evoqua
WATER TECHNOLOGIES

TECHNOLOGY AT ITS HIGHEST LEVEL – ULTRAPURE WATER FOR YOUR NEEDS

LABOSTAR™ AND ULTRA CLEAR™ LAB WATER SYSTEMS
HIGH QUALITIY ULTRAPURE WATER – LOW RUNNING COSTS

LABOSTAR™ BENCH-TOP AND WALL MOUNTED SYSTEM

LABOSTAR™ ULTRAPURE WATER SYSTEMS

HIGHEST WATER QUALITY – ECONOMICALLY PRODUCED

The LaboStar™ system is a cost effective means of producing analytical grade water. This extremely compact ultrapure water system can be used on a laboratory bench or can also be mounted on the wall. The water produced by the deionized (DI) version has a conductivity of 0.055 µS/cm (equivalent to 18.2 MΩ-cm) and a TOC value of < 10 ppb. The water produced by the ultraviolet (UV) version has a TOC value of 1 – 5 ppb. This water quality exceeds all relevant standards including ASTM Type I, CLSI (Clinical Laboratory Standards Institute) and ISO 3696 Type I. The LaboStar™ system is fed with either deionized water, distilled water or permeate from a reverse osmosis unit.

The selection of treatment materials in LaboStar™ 2 and 4 systems, along with the DI polishing modules, gurantees that the product water meets the highest quality standards. A conductivity meter in the recirculation section continually monitors the purity of the product water.

A 0.2 µm charged sterile filter at the dispenser removes bacteria and endotoxins. This makes it possible to produce pure water with an endotoxin content of <0.001 EU/ml without the need for any further investment in an ultra filter. An uncharged 0.2 µm final filter is also available.

LABOSTAR™ SERIES SYSTEM

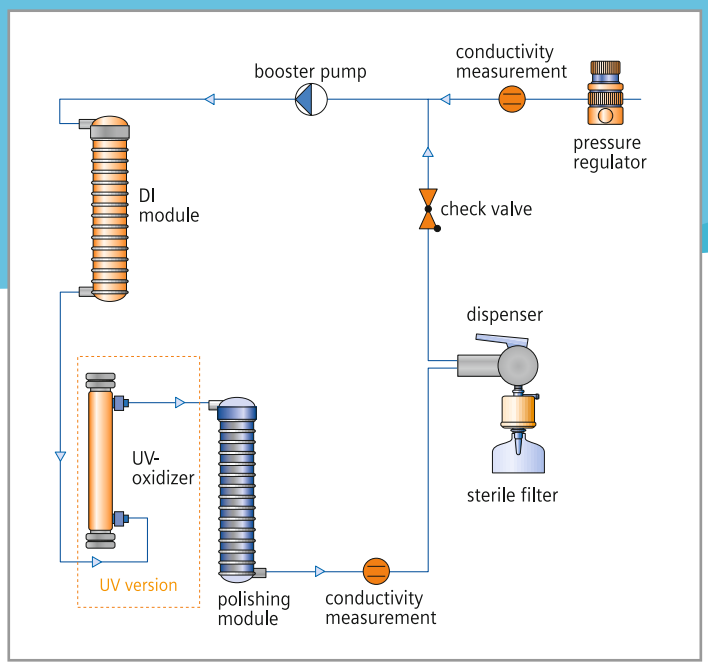
		DI 2	UV	UV 4
Ultrapure water specifications				
Output* up to	LPH	1.5	1.5	1.5
Conductivity at 25° C	µS/cm	0.055	0.055	0.055
Resistivity at 25° C	MΩ-cm	18.2	18.2	18.2
TOC	ppb	5 – 10	1 – 5	1 – 5
Bacteria	cfu/ml	< 1	< 1	< 1
Endotoxins with use of filter	EU/ml	< 0.001	< 0.001	< 0.001
Particles > 0.2 µm	per ml	< 1	< 1	< 1
Feed water specification				
Pressure	bar	0.1 – 6	0.1 – 6	–
Conductivity	µS/cm	< 20	< 20	< 20
TOC	ppb	< 50	< 50	< 50
SiO_2	mg/l	15	15	15
CO_2 max.	mg/l	15	15	15
Temperature	°C	5 – 35	5 – 35	5 – 35
Power supply	V/Hz		100-240 / 50-60	
Dimension: H/W/D	mm	535 / 290 / 320	535 / 290 / 320	535 / 290 / 400
Shipping weight	kg	20/21	22/23	23/24
Catalog Number		**W3T199558**	**W3T197634**	**W3T199603**
Cat.No. for wall mounting			**W3T199267**	

* Gravity feed 1.2 l/min

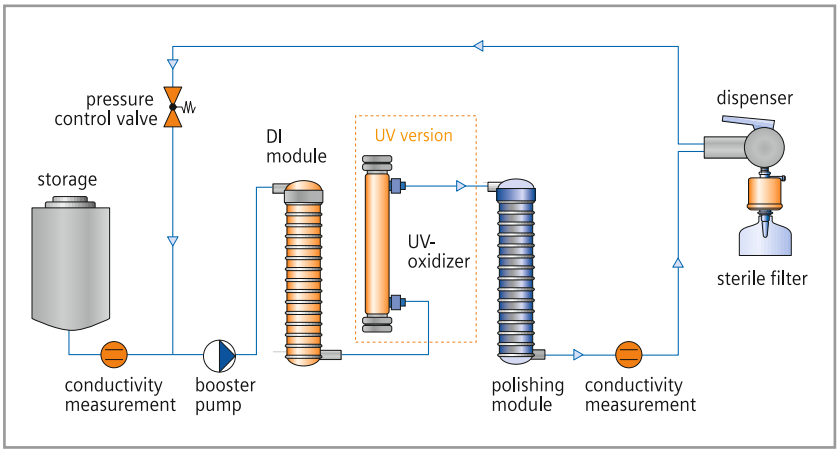
The LaboStar™ 4 system is a mobile bench device with an integrated tank which can be directly filled with feed water.

LaboStar™ systems are delivered with the first set of modules and filters and are ready for use.

