PURELAB Quest UV Performance Datasheet

Product Name: **PURELAB Quest UV**

Performance Test: **Validation of primary product specifications**

Test description:

A PURELAB Quest UV was set up with a 30-litre 'external' reservoir, and fed with potable water (conductivity approx. 600 µS/cm, TOC approx. 700 ppbC) at 4 bar. The system was operated over a 3 month period and Type I and III product water was taken daily (10l and 30 l/day respectively) to simulate a typical usage pattern. Resistivity and TOC were logged on-line using a Mettler Toledo M300 meter and a Sievers 900 TOC analyser, respectively. Samples were taken for biological testing; Total viable counts were measured after membrane filtration and incubation at 27°C for 5 days on R2A agar.

Parameter	Type I Water Specification*	Typical Measured Values
Resistivity (Mohm.cm @ 25°C)	up to 18.2	up to 18.2
Conductivity (µS/cm @ 25°C)	down to 0.055	down to 0.055
TOC (ppb C)	<5	2.8 - 4.3
TVC (CFU/ml)	<0.1**	0.4-1.9 / <0.1**

Parameter	Type II Water Specification*	Typical Measured Values
Resistivity (Mohm.cm @ 25°C)	>1	3 -10
Conductivity (µS/cm @ 25°C)	<1	0.3 - 0.1
TOC (ppb C)	<50	4 - 9
TVC (CFU/ml)	<100	4 - 70

Parameter	Type III Water Specification*	Typical Measured Values
Conductivity (µS/cm @ 25°C)	<20	12 - 23
TOC (ppb C)	<200	52 - 89
TVC (CFU/ml)	<1000	146 - 915

Results:
* Subject to suitable feedwater, unit maintained and serviced as per recommendations
** With optional point-of-use filter fitted

Commentary:

PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: Compliance of Type I water with water standards

Test description:

A PURELAB Quest UV was set up with a 30-litre 'external' reservoir, and fed with potable water (conductivity approx. 600 µS/cm, TOC approx. 700 ppbC) at 4 bar. The system was operated over a 3 month period and Type I and III product water was taken daily (10l and 30 l/day respectively) to simulate a typical usage pattern. Type 1 water resistivity and TOC were logged on-line using a Mettler Toledo M300 meter and a Sievers 900 TOC analyser, respectively. Samples were taken for biological testing; Total viable counts were measured after membrane filtration and incubation at 27°C for 5 days on R2A agar. Endotoxin determination was carried out with an Ati 320. Nitrate and Chloride were determined by ion chromatography, sodium by ICP-MS, and silica by colourimetry.

Parameter	Typical Measured Values for Type I Water	CLSI CLRW Specification	USP Purified Water Specification	EP Purified Water Specification
Conductivity (µS/cm at 25°C)	down to 0.055	<0.1	<1.3	<5.1
TOC (ppb C)	2.8 - 4.3	<500	<500	<500
Bacteria (CFU/ml)	0.4 -1.9/<0.1*	<10	<100	<100
Particles	0.2µm filtration*	0.22µm stage	ns	ns
Nitrates (ppb)	<0.02	ns	ns	<200
Heavy Metals (as ppm Pb)	<0.1	ns	ns	<0.1

Parameter	Typical Measured Values for Type I Water	ISO Grade 1 Specification	ASTM Type IC Specification	ASTM Bio-applications Grade
Resistivity (MΩ-cm at 25ºC)	up to 18.2	>10	>18	18.2
TOC (ppb C)	2.8 - 4.3	ns	<50	<20
Sodium (ppb)	<0.002	ns	<1	<1
Chloride (ppb)	<0.02	ns	<1	<1
Silica (ppb)	<1	<10	<3	ns
Bacteria (CFU/ml)	0.4-1.9/<0.1*	ns	<10	<1
Absorbance/cm at 254nm	<0.001	<0.001	ns	ns
Endotoxin (EU/ml)	<0.001	ns	ns	<0.01

Results:

Water from the unit met or exceeded the following standards:

- *US Pharmacopoeia Purified Water Specification (USP 32, 1.1.2009.)*
- *European Pharmacopoeia Purified Water Specification (EP 6th Edition, 2009)*
- *ASTM Type IC Reagent Water Specification (ASTM D1193 - 06)*
- *CLSI CLRW Specification (CLSI C3-A4 (2006))*
- *BS3978/ISO 3696 Specification for "Water for laboratory use", Grade 1*
- ASTM Bio-Applications Grade Water (ASTM D5196 – 06)

* Point-of-use filter fitted

Note: Final water quality is affected by many factors; feedwater quality, sample preparation techniques, analytical instrumentation techniques, models and settings, sample preparation methods and standard operating procedures together with the laboratory environment can all differ from one laboratory to another. The data and conclusions included in this document was obtained by ELGA R&D scientists and chemists under certain laboratory conditions and using specific equipment and defined laboratory protocols. Your results may vary depending on your actual experimental conditions, equipment and procedures.

PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: Inorganic Purity of water produced

Test description:

A PURELAB Quest UV was set up with a 30-litre 'external' reservoir, and fed with potable water (conductivity approx. 600 µS/cm, TOC approx. 700 ppbC) at 4 bar. The system was operated over a 1.5 month period and Type I and II product water was taken daily (10l and 30 l/day respectively) to simulate a typical usage pattern. Samples of Type I water were dispensed for analysis. Samples were analysed for elements by high-resolution ICP-MS, silica by colourimetry and for anions by ion chromatography after pre-concentration.

Results:

Quest UV

	ppt (ng/l)		ppt (ng/l)		ppt (ng/l)		ppt (ng/l)
Aluminium	<1	Germanuim	<1	Palladium	<2	Thorium	<1
Antimony	<0.2	Gold	<5	Platinum	<5	Thullium	<0.5
Arsenic	<2	Hafnium	<1	Potassium	<5	Tin	<0.5
Barium	<0.5	Holmium	<1	Praseodymium	<1	Titanium	<0.5
Beryllium	<3	Indium	<1	Rhenium	<3	Tungsten	<1
Bismuth	<0.2	Iridium	<2	Rhodium	<1	Uranium	<2
Boron	<10	Iron	<2	Rubidium	<1	Vanadium	<0.2
Cadmium	<0.5	Lanthanum	<1	Ruthenium	<2	Ytterbium	<1
Calcium	<2	Lead	<0.2	Samarium	<2	Yttrium	<1
Cerium	<1	Lithium	<0.2	Scandium	<5	Zinc	<2
Caesium	<1	Lutetium	<1	Selenium	<500	Zirconium	<5
Chromium	<1	Magnesium	<1	Silicon	<25		
Cobalt	<0.5	Manganese	<0.5	Silver	<0.5	Fluoride	<30
Copper	<1	Mercury	<5	Sodium	<2	Chloride	<20
Dysprosium	<1	Molybdenum	<0.5	Strontium	<0.2	Nitrite	<20
Erbium	<1	Neodymium	<1	Tantalum	<3	Bromide	<20
Europium	<1	Nickel	<2	Tellurium	<1	Nitrate	<20
Gadolinium	<1	Niobium	<1	Terbium	<1	Phosphate	<20
Gallium	<0.5	Osmium	<2	Thallium	<1	Sulphate	<50

Commentary:

ICP-MS is by far the most sensitive method for elemental analysis. We use Balazs Labs in California which is the best commercial lab of which we are aware. The limits of detection achievable are a function of the cleanliness of the equipment and the local environment.

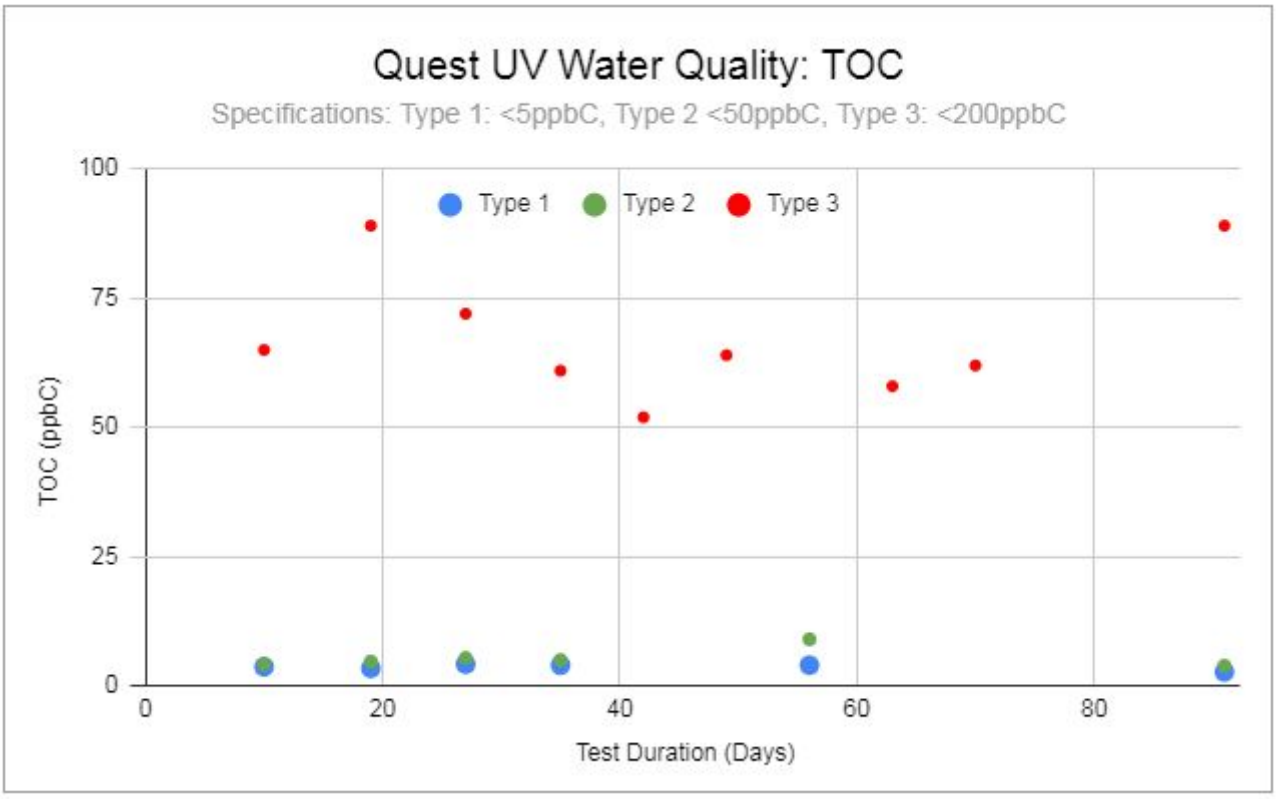
PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: TOC performance

Test description:

A PURELAB Quest UV was set up with a 30-litre 'external' reservoir, and fed with potable water (conductivity approx. 600 µS/cm, TOC approx. 700 ppbC) at 4 bar. The system was operated over a 3 month period and Type I and III product water was taken daily (10l and 30 l/day respectively) to simulate a typical usage pattern. A Sievers 900 TOC analyser was connected to the product and used to measure TOC of each water type. Results are shown below.



Results:

TOC of Type I, II, & III waters were respectively measured at, 2.8-4.3, 4-9, and 52-89 ppbC, during this test period.

Commentary:

Total organic carbon (TOC) provides a good indication of the overall levels of organic contaminants in purified water. On-line measurement is needed when testing ultra-pure water to give adequate sensitivity and freedom from contamination.

Note: Final water quality is affected by many factors; feedwater quality, sample preparation techniques, analytical instrumentation techniques, models and settings, sample preparation methods and standard operating procedures together with the laboratory environment can all differ from one laboratory to another. The data and conclusions included in this document was obtained by ELGA R&D scientists and chemists under certain laboratory conditions and using specific equipment and defined laboratory protocols. Your results may vary depending on your actual experimental conditions, equipment and procedures.

PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: Thermal Desorption GC-MS Analysis of Product Water

A PURELAB Quest UV was set up with a 30-litre 'external' reservoir, and fed with potable water (conductivity approx. 600 µS/cm, TOC approx. 700 ppbC) at 4 bar. The system was operated over a 1.5 month period and Type I and III product water was taken daily (10l and 30 l/day respectively) to simulate a typical usage pattern. Samples of Type I water were dispensed for analysis. Analyses were carried out by Balazs Analytical Services, California, USA.

This test method is designed to determine semi-volatile organic compounds in the boiling range of n-heptane (ca. 100°C) to n-octacosane (430°C).

The water samples were passed through sample tubes containing an adsorbent to trap organic compounds. The sample tubes were analyzed by TD-GC-MS (Thermal desorption – Gas - Chromatograph – Mass – Spectrometry). The GC used a non-polar poly(dimethylsiloxane) phase capillary column. The following temperature program was used for the GC: Initial temperature held at 35C for 3.5 minutes then increased at a rate of 10C/minute to 280C then held at the final temperature for 10 minutes. Helium was used as the carrier gas for the GC-MS. An internal standard, toluene-d8, was added to each sample tube during the analysis.

In the absence of any detectable compounds the total ion count was used to estimate the total of components in the following boiling ranges:

Results:

Quest UV

	ppb (µg/l)
Low Boilers C7-C10	0.06
Medium Boilers >C10-C20	0.07
High Boilers >C20	0.08
Sum >=C7	0.22

Note: Final water quality is affected by many factors; feedwater quality, sample preparation techniques, analytical instrumentation techniques, models and settings, sample preparation methods and standard operating procedures together with the laboratory environment can all differ from one laboratory to another. The data and conclusions included in this document was obtained by ELGA R&D scientists and chemists under certain laboratory conditions and using specific equipment and defined laboratory protocols. Your results may vary depending on your actual experimental conditions, equipment and procedures.

PURELAB Quest UV Performance Datasheet

Results:

	ppb (µg/l)
Hexanal	<0.025
C8 Hydrocarbon	<0.025
xylene isomer	<0.025
1-chloro-2-methylpropene	<0.025
Dichlorocyclopentane	<0.025
2,2-bis(chloromethyl)-1-propanol	<0.025
ethyl-3-ethoxypropionate	<0.025
octanol	<0.025
C10 hydrocarbon	<0.025
nonanal	<0.025
ethlyhexanoic acid	<0.025
decanal	<0.025
allyl benzene	<0.025
organic ether	<0.025
phthalic anhydride	<0.025
BHT-quinone-methide	<0.025
butylated hydroxytoluene	<0.025
TXIB+diethyl phthalate	<0.025
benzophenone	<0.025
1,3-dioxolane, 2,4,5-trimethyl-2-(p-tolyl0-di-isobutyl phthalate	<0.025
dibutyl phthalate	<0.025
tributyl aconitate	<0.025
tributyl acetylcitrate	<0.025
benzyl butyl phthalate	<0.025
bis(2-ethylhexyl) adipate	<0.025

Commentary:
This test method was designed to analyze semi-volatile organic compounds in the boiling point range of n- heptane (boiling point approximately 100 degrees C) to n-octacosane (boiling point approximately 430 degrees.
The method is capable of detecting a wide variety of compounds, and is not limited to those listed above. The particular set of SVOCs 'not detected', and the limits of detection will depend on the laboratory carrying out the work.

PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: Purge and Trap GC-MS Analysis of Product Water

A PURELAB Quest UV was set up with a 30-litre 'external' reservoir, and fed with potable water (conductivity approx. 600 µS/cm, TOC approx. 700 ppbC) at 4 bar. The system was operated over a 1 month period and Type I and III product water was taken daily (10l and 30 l/day respectively) to simulate a typical usage pattern. Samples of Type I water were dispensed for analysis by Purge & Trap-GC-MS according to EPA524.3.

Quest UV

	ppb (µg/l)		ppb (µg/l)
1-chorobutane	<0.05	chloromethane	<1
1,1-dichloroethene	<0.05	cis-1,2-dichloroethene	<0.05
1,1-dichloroethene	<0.05	cis-1,3-dichloropropene	<0.05
1,1-dichloropropene	<0.05	di-isopropyl ether (DIPE)	<0.05
1,1,1-trichloroethane	<0.05	dibromochloromethane	<0.05
1,1,1,2-tetrachloroethane	<0.05	dibromomethane	<0.05
1,1,2-trichloroethane	<0.05	dichlorodifluoromethane	<1
1,1,2,2-tetrachloroethane	<0.05	diethyl ether	<0.05
1,2-dibromo-3-chloropropane	<0.05	ethyl methacrylate	<0.05
1,2-dibromoethane	<0.05	ethylbenzene	<0.05
1,2-dichlorobenzene	<0.05	hexachlorobuadiene	<0.05
1,2-dichloroethane	<0.05	hexachloroethane	<0.05
1,2-dichloropropane	<0.05	isopropylbenzene	<0.05
1,2,3-trichlorobenzene	<0.05	methyl acetate	<0.5
1,2,3-trichloropropane	<0.05	methyl iodide	<1
1,2,4-trichlorobenzene	<0.05	methyl-t-butyl ether (MtBE)	<0.05
1,2,4-trimethylbenzene	<0.05	methylene chloride	<0.1
1,3-butadiene	<0.2	n-butylbenzene	<0.05
1,3-dichlorobenzene	<0.05	n-propylbenzene	<0.05
1,3-dichloropropane	<0.05	napthalene	<0.05
1,3,5-trimethylbenzene	<0.05	o-xylene	<0.05
1,4-dichlorobenzene	<0.05	p/m-xylene	<0.05
2-chlorotoluene	<0.05	sec-butylbenzene	<0.05
4-chlorotoluene	<0.05	styrene	<0.05
4-isopropyltoluene	<0.05	t-amyl ethyl ether (TAME)	<0.05
allyl chloride	<0.5	t-amyl methyl ether (TAME)	<0.05
benzene	<0.05	t-butyl alcohol (TBA)	<1
bromobenzene	<0.05	t-Butyl ethyl ether (ETBE)	<0.05
bromochloromethane	<0.05	t-butylbenzene	<0.05
bromodichloromethane	<0.05	tetrachloroethