	•	•	•	•	•	•	•
Immunology (e.g. monoclonal antibody production, blots)	•	•	•	•	•	•	•
Pharmacology	•	•	•	•	•	•	•
Cell and tissue culture	•	•	•	•	•	•	•
Drug discovery	•	•	•	•	•	•	•

## TABLE 1. THE IMPACT OF DIFFERENT CONTAMINATINGPARAMETERS ON EXPERIMENTAL PERFORMANCE BY APPLICATION

#### SUSPENDED PARTICLES, COLLOIDS AND **INORGANIC IONS**

Particles 1 to 10 µm in size (sand, silt etc) can interfere with instrument operation, plug valves and other narrow flow paths as well as foul reverse osmosis membranes.

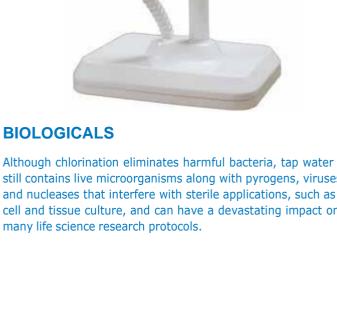
Slightly smaller  $(0,01 \text{ to } 1,0 \mu \text{m})$  colloidal particles typically have a slightly net negative charge and clog filters, interfere with instrument operation, foul reverse osmosis membranes and can bypass ion exchange resins, resulting in lower resistivity in deionised water systems.

Cations and anions adversely affect the results of inorganic analyses such as IC, AA, ICP/MS and may retard cell and tissue growth in biological research. They can also affect cartridge life in deionised water systems.

#### **DISSOLVED GASES & ORGANICS**

Water naturally contains dissolved gases that can alter the pH of the water. While oxygen, the most common non ionised gas, may cause corrosion of metal surfaces. Organics foul ion exchange resins and interfere with organic analyses including HPLC, gas chromatography and fluoroscopy, as well as hindering electrophoresis, tissue and cell culture. Typical organic impurities in tap water include proteins, residues of pesticides and more and more hormones as wastewater plants are unable to remove them.

still contains live microorganisms along with pyrogens, viruses and nucleases that interfere with sterile applications, such as cell and tissue culture, and can have a devastating impact on many life science research protocols.



## Purification methods

To make pure and ultrapure water, impurities need to be efficiently and effectively removed. Water purification systems employ multiple technologies, some synergistically, to remove impurities giving you consistently pure water. Water purification is a step-by-step process often requiring a combination of technologies. Table 2 shows that the choice of methodology used depends on the application the water is being used for.

In general, the higher the purity the more expensive it is to produce every litre.

## **TABLE 2.** EFFICIENCY OF DIFFERENT METHODS AT REMOVING CONTAMINATIONFROM WATER

	Distillation	Reverse osmosis	Deionisation	Electro- deionisation	Filtration	Ultrafiltration (UF)	Adsorption	Ultraviolet oxidation (UV)	Combination UV/UF
Inorganic ions	+++	++	+++	+++	+	+	+	+	+
Dissolved gases	++	+	+++	+++	+	+	++	+	+
Organics	++	++	+	+	+	+	+++	+++	+++
Particles	+++	+++	+	+	+++	+++	+	+	+++
Bacteria	+++	+++	+	+	+++	+++	+	+++	+++
Pyrogens	+++	+++	+	+	+	+++	++	+	+++
Nucleases	+	+	+	+	+	++	++	+	+++

Key: +++ Excellent, ++ Good, + Poor

## TABLE 3. INTERNATIONAL STANDARDSFOR WATER QUALITY

Type of water	Electrical conductivity (µS/cm)	Salt content (ppm)	TOC content (µg/l)
Tap water*	600	300	Up to 5000
ASTM Type 3	0,25	0,05	200
ASTM Type 2	1	0,12	50
ASTM Type 1	0,055	0,028	50

\* Tap water quality differs from place to place, this is an example only.

Typically, Type 2 or RO water is used for general laboratory equipment like water baths or incubators, buffer, media and reagent preparation or as a feed water supply for Type 1 water purification systems. Type 1 water is essential for analytical and life science techniques to ensure the best results.



## **Equipment Services**

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Ultrapure water system, G Series

#### **ULTRAPURE WATER SYSTEM, G SERIES**

This powerful and intuitive laboratory water purification system provides superior and consistent ultrapure Type I and EDI based Type II water from tap-water. Quality of the ultrapure water meets or exceeds ASTM, CLSI, CAP, and ISO Type I water standards, respectively.