LABOSTAR™ SYSTEM OPEN



FLOWSHEET OF LABOSTAR™ DI/UV 2 SYSTEM



FLOWSHEET OF LABOSTAR™ DI/UV 4 SYSTEM

CONSUMABLES LABOSTAR™ SERIES SYSTEM

Item	Change frequency	Cat.No.
DI-module*	6 – 12 monthly	**W3T198255**
UV replacement bulb**	6-monthly	**W3T199951**
Polishing module – HP1 for low inorganic applications – HP2 for low organic applications	 6 – 12 monthly 6 – 12 monthly	 **W3T199854** **W3T199773**
Sterile filter (pack of 3) – 0.2 micron charged filter – 0.2 micron uncharged filter	6 monthly	 **W3T199279** **W3T199209**
Disinfection kit (pack of 3)		**W3T199768**

Consumable change frequency information is average and can vary.
* for LaboStar DI 2 and DI 4 Systems
** for UV versions

ACCESSORIES FOR LABOSTAR™ SERIES SYSTEM

Item	Cat.No.
Degassing unit 10 – 150 l/h to reduce CO_2 in the inlet water which is increasing the cartridge life time	**W3T314414**

TYPICAL APPLICATIONS

All LaboStar™ DI types:

- General analysis
- standard buffer
- AAS
- GC
- IC
- ICP
- cell and tissue culture
- pyrogen sensitive applications

All LaboStar™ UV types:

- Micro- und molecularbiology
- PCR
- HPLC
- TOC analysis

LABOSTAR™ SYSTEM ADVANTAGES:

- Ultrapure water circulation right into the dispenser head
- Easy to dispense water using the practical dispenser
- Whisper operation mode
- Rapid and simple disinfection
- Conductivity monitoring of ultrapure water
- Pressure reducer included (only type 2)
- Simple module exchange via quick-release connections
- Protective jacket at the end of the sterile filter

LABOSTAR™ 4 SYSTEM ADVANTAGES:

- 7 liter tank volume
- Suitable for mobile use
- Ultrapure water is ready for use within minutes of filling the tank
- System can be used at different locations

PURE PURITY - ULTRA CLEAR™ SYSTEMS

PROGRAMMABLE VOLUME CONTROL DISPENSING INCLUDED.

Outstanding performance

The Ultra Clear™ bench top/ wall mounting and Ultra Clear™ Integra systems are designed for maximizing space saving in bench top and under bench installations. Each Ultra Clear™ system is equipped with economical state-of-the-art purification technology.

System includes:

- Deionization module
- Conductivity meter to measure pretreated water
- Polishing module
- Conductivity meter to measure
- polished water
- 0.1 µm sterile filter in the recirculation loop

Water quality with a resistivity of 18.2 MΩ-cm and a TOC-level <1ppb far exceed all reagent water quality standards including: ASTM Type 1, CLSI and ISO 3696 Type 1.

All systems that include UV-oxidization, TOC monitoring and ultrafiltration produce the highest possible water quality. These units deliver RNase-, DNase- and DNA-free water.

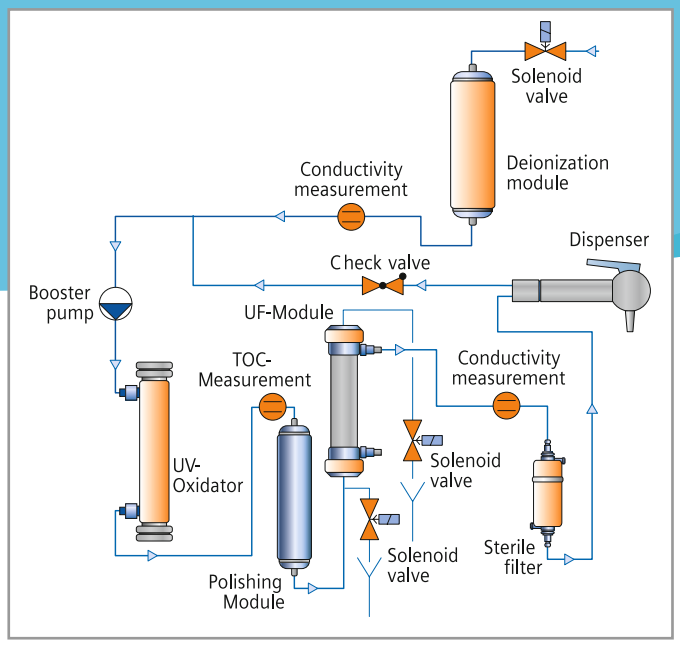
Systems are also capable of producing purified water with endotoxin levels of < 0.001 EU/ml.

The dispense flow rate is up to 2 LPM of ultrapure water. The high resolution display indicates the water conductivity in µS/cm or resistivity in MΩ-cm with the corresponding water temperature.

ULTRA CLEAR™ SERIES SYSTEM

		-	UV	UV UF	UV TM	UV UF TM
Ultrapure water specifications						
Output** up to	l/min	2	2	2	2	2
Conductivity at 25° C	µS/cm	0.055	0.055	0.055	0.055	0.055
Resistivity at 25° C	MΩ-cm	18.2	18.2	18.2	18.2	18.2
TOC	ppb	5 - 10	< 1 - 3	< 1 - 3	< 1 - 3	< 1 - 3
DNase, RNase, DNA		-	-	free	-	free
Bacteria	cfu/ml	< 1	< 1	< 1	< 1	< 1
Endotoxins	EU/ml	-	-	< 0.001	-	< 0.001
Particles > 0.1 µm	per ml	< 0.1	< 0.1	< 0.1	< 0.1	< 1
Feed water specification						
Pressure	bar	0.1 - 5	0.1 - 5	0.1 - 5	0.1 - 5	0.1 - 5
Conductivity	µS/cm	< 20	< 20	< 20	< 20	< 20
CO_2 max.	mg/l	15	15	15	15	15
TOC	ppb	< 50	< 50	< 50	< 50	< 50
Temperature	°C	5 - 35	5 - 35	5 - 35	5 - 35	5 - 35
Shipping weight Ultra Clear/ Ultra Clear Integra	kg	24	25 / 27	26 / 28	26 / 28	26 / 28
Power supply	V/Hz	for all models 100 - 240 / 50 - 60				
Dimension: H/W/D	mm	for all models 530 / 340 / 320				
Cat. No. Ultra Clear™		**W3T199551**	**W3T199154**	**W3T198275**	**W3T197571**	**W3T199305**
Cat. No. Ultra Clear™ Integra		**-**	**-**	**-**	**W3T199151**	**W3T197652**

* The technical specifications are the same for all Ultra Clear™ systems (only the Integra model housing dimensions are slightly smaller).
** Gravity feed 1.5 l/min



FLOWSHEET OF ULTRA CLEAR™ UV UF TM SYSTEM

TYPICAL APPLICATIONS

Ultra Clear™:

- AAS
- routine analysis
- standard buffer
- GC

Ultra Clear™ UV and Ultra Clear™/Integra UV TM:

- HPLC
- IC
- GC and GC/MS
- TOC analysis
- ICP and ICP/MS

Ultra Clear™ /Integra UV UF and UV UF TM:

- DNA sequencing
- RNase- and DNase-free
- DNA-free
- PCR
- IVF
- 2-D-electrophoresis
- critical cell and tissue culture
- pyrogen sensitive applications

CONSUMABLES ULTRA CLEAR™ SERIES SYSTEM

Item	Change frequency	Cat.No.
Deionization Module VMD for applications in the inorganic range	6 – 12 monthly	**W3T197618**
Pretreatment Module DTO for applications that need low TOC	6 – 12 monthly	**W3T197621**
Polishing Module MF III D for applications in the low TOC range	6 – 12 monthly	**W3T197694**
Polishing Module ILT for inorganic applications	6 – 12 monthly	**W3T199853**
Sterile filter 0.1 µm, 1000 cm^2	6 monthly	**W2T526542**
Disinfection kit (pack of 3)	–	**W3T199768**
UV- Replacement bulb for systems with and without TM	12 monthly	**W2T558521**
UF Membrane Preventor 5000	18 – 36 monthly	**W3T197614**

Consumable change frequency information is average and can vary.

The 24 hour energy saving option allows to start and stop the unit at different times. Day and night operation is free selectable with interval option for UV oxidization.

ACCESSORIES ULTRA CLEAR™ SERIES SYSTEM

Item	Cat.No.
Degassing unit 10 – 150 l/h to reduce CO_2 in the inlet water which is increasing the cartridge life time	**W3T314414**

Cartridge changes are very simple and fast due to quick and easy access to the replacement parts.

A single UV-lamp is used for the oxidization of organic compounds and TOC-measurement. „The energy saving mode“ enables the user to program the running cycles according to the real needs. The use of a single UV lamp results in much lower annual running cost compared to the competition.

A flexible remote dispenser enables the user to dispense water where it is needed. A built-in automatic self-cleaning/sanitization mechanism extends the life of the ultrafilter module.

Pure water dispensing is made easy by simply activating the valve lever. A continuous flow of pure water is achieved by simply placing the draw-off lever in an upright position.

Our new systems are available with special features such as volume control dispensing, a 24-hour-circulation mode with extreme low sound level < 40dba and integrated RS 232 interface for data recording. Flexible remote dispenser hoses are available at various lengths.

Ultra Clear systems are delivered with the first set of cartridges and filters.available in the tank section of this brochure. All systems display inlet and product water quality. The salt reduction rate will be shown in percentage.

Dispenser tube length 1.2, 1.5 and 2 m are available.

LABOSTAR™ TWF WITH STERILE FILTER (BIOFILTER)

LABOSTAR™ TWF ULTRAPURE WATER SYSTEMS

FROM TAP TO ULTRAPURE WATER – ONLY ONE INNOVATIVE STEP

The LaboStar™ TWF systems produce ultrapure water straight from your drinking water supply. This equipment incorporates a pre-filtration unit and a reverse osmosis membrane in one single compact module. The Type III quality reading of the reverse osmosis water appears in the display. The pure water collects in an integrated tank and is finally circulated through the polishing module by a circulation pump. The user can extract either Type III water from the tank or Type I water from the dispenser with a quality of 0.055 µS/cm, equivalent to 18.2 MΩ-cm, and TOC of between 1 and 10 ppb, depending on the system type. The functional designed LaboStar equipment can cost-effectively produce even small amounts of analytical-grade water. The water quality exceeds all relevant standards including ASTM Type I, CLSI and ISO 3696 Type I.

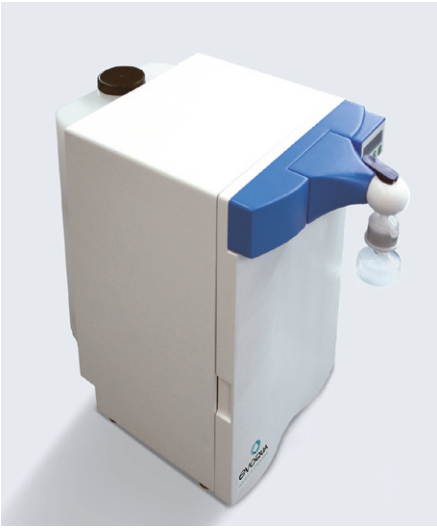
A conductivity sensor constantly measures the product water purity in the recirculation loop. A charged 0.2 µm sterile filter at the dispenser removes bacteria and endotoxins, eliminating the need for an ultra filter. An uncharged 0.2 µm final filter is also available.

LaboStar™ systems are delivered with the first set of modules and filters.

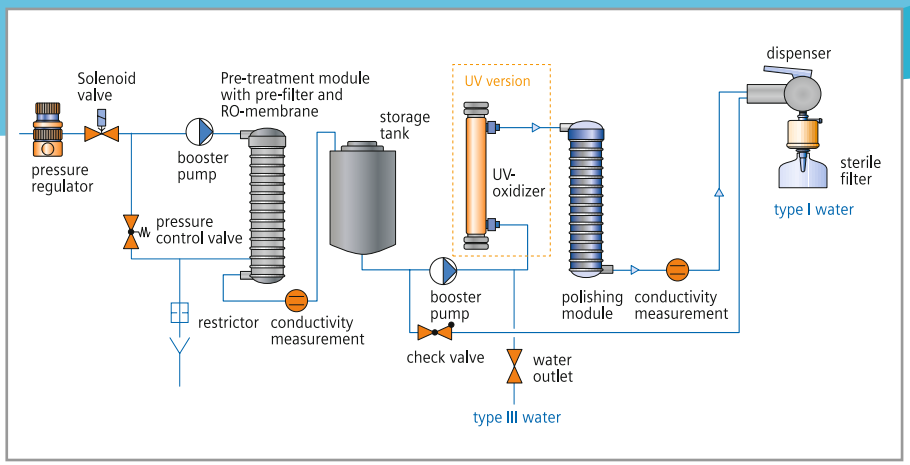
LABOSTAR™ TWF SERIES SYSTEM

		-	UV
Ultrapure water specifications			
Output	l/min	1.2	1.2
Permeate rate at 25°C at 20°C at 15°C	LPH	9 8 7	9 8 7
Conductivity at 25° C	µS/cm	0.055	0.055
Resistivity at 25° C	MΩ-cm	18.2	18.2
TOC	ppb	5 – 10	1 – 5
Bacteria	cfu/ml	< 1	< 1
Endotoxins with use of filter	EU/ml	< 0.001	< 0.001
Particles > 0.2 µm	per ml	< 1	< 1
Conductivity of input water is reduced by 98 %			
Feed water specification			
Feed water pressure	bar	0.1 – 5	0.1 – 5
Feed conductivity	µS/cm	< 1400	< 1400
CO_2 max.	mg/l	15	15
TOC	ppb	< 50	< 50
Temperature	°C	5 – 35	5 – 35
Power supply	V/Hz	100-240 / 50-60	
Dimension: H/W/D	mm	535 / 290 / 400	
Shipping weight	kg	24	25
Catalog Number		**W3T197642**	**W3T199771**
Cat.No. for wall mounting		**W3T207323**	**W3T197641**

* Gravity feed 1.2 l/min



LABOSTAR™ TWF WITH 7 LITER INTEGRATED TANK



FLOWSHEET OF LABOSTAR™ TWF/TWF UV SYSTEMS

STERILE FILTER, 0.2 µm, WITH RETENTION OF ENDOTOXIN (W3T199279).

RNase and DNase free water with the use of filter **W3T199279:**

RNase < 0,05 pg/ml

DNase < 10 pg/µml.

CONSUMABLES LABOSTAR™ TWF SERIES SYSTEM

Item	Change frequency	Cat.No.
Pre-treatment/RO module 7 l/h	6 – 12 monthly	**W3T199208**
UV replacement bulb*	12 monthly	**W3T199951**
Polishing module – HP1 for low inorganic applications – HP2 for low organic applications	 6 – 12 monthly 6 – 12 monthly	 **W3T199854** **W3T199773**
Sterile filter (pack of 3) – 0.2 micron charged filter – 0.2 micron uncharged filter	6 monthly	 **W3T199279** **W3T199209**
Disinfection kit (pack of 3)		**W3T199768**

Consumable change frequency information is average and can vary.
* for UV versions

OPTIONS LABOSTAR™ TWF SERIES SYSTEM

Item	Cat.No.
Wall bracket	**W3T199556**
Vent filter, PTFE membrane (pack of 3)	**W3T199880**
30 and 60 l tanks available upon request	

TYPICAL APPLICATIONS

LaboStar™ TWF

- General analysis
- standard buffer
- AAS
- GC
- IC
- ICP
- cell and tissue culture
- pyrogen sensitive applications
- type III water

LaboStar™ TWF UV

- Micro- und molecularbiology
- PCR
- HPLC
- TOC analysis
- type III water

LABOSTAR™ TWF SYSTEM ADVANTAGES:

- Connection to municipal drinking water supply
- 7 liter tank volume
- Ultrapure water circulation right into the dispenser head
- Easy to dispense water using the practical dispenser
- Whisper mode
- Rapid and simple disinfection
- Conductivity monitoring of pre-treatment module and ultrapure water
- Simple module exchange via quick-release connections
- Protective jacket at the end of the sterile filter
- Extraction of Type III pure water also possible

ACCESSORIES LABOSTAR™ TWF SERIES SYSTEM

Item	Cat.No.
Degassing unit 10 – 150 l/h to reduce CO_2 in the inlet water which is increasing the cartridge life time	**W3T314414**

ULTRA CLEAR TWF WITH 30 AND 60 LITER TANK

ULTRA CLEAR™ TWF SYSTEMS DIRECT PURITY – TAP WATER FEED

DEIONIZED AND ULTRAPURE WATER OBTAINABLE FROM A SINGLE SYSTEM.

The Ultra Clear™ TWF system is equipped with all the necessary components to produce reagent grade water directly from municipal tap water. The built-in reverse osmosis system has a recovery rate of > 30% to conserve water.

The downstream deionization module polishes the RO product water prior to delivery to the storage tank. Water going to storage has a quality of < 2 µS/cm.

The Ultra Clear™ TWF systems have a dispense rate of up to 1.8 LPM with a water quality of 18.2 MΩ-cm and a TOC-level from 10 down to < 1ppb depending on the selected unit.

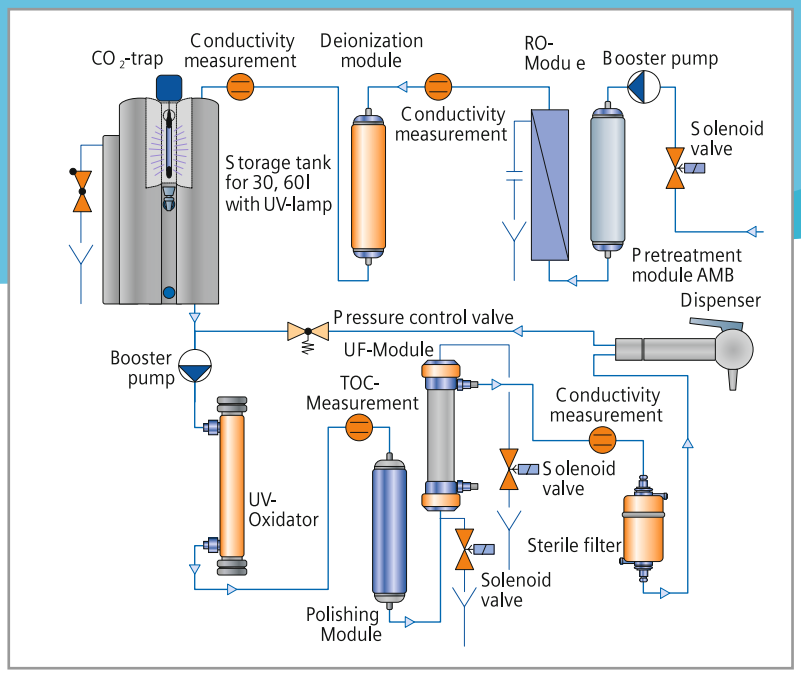
The water exceeds all reagent grade water quality standards including: ASTM Type 1, CLSI and ISO 3696 Type 1.

Options include: ultrafiltration, UV-oxidization and TOC monitoring for all applications. Pretreatment, reverse osmosis module, deionization cartridge, storage tank, UV-oxidization chamber, polisher, ultrafilter and sterile filter are all integrated into one system. The system delivers ultrapure water which is RNase-, DNase- and

ULTRA CLEAR™ TWF SERIES SYSTEM

		-	UV	UV UF	UV TM	UV UF TM
Ultrapure water specifications						
Output up to	l/min	1.8	1.8	1.8	1.8	1.8
Conductivity at 25° C	µS/cm	0.055	0.055	0.055	0.055	0.055
Resistivity at 25° C	MΩ-cm	18.2	18.2	18.2	18.2	18.2
TOC	ppb	5 – 10	< 1	< 1	< 1	< 1
DNase, RNase, DNA		–	–	free	–	free
Bacteria	cfu/ml	< 1	< 1	< 1	< 1	< 1
Endotoxins	EU/ml	–	–	< 0.001	–	< 0.001
Particles > 0.1 µm	per ml	< 1	< 1	< 1	< 1	< 1
Feed water specification						
Pressure	bar	0.1 – 5	0.1 – 5	0.1 – 5	0.1 – 5	0.1 – 5
Conductivity	µS/cm	< 2000	< 2000	< 2000	< 2000	< 2000
Colloid index SDI		< 3	< 3	< 3	< 3	< 3
Free Chlorine	mg/l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Fe	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
CO_2 max.	mg/l	15	15	15	15	15
TOC	ppb	< 50	< 50	< 50	< 50	< 50
Temperature	°C	5 – 35	5 – 35	5 – 35	5 – 35	5 – 35
Shipping weight 30 l/ 60 l	kg	41 / 44	42 / 45	44 / 47	43 / 46	44 / 47
Power supply	V/Hz	for all models 100 – 240 / 50 – 60				
Dimension: H/W/D	mm	with 30 l tank: 530 / 560 / 320 – with 60 l tank: 530 / 900 / 320				
Cat. No. for 30 l tank		**W3T197649**	**W3T199719**	**W3T199741**	**W3T199941**	**W3T199850**
Cat. No. for 60 l tank		**W3T198240**	**W3T199149**	**W3T199162**	**W3T199298**	**W3T197659**

Catalog Numbers for 80 l tank upon request.



FLOWSHEET OF ULTRA CLEAR™ TWF UV UF TM SYSTEM

TYPICAL APPLICATIONS

Ultra Clear™ TWF

- AAS
- routine analysis
- standard buffer
- GC

Ultra Clear™ TWF UV and UV TM:

- HPLC
- IC
- GC and GC/MS
- TOC analysis
- ICP and ICP/MS

Ultra Clear™ TWF UV UF and UV UF TM:

- DNA sequencing
- RNase-, DNase- and DNA-free
- PCR
- IVF
- 2-D-electrophoresis
- critical cell and tissue culture
- pyrogen sensitive applications

DNA-free. Endotoxin content is extremely low at < 0.001 EU/ml.

This compact system has been successfully developed with all the required technical features to economically produce purified and ultrapure water with low running costs. Other systems consisting of separate reverse osmosis unit, storage tank and polishing unit are typically more expensive.

Our new systems are available with special features such as: volume control dispensing, a 24-hour-circulation mode with an extreme low noise level of <40 dba and an integrated RS232 interface for data recording. Variable length hoses for the remote dispenser are also available.

In all versions the polishing module MFIIID is included. All UV versions are delivered with pretreatment module DTO and all other versions with the deionization module VMD.

The 24 hour energy saving option allows to start and stop the unit at different times. Day and night operation is free selectable with interval option for UV oxidization.

CONSUMABLES ULTRA CLEAR™ TWF SERIES SYSTEM

Item	Change frequency	Cat.No.
Deionization Module VMD	6 – 12 monthly	**W3T197618**
Pretreatment Module AMB	6 – 12 monthly	**W3T197613**
Pretreatment Module DTO for applications that need low TOC	6 – 12 monthly	**W3T197621**
Polishing Module MF III D for applications in the low TOC range	6 – 12 monthly	**W3T197694**
Polishing Module ILT for inorganic applications	6 – 12 monthly	**W3T199853**
Sterile filter 0.1 µm, 1000 cm^2	6 monthly	**W2T526542**
Disinfection kit (pack of 3)	–	**W3T199768**
UV- Replacement bulb only for systems with and without TM	12 monthly	**W2T199521**
RO Replacement Module	2 – 3 years	**W3T197620**
CO_2 Trap CT1, Replacement Cartridge	yearly	**W3T199197**
UV-Submersible Replacement bulb UV-SL 1 30 and 60 l tanks	yearly	**W2T558519**
UF Membrane Preventor 5000	18 – 36 monthly	**W3T197614**

Consumable change frequency information is average and can vary.

ACCESSORIES ULTRA CLEAR™ TWF SERIES SYSTEM

Item	Cat.No.
Degassing unit 10 – 150 l/h to reduce CO_2 in the inlet water which is increasing the cartridge life time	**W3T314414**

PURE WATER SPECIFICATIONS FOR ALL TYPES

Product rate into the tank	**10 l/h**
Conductivity	**< 2 µS/cm***

* Limiting value adjustable.

OPTIONS ULTRA CLEAR TWF

Item	Cat.No.
Bracket ET 30 for 30 l tank including screws and plugs	**W3T199991**
Bracket ET 60 for 60 l tank including screws and plugs	**W3T197563**
Dispenser hose extension (to be ordered together with the system, please specify the needed length)	**1.2, 1.5 and 2 m upon request**

ULTRA CLEAR™ TWF (30 L TANK) WITH EL-ION™ CEDI CELL (CONTINUOUS ELECTRODEIONIZATION CELL)

PURE AND ULTRAPURE WATER FROM A SINGLE SYSTEM – WITH TAP WATER FEED

UNITS WITH CONTINUOUS ELECTRODEIONIZATION

The Ultra Clear™ TWF system with El-Ion™ CEDI cell is equipped with the necessary components to produce pure and ultrapure water directly from a municipal tap water source.

The reverse osmosis unit has a recovery rate of > 30 % to conserve water. The continuous electrodeionization (CEDI) stage purifies RO product water down to a quality range between 0.06 to 0.2 µS/cm. CEDI product water can be drawn directly from the integrated storage tank.

A polishing cartridge is provided that can obtain a water quality of 0.055 µS/cm (18,2 MΩ-cm) with a TOC-level of < 1 ppb (only in units with UV oxidation). Systems with ultrafilters deliver ultrapure water that is RNase, DNase and DNA free with a dispense rate up to 1.8 LPM.

ULTRA CLEAR™ TWF / EL-ION™ SERIES SYSTEM

		UV TM	UV UF TM
Ultrapure water specifications			
Output up to	l/min	1.8	1.8
Conductivity at 25° C	µS/cm	0.055	0.055
Resistivity at 25° C	MΩ-cm	18.2	18.2
TOC	ppb	< 1	< 1
DNase, RNase, DNA		–	free
Bacteria	cfu/ml	< 1	< 1
Endotoxins	EU/ml	–	< 0.001
Particles > 0.1 µm	per ml	< 1	< 1
Feed water specification			
Pressure	bar	0.1 – 5	0.1 – 5
Conductivity	µS/cm	< 1400	< 1400
Colloid index SDI		< 3	< 3
Free Chlorine	mg/l	< 0.5	< 0.5
Fe	mg/l	< 0.1	< 0.1
SiO_2.	mg/l	15	15
CO_2 max.	mg/l	15	15
Temperature	°C	5 – 35	5 – 35
Shipping weight 30 l/ 60 l	kg	43 / 46	44 / 47
Power supply	V/Hz	for all models 100 – 240 / 50 – 60	
Dimension: H/W/D	mm	with 30 l tank: 530 / 560 / 320 with 60 l tank: 530 / 900 / 320	
Cat. No. for 30 l tank		**W3T197584**	**W3T199163**
Cat. No. for 60 l tank		**W3T198277**	**W3T199946**

Catalog Numbers for 80 l tank upon request.

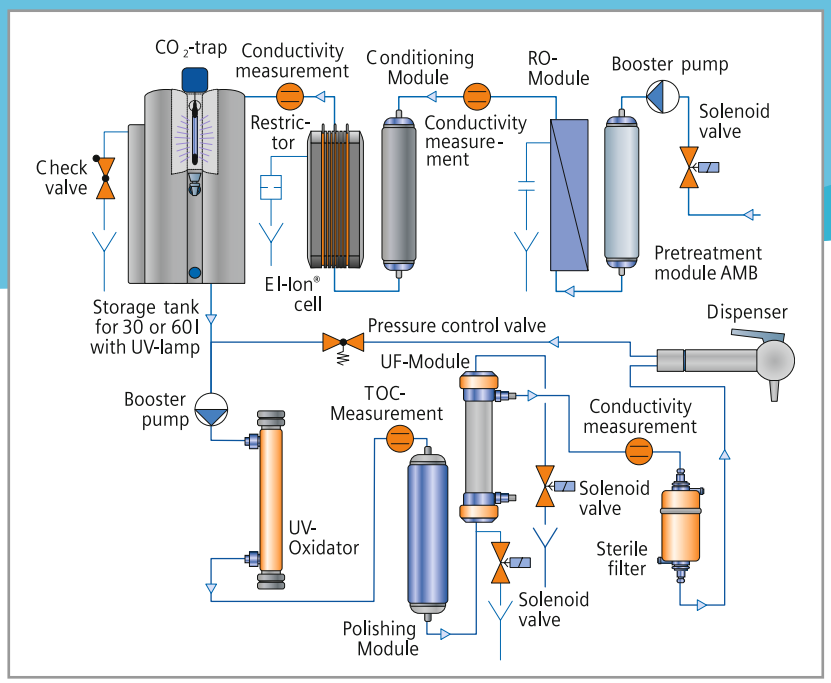
The system water quality exceeds all reagent grade water quality standards including: ASTM Type 1, CLSI and ISO 3696 Type 1.

Various system options are available to fulfill all your lab needs. These options include an ultrafiltration module, UV-oxidization and TOC monitoring that can be tailored for any laboratory application in a single system.

A built-in automatic flush cycle extends the life of the ultrafilter and helps reduce operating cost.

This compact system has been designed with all the required technical features to economically produce purified and ultrapure water. Performance of the system equals that of larger multi-component purification systems that cost more to purchase and operate. The system does it all from one compact unit.

The unit can either be bench or wall mounted. A flexible remote



FLOWSHEET OF ULTRA CLEAR™ TWF UV UF TM SYSTEM WITH EL-ION™ CEDI CELL

dispenser enables the user to dispense water wherever it is needed.

Our new systems are available with special features such as: volume control dispensing and TOC monitoring. A programmable, 24-hour-circulation mode, an extreme low sound level (< 40 dba) and integrated RS232 interface for data recording are included. Various remote dispenser hose lengths are also available.

TYPICAL APPLICATIONS

All types:

- General chemistry
- laboratory washing machines
- water for autoclaves and environmental chambers

Ultra Clear™ TWF UV TM / El-Ion™:

- HPLC
- IC
- GC and GC/MS
- TOC analysis
- ICP and ICP/MS

Ultra Clear™ TWF UV UF TM / El-Ion™:

- DNA sequencing
- RNase-, DNase- and DNA-free
- PCR
- IVF
- 2-D-electrophoresis
- critical cell and tissue culture
- pyrogen sensitive applications

The 24 hour energy saving option allows to start and stop the unit at different times. Day and night operation is free selectable with interval option for UV oxidization.

CONSUMABLES ULTRA CLEAR™ TWF / EL-ION™ SERIES SYSTEM

Item	Change frequency	Cat.No.
Pretreatment Module AMB	6 – 12 monthly	**W3T197613**
Conditioning Module	Depends on inlet water hardness and used amount of water	**W3T199848**
Polishing Module MF III D for applications in the low TOC range	6 – 12 monthly	**W3T197694**
Polishing Module ILT for inorgan ic applications	6 – 12 monthly	**W3T199853**
Sterile filter 0.1 µm, 1000 cm²	6 monthly	**W2T526542**
Disinfection kit (pack of 3)	–	**W3T199768**
UV- Replacement bulb only for systems with and without TM	12 monthly	**W2T199521**
RO Replacement Module	2 – 3 years	**W3T197620**
CO_2 Trap CT1, Replacement Cartridge	yearly	**W3T199197**
UV-Submersible Replacement bulb UV-SL 1 30 and 60 l tanks	yearly	**W2T558519**
UF Membrane Preventor 5000	18 – 36 monthly	**W3T197614**
El-Ion™ CEDI cell 10 l/h	4 – 5 years	**W3T198007**

Consumable change frequency information is average and can vary.

ACCESSORIES ULTRA CLEAR™ TWF SERIES SYSTEM

Item	Cat.No.
Degassing unit 10 – 150 l/h to reduce CO_2 in the inlet water which is increasing the cartridge life time	**W3T314414**

PURE WATER SPECIFICATIONS FOR ALL TYPES

Product rate into the tank	**20 l/h**
Conductivity	**< 0.2 µS/cm**
TOC	**< 30 ppb**

OPTIONS ULTRA CLEAR TWF

Item	Cat.No.
Bracket ET 30 for 30 l tank including screws and plugs	**W3T199991**
Bracket ET 60 for 60 l tank including screws and plugs	**W3T197563**

ACTIVATED CARBON, ANION, MIXED BED AND CATION EXCHANGE RESINS (FROM LEFT TO RIGHT)

SYSTEM COMPONENTS

HIGH CLASS CONSUMABLE MATERIALS

Only new, specially selected and certified materials are used for the treatment steps in our ultrapure water systems.

High quality, virgin electronic grade ion exchange resins are used in cartridges and systems. Resins and treatment media go through a rigorous R&D stage before approval for use to ensure high quality and zero leachable material that could interfere with water quality. Upon delivery, each resin must pass incoming quality control inspection tests. Materials are strictly stored and handled according to our standard operating procedure to prevent contamination.

Carefully selected activated carbon is used in the systems to produce pure water with extremely low organic contaminants. However, different types are available depending on the required water quality or application.

All activated carbon materials undergo a complete cleaning process prior application to remove particles and impurities. This involves an acid wash followed by rinsing the carbon with ultrapure water. All wetted parts within the systems are specially selected and tested to ensure purity. Tests are performed to determine there are no extractable metals or TOC released from the water contact parts.

The purification modules are accurately designed to ensure complete wetting of the activated carbon to remove entrained air and purge the systems.

Mixed bed resin modules must have the correct moisture content and fill level to ensure quality and operating capacity. Rapid filling of the modules is essential to prevent excess air contact and avoid the uptake of carbon dioxide.

An environment free of organic contaminants during the cartridge filling process plays a vital role in producing ultrapure water. Modules are sealed with airtight end caps to prevent drying and are shrink-wrapped to prevent contamination.

Modules should be stored in a cool, dry location (< 20 °C) away from light.

PRE-PURIFICATION MODULES AMB AND VMD, POLISHING MODULE MFIIID AND CONDITIONING MODULE FOR ULTRA CLEAR™ SYSTEM SERIES.

PURIFICATION MODULES FOR LABOSTAR™ SYSTEMS.

Pretreatment module AMB
Activated carbon / pre-filter combination to protect RO membranes.
Granulated carbon and a 1 µm filter.

Catalog No.: W3T197613

Conditioning module
Module used for the removal of residual hardness. The special cation deionizer resin prevents "Scaling" in the EI-Ion cell.

Catalog No.: W3T199848

Deionization module VMD
Mixed bed resinmodule utilized for a reduction of the inlet conductivity. Used for inorganic applications.

Catalog No.: W3T197618

Deionization module (LaboStar™ Systems)
Mixed bed resinmodule utilized for a reduction of the inlet conductivity. Used for inorganic applications.

Catalog No.: W3T198255

Pre-purification module DTO
Application for low TOC-level with deionized feed water. Comprised of activated carbon and specially selected mixed bed resin.

Catalog No.: W3T197621

Pre-purification module TAO
Application for low TOC-level with tap water feed. Comprised of special pretreatment and high quality mixed bed resin.

Catalog No.: W3T199215

Pre-treatment module (LaboStar™ Systems)
Activated carbon / pre-filter and RO membrane combination.

Catalog No.: W3T199208

Polishing module MFIIID
Special carbon and electronic grade resin material combined in one polishing module. Module used to remove organic contaminants (especially low TOC-level) and produce water at 0.055 µS/cm.

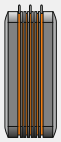
Catalog No.: W3T197694

Polishing module ILT
For inorganic application. Consist of electronics grade mixed bed resin material.

Catalog No.: W3T199853

Polishing module HP1 / HP2 (LaboStar™ Systems)
HP1: For inorganic application. Consist of electronics grade mixed bed resin material
HP2: Selected carbon and electronic grade resin material combined in one polishing module.
Module used to remove organic contaminants (especially low TOC-level) and produce water at 0.055 µS/cm

Catalog No.: HP1: W3T199854
Catalog No.: HP2: W3T199773



EI-Ion™ CEDI cell
Electro-deionization process module for pure water production < 0.2 µS/cm.

Reverse-Osmosis module
High performance TFC (thin-film-composite) membrane with a salt retention rate of up to 98 %. Retention rate for dissolved organic compounds, particles and colloids and bacteria can exceed 99%.

Catalog No.: W3T197620

UV-oxidization chamber
UV light energy at 185 nm creates ozone. The 254 nm wavelengths energy reacts with the ozone and produces hydroxyl radicals (OH). These radicals oxidize the organic material in the water to carbon dioxide, water and some by-products like hydrogen peroxide. These by-products are then removed by the activated carbon material and electronics grade mixed bed resin.

UV-lamp
LaboStar™ Systems: Catalog No.: W3T199951
Ultra Clear™ Systems: Catalog No.: W2T199521
30 l and 60 l tanks: Catalog No.: W2T558519

Ultrafiltration module
Ultrafiltration module „Preventor 5000". Consists of hollow fiber membranes that produce water quality having an endotoxin-level of < 0.001 EU/ml, furthermore RNase-, DNase- and DNA-free.

Catalog No.: W3T197614

Sterile filter 0.1 µm
Filter with 0.1 µm pore size and 1000 cm2 surface area. The cartridge filter operates inline to eliminate dead volume and prevent bacterial contamination. Filter provides low back pressure and long service life.

Catalog No.: W2T526542

Sterile filter 0.2 µm
Filter with 0.2 µm pore size (pack of 3).

Catalog No.: W3T199209

Sterile filter 0.2 µm
Charged filter with 0.2 µm pore size, enables endotoxin retention (pack of 3).

Catalog No.: W3T199279

EASY HANDLING OF
THE DISINFECTION KIT

ULTRAPURE WATER

BASIC INFORMATION

Disinfection

An aqueous solution consisting of a mixture of bactericide and fungicide is used to disinfect systems.

The solvent has an extremely high biocide effect on all microbes found in water such as, bacteria, fungus (yeast) and algae. Material also provides the advantage of decomposing bio-film. The concentration used is classified as non-toxic, non-corrosive and not harmful to the skin.

Understanding TOC

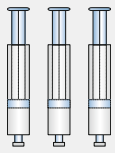
The Total Organic Carbon (TOC) content in water is expressed as the sum of the carbon (associated with organic material) contained in the water or wastewater analysis. The organic content of the water is based on the sum of all organic compounds present and only provides a generic measure of total carbon. Specific compounds are not identified. The TOC is measured in ppb (parts per billion).

The method efficiently destroys organic compounds in water using an ultraviolet chamber and lamp capable of producing radiation at 185 and 254 nm wave-lengths. The by-product of CO_2 alters the conductivity of the water. The conductivity shift between inlet and outlet of the oxidization chamber is used to measure the TOC-level of the water.

The user can obtain a quick indication of the performance of the UV-lamp on the system display (used hours).

CONVERSION TABLE RESISTIVITY / CONDUCTIVITY AND TDS (TOTAL DISSOLVED SUBSTANCES)

Resistivity (MΩ - cm)	Conductivity (µS/cm)	TDS in (ppm) $CaCO_3$
18.18	0.0550	0.000
18.00	0.0556	0.000
17.00	0.0588	0.001
16.00	0.0625	0.003
15.00	0.0667	0.005
14.00	0.0714	0.006
13.00	0.0769	0.009
12.00	0.0833	0.011
11.00	0.0909	0.014
10.00	0.100	0.017
9.00	0.111	0.022
8.00	0.125	0.027
7.00	0.143	0.034
6.00	0.167	0.043
5.00	0.20	0.056
4.00	0.25	0.076
3.00	0.33	0.108
2.00	0.50	0.173
1.00	1.0	0.367
0.50	2.0	0.756
0.20	5.0	1.921
0.10	10.0	3.863
0.05	20.0	7.748
0.02	50.0	19.401
0.01	100.0	38.824



Disinfection-kit
Highly effective disinfection solvent (pack of 3).

Catalog No.: W3T199768

HIGH-GRADE ULTRAPURE WATER SERVES ALSO AS A PROTECTION FOR VALUABLE HPLC-COLUMNS

EASY TO DISPENSE WATER USING THE PRACTICAL DISPENSER

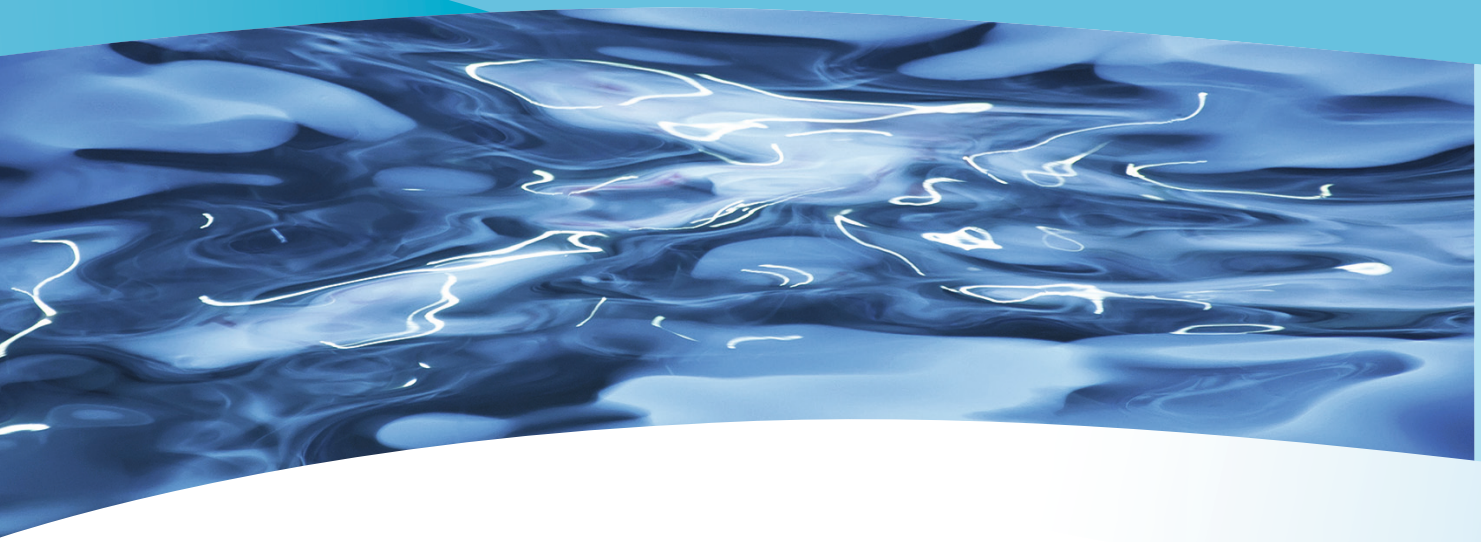
TYPE I, II AND III WATER SPECIFICATIONS

ISO 3696 WATER SPECIFICATIONS

	Type I	Type II	Type III
Resistivity (megohm-cm compensated to 25°C)	10.0	1.0	0.25
TOC (ppb)	N.A.	80	400
Absorbance at 254 nm l cm optical path (A.U.)	< 0.001	< 0.01	N.S.
Silica (mg/l)	< 0.01	< 0.02	< 1
Dry residue after evaporating on heating at 110°C	N.A.	< 1.0	< 2.0

ASTM STANDARD SPECIFICATION FOR REAGENT WATER

Type	(µS/cm) (max.)	MΩ-cm (min.)	TOC µS/l (max.)	Na µS/l (max.)	Cl µg/l (max.)	Total Silica µg/l (max.)	Bac. growth cfu/ml (max.)	Endotoxin EU/ml (max.)
I	0.055	18	50	1	1	3		
I A	0.055	18	50	1	1	3	10 / 1000	0.03
I B	0.055	18	50	1	1	3	10 / 100	0.25
I C	0.055	18	50	1	1	3	10 / 10	0.25



PURE AND ULTRAPURE WATER

WATER QUALITY STANDARDS

- The storage of ultrapure water without a recirculation loop should be avoided to minimize excess contamination caused by material leaching and bacterial growth.
- High quality pure and ultrapure water can only be maintained if the produced water is constantly being re-circulated via different purification stages including the sterile filter.
- A tank for storing pure water should always be equipped with a sterile vent filter, activated carbon unit, a CO_2 trap and a submersible UV-lamp. A constant high water quality level can only be maintained by implementation of these components.
- A regular disinfection procedure diminishes the formation of bio-film.
- To prevent the growth of algae, tanks used for storing water should be made of opaque material or be placed in a cabinet to prevent exposure to light. Avoid direct sun light.
- The recommended materials of construction to prevent leaching are: polyethylene (PE), polypropylene (PP) and polyvinyldiene fluoride (PVDF; Teflon).
- Purifying modules should be replaced on a regular basis in order to maintain high quality water and to minimize possible contamination of bacteria. The ion exchange capacity is not the only quality indicator.
- Non recirculation periods or dead zones or dead-legs should always be avoided in all pure water systems. However, if non -recirculation periods occurs, the first 0.3 to 3 litres of water after an initial start should be discharged. This precaution is especially vital for critical applications such as the HPLC or ICP/MS.
- In order to guarantee the best water quality and operation of the water systems, the system should undergo a regularly scheduled preventative maintenance and service procedure. An agreement for this service can be arranged.
- Drainage tubing from any water treatment device should contain an air gap to prevent contamination. Maintain at least a 5-cm gap between the end of the tube and the drain.

EVOQUA WATER TECHNOLOGIES

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