- Simple and intuitive to dispense water via the dispenser or the central console
- Central console is an 8 inch water-proof touchscreen, providing user full control and access of system performance
- One water system can drive several dispensing units («1 + N mode»)
- Dispensing flow rate is up to 2 l/min and volumetric dispensing is available
- RFID tagged consumables for easier tracking of lifetime and performance
- Wireless communication option to control multiple dispensers and the central console (optionally available)
- Real-time TOC and resistivity/conductivity monitoring
- Users can see essential information (water quality, system status, warnings) on the dispenser unit and the central console at any time (data stored up to 2 years; downloadable)

The graphic display on the VWR water system guides user through system operation, performance, trouble shooting and maintenance and can be password protected for multiple access levels.

Applications (Type I - ultrapure water): HPLC mobile phase preparation; preparation of reagent blank solutions; sample diluent for GC, HPLC, ICP-MS, AA and other analytical techniques; preparation of buffers and culture media for mammalian cell culture; preparation of molecular biology reagents. Applications (Type II - EDI water): Preparation of chemical and bio-reagents; preparation of culture media; preparation of solutions for chemical analysis (such as HPLC and ICP); clinical analyzers; medical device and equipment rinsing; serum and blood fractionation; ophthalmics

The VWR water system is delivered with a Certificate of Conformity ensuring that it has been built and tested fully assembled following Standard Operating Procedures and a Certificate of Calibration for the temperature and resistivity meters built in the system. Consumables are automatically delivered with a Certificate of Quality. Manufacturing site is ISO 9001 (2015) and ISO 140001 certified.

For a complete system the production unit and the mandatory accessories have to be ordered. Other accessories and consumables, including wall mounting brackets, purification cartridges and wireless upgrade kit are available separately.

**Please note:** For the G5 system it is required to order **one** unit of the RO pack **171-1276** (12 l/h), For the G10 system it is required to order **two** units of the RO pack **171-1276** (12 l/h). For the G15 system please order **two** units of the RO pack **171-1277** (16 l/h).

Model	G5	G10	G15		
Feed water	Tap water (conduc	tivity: < 2000 µS/cm / <sup>-</sup>	TDS: < 1000 ppm)		
Flow rate (I/min)	Max. 2				
Production flow rate (I/h)	5 10 15				
TOC content	< 5 ppb (Type I) < 30 ppb (Type II)				
Resistivity at +25 °C	18,2 MΩ·cm (Type I)				
Particles	No particles (with a 0,2 $\mu$ m final filter or Bio filter)				
Endotoxin	< 0,001 Eu/ml (with Bio filter)				
Microorganisms	< 0,1 cfu/ml (with a 0,2 µm final filter or Bio filter)				
RNases	< 0,5 pg/ml (with Bio filter)				
DNases	< 10 pg/ml (with Bio filter)				
W×D×H (mm)	320×440×540				

Description	Pk	Cat. No
VWR G5 system with TOC (5 l/h)	1	171-1094
VWR G10 system with TOC (10 l/h)	1	171-1095
VWR G15 system with TOC (15 l/h)	1	171-1096

Description	Pk	Cat. No.
Mandatory cartridges		
AC pack	1	171-1254
P pack	1	171-1255
U pack (low TOC)	1	171-1260
RO pack, 12 l/h *	1	171-1276
RO pack, 16 l/h *	1	171-1277
Accessories		
30 I PE tank with sensors	1 SET	171-1264
Tank vent filter	1 Pack	171-1267
UV sanitisation module for tank	1 Pack	171-1268
Dispenser kit	1 Pack	171-1273
Leak protection	1 Pack	171-1278
Cleaning pack	1 Pack	171-1281
P pack for harder water	1	171-1256
U pack (ICP)	1	171-1261
Bio filter	1 Pack	171-1263
Tank recirculation upgrade kit with a cartridge	1 Pack	171-1269
Wireless dispenser upgrade kit	1 Pack	171-1274



Ultrapure water system, U Series

#### **ULTRAPURE WATER SYSTEM, U SERIES**

This two-in-one lab water system produces ultrapure (Type I) and RO (Type III) water from tap water. Quality of ultrapure water meets or exceeds ASTM, CLSI, CAP, and ISO Type I water standards.

- Simple and intuitive to dispense water via the dispenser or the central console
- Central console is an 8 inch water-proof touchscreen, providing user full control and access of system performance
- One water system can drive several dispensing units («1 + N mode»)
- Dispensing flow rate is up to 2 l/min and volumetric dispensing is available
- RFID tagged consumables for easier tracking of lifetime and performance
- Wireless communication option to control multiple dispensers and the central console (optionally available)
- Real-time TOC and resistivity/conductivity monitoring
- Optional tank circulation mode to maintain a stable water quality in the tank
- Users can see essential information (water quality, system status, warnings) on the dispenser unit and the central console at any time (data stored up to 2 years; downloadable)

The graphic display on the VWR water system guides user through system operation, performance, trouble shooting and maintenance and can be password protected for multiple access levels.

Applications (Type I - ultrapure water): HPLC mobile phase preparation; preparation of reagent blank solutions; sample diluent for GC, HPLC, ICP-MS, AA and other analytical techniques; preparation of buffers and culture media for mammalian cell culture; preparation of molecular biology reagents. Applications (Type III - RO water): Glassware cleaning, washing machines for glassware, water bath water, autoclave filling, water for laboratory animals.

The VWR water system is delivered with a Certificate of Conformity ensuring that it has been built and tested fully assembled following Standard Operating Procedures and a Certificate of Calibration for the temperature and resistivity meters built in the system. Consumables are automatically

delivered with a Certificate of Quality. Manufacturing site is ISO 9001 (2015) and ISO 140001 certified.

For a complete system the production unit and the mandatory accessories have to be ordered. Other accessories and consumables, including wall mounting brackets, purification cartridges and wireless upgrade kit are available separately.

**Please note:** For the U12 system it is required to order **one** unit of the RO pack **171-1276** (12 l/h), For the U24 system it is required to order **two** units of the RO pack **171-1276** (12 l/h). For the U32 system please order **two** units of the RO pack **171-1277** (16 l/h).

Model	U12	U24	U32		
Feed water	Tap water (conductivity: < 2000 µS/cm / TDS: < 1000 ppm)				
Flow rate (I/min)	Max. 2				
Production flow rate (I/h)	12 24 32				
TOC content	< 5 ppb (Type I)				
Resistivity at +25 °C	18,2 MΩ·cm (Type I)				
Particles	No particles (with a 0,2 µm final filter or Bio filter)				
Endotoxin	< 0,001 Eu/ml (with Bio filter)				
Microorganisms	< 0,1 cfu/ml (with a 0,2 µm final filter or Bio filter)				
RNases	< 0,5 pg/ml (with Bio filter)				
DNases	< 10 pg/ml (with Bio filter)				
W×D×H (mm)	320×440×540				

Description	Pk	Cat. No.
VWR U12 water system (12 l/h)	1	171-1097
VWR U12 water system, with TOC (12 l/h)	1	171-1098
VWR U24 water system (24 l/h)	1	171-1099
VWR U24 water system, with TOC (24 l/h)	1	171-1244
VWR U32 water system (32 l/h)	1	171-1245
VWR U32 water system, with TOC (32 l/h)	1	171-1246

Description	Pk	Cat. No.
Mandatory cartridges		
AC pack	1	171-1254
P pack	1	171-1255
H pack	1	171-1257
U pack	1	171-1258
RO pack, 12 l/h *	1	171-1276
RO pack, 16 l/h *	1	171-1277
Accessories		
0,2 μm PES final filter	1 Pack	171-1262
30 I PE tank with sensors	1 SET	171-1264
Tank vent filter	1 Pack	171-1267
Dispenser kit	1 Pack	171-1273
Leak protection	1 Pack	171-1278
Cleaning pack	1 Pack	171-1281
P pack for harder water	1	171-1256
U pack (ICP)	1	171-1261
Bio filter	1 Pack	171-1263
UV sanitisation module for tank	1 Pack	171-1268
Tank recirculation upgrade kit with a cartridge	1 Pack	171-1269
Wireless dispenser upgrade kit	1 Pack	171-1274



VWR Ultrapure water system, P series

#### **ULTRAPURE WATER SYSTEM, P SERIES**

This powerful and intuitive laboratory water purification system produces Type I ultrapure water from RO, distilled or deionised water. The product water quality meets or exceeds CLSI and CAP Type I water standards.

- Simple and intuitive to dispense water via the dispenser or the central console
- Central console is an 8 inch water-proof touchscreen, providing user full control and access of system performance
- One water system can drive several dispensing units («1 + N mode»)
- Dispensing flow rate is up to 2 l/min and volumetric dispensing is available
- RFID tagged consumables for easier tracking of lifetime and performance
- Wireless communication option to control multiple dispensers and the central console (optionally available)
- Real-time TOC and resistivity/conductivity monitoring
- Users can see essential information (water quality, system status, warnings) on the dispenser unit and the central console at any time (data stored up to 2 years; downloadable)

The graphic display on the VWR water system guides user through system operation, performance, trouble shooting and maintenance and can be password protected for multiple access levels.

Applications: HPLC mobile phase preparation; preparation of reagent blank solutions; sample diluent for GC, HPLC, ICP-MS, AA and other analytical techniques; preparation of buffers and culture media for mammalian cell culture; preparation of molecular biology reagents.

The VWR water system is delivered with a Certificate of Conformity ensuring that it has been built and tested fully assembled following Standard Operating Procedures and a Certificate of Calibration for the temperature and resistivity meters built in the system. Consumables are automatically delivered with a Certificate of Quality. Manufacturing site is ISO 9001 (2015) and ISO 140001 certified.

For a complete system the production unit and the mandatory accessories have to be ordered. Other accessories and consumables, including wall mounting brackets, purification cartridges and wireless upgrade kit are available separately.

Model	P
Feed water	EDI water, RO water, distilled water, deionised water
Flow rate (I/min)	Max. 2
TOC content	< 5 ppb
Resistivity at +25 °C	18,2 MΩ·cm (Type I)
Particles	No particles (with a 0,2 $\mu$ m final filter or Bio filter)
Endotoxin	< 0,001 Eu/ml (with Bio filter)
Microorganisms	< 0,1 cfu/ml (with a 0,2 µm final filter or Bio filter)
RNases	< 0,5 pg/ml (with Bio filter)
DNases	< 10 pg/ml (with Bio filter)
W×D×H (mm)	300×480×510

Description	Pk	Cat. No.
VWR P system	1	171-1247
VWR P system, with TOC	1	171-1248

Description	Pk	Cat. No.
Mandatory cartridges		
H pack	1	171-1257
U pack	1	171-1258
Accessories		
0,2 µm PES final filter	1 Pack	171-1262
Dispenser kit	1 Pack	171-1273
U pack (ICP)	1	171-1261
Bio filter	1 Pack	171-1263
Wireless dispenser upgrade kit	1 Pack	171-1274



Ultrapure water system, A Series

#### ULTRAPURE WATER SYSTEM, A SERIES

This compact plug-and-play lab water system is an ideal choice for users who need up to 20 liters of ultrapure Type I water or RO water (Type III) per day. Quality of the ultrapure product water meets or exceeds ASTM, CLSI, CAP, and ISO Type I water standards.

- Simple and intuitive to dispense water via the dispenser or the central console
- Central console is an 8 inch water-proof touchscreen, providing user full control and access of system performance
- One water system can drive several dispensing units («1 + N mode»)
- Dispensing flow rate is up to 0,5 l/min and volumetric dispensing is available
- No storage tank needed as RO and ultrapure water are produced on demand
- RFID tagged consumables for easier tracking of lifetime and performance
- Wireless communication option to control multiple dispensers and the central console (optionally available)
- Real-time TOC and resistivity/conductivity monitoring
  Users can see essential information (water quality)
- Users can see essential information (water quality, system status, warnings) on the dispenser unit and the central console at any time (data stored up to 2 years; downloadable)

The graphic display on the VWR water system guides user through system operation, performance, trouble shooting and maintenance and can be password protected for multiple access levels.

Applications (Type I - ultrapure water): HPLC mobile phase preparation; preparation of reagent blank solutions; sample diluent for GC, HPLC, ICP-MS, AA and other analytical techniques; preparation of buffers and culture media for mammalian cell culture; preparation of molecular biology reagents. Applications (Type III - RO water): Glassware cleaning, washing machines for glassware, water bath water, autoclave filling, water for laboratory animals.

The VWR water system is delivered with a Certificate of Conformity ensuring that it has been built and tested fully assembled following Standard Operating Procedures and a Certificate of Calibration for the temperature and resistivity meters built in the system. Consumables are automatically delivered with a Certificate of Quality. Manufacturing site is ISO 9001 (2015) and ISO 140001 certified.

For a complete system the production unit and the mandatory accessories have to be ordered. Other accessories and consumables, including wall mounting brackets, purification cartridges and wireless upgrade kit are available separately.

Model	A	
Feed water	Tap water (conductivity: < 2000 µS/cm / TDS: < 1000 ppm)	
Flow rate (I/min)	Max. 0,5	
TOC content	< 5 ppb	
Resistivity at +25 °C	18,2 MΩ·cm (Type I)	
Particles	No particles (with a 0,2 µm final filter or Bio filter)	
Endotoxin	< 0,001 Eu/ml (with Bio filter)	
Microorganisms	< 0,1 cfu/ml (with a 0,2 µm final filter or Bio filter)	
RNases	< 0,5 pg/ml (with Bio filter)	
DNases	< 10 pg/ml (with Bio filter)	
W×D×H (mm)	320×440×540	

Description	Pk	Cat. No.
VWR A system	1	171-1249
V <mark>WR</mark> A system, with TOC	1	171-1250

Description	Pk	Cat. No.
Mandatory cartridges		
U pack	1	171-1258
U pack (low TOC)	1	171-1260
Accessories		
Dispenser kit with on-system anchor	1 Pack	171-1275
Mandatory cartridges		
RO pack, 16 l/h *	1	171-1277
Accessories		
Leak protection	1 Pack	171-1278
Cleaning pack	1 Pack	171-1281
P pack for harder water	1	171-1256
U pack (ICP)	1	171-1261
0,2 µm PES final filter	1 Pack	171-1262
Bio filter	1 Pack	171-1263
Dispenser kit	1 Pack	171-1273
Wireless dispenser upgrade kit	1 Pack	171-1274



Ultrapure water system, E Series

#### WATER PURIFICATION SYSTEM, E SERIES

This compact system produces EDI based Type II water directly from tap water. Quality of Type II water meets or exceeds water quality as defined by ASTM, CAP, CLSI and ISO 3696 / BS 3997 and also complies with the Purified Water requirements from the European and U.S. Pharmacopoeia.

- Simple and intuitive to dispense water via the dispenser or the central console
- Central console is an 8 inch water-proof touchscreen,
- providing user full control and access of system performance
  One water system can drive several dispensing units («1 + N mode»)
- Dispensing flow rate is up to 2 l/min and volumetric dispensing is available
- RFID tagged consumables for easier tracking of lifetime and performance
- Wireless communication option to control multiple dispensers and the central console (optionally available)
- Real-time TOC and resistivity/conductivity monitoring
- Optional tank circulation mode to maintain a stable water quality in the tank
- Users can see essential information (water quality, system status, warnings) on the dispenser unit and the central console at any time (data stored up to 2 years; downloadable)

The graphic display on the VWR water system guides user through system operation, performance, trouble shooting and maintenance and can be password protected for multiple access levels.

Applications: Preparation of chemical and bio-reagents; preparation of culture media; preparation of solutions for chemical analysis (such as HPLC and ICP); clinical analyzers; medical device and equipment rinsing; serum and blood fractionation; ophthalmics The VWR water system is delivered with a Certificate of Conformity ensuring that it has been built and tested fully assembled following Standard Operating Procedures and a Certificate of Calibration for the temperature and resistivity meters built in the system. Consumables are automatically delivered with a Certificate of Quality. Manufacturing site is ISO 9001 (2015) and ISO 140001 certified.

For a complete system the production unit and the mandatory accessories have to be ordered. Other accessories and consumables, including wall mounting brackets, purification cartridges and wireless upgrade kit are available separately.

**Please note:** For the E5 system it is required to order **one** unit of the RO pack **171-1276** (12 l/h), For the E10 system it is required to order **two** units of the RO pack **171-1276** (12 l/h). For the E15 system please order **two** units of the RO pack **171-1277** (16 l/h).

Model	E5	E10	E15
Feed water	Tap water (conductivity: < 2000 µS/cm / TDS: < 1000 ppm)		
Flow rate (I/min)	Max. 2		
Production flow rate (I/h)	5	10	15
TOC content	< 30 ppb		
Resistivity at +25 °C	> 5 MΩ·cm (typically 10 - 15 MΩ·cm)		
W×D×H (mm)	320×440×540		

Description	Pk	Cat. No.
Water purification system, E5	1	171-1251
Water purification system, E10	1	171-1252
Water purification system, E15	1	171-1253

Description	Pk	Cat. No.
Mandatory cartridges		
AC pack	1	171-1254
P pack	1	171-1255
RO pack, 12 l/h *	1	171-1276
RO pack, 16 l/h *	1	171-1277
Accessories		
30 I PE tank with sensors	1 SET	171-1264
Tank vent filter	1 Pack	171-1267
Leak protection	1 Pack	171-1278
Cleaning pack	1 Pack	171-1281
P pack for harder water	1	171-1256
0,2 µm PES final filter	1 Pack	171-1262
UV sanitisation module for tank	1 Pack	171-1268
Tank recirculation upgrade kit with a cartridge	1 Pack	171-1269
Dispenser kit	1 Pack	171-1273

# Setting science in motion to create a better world

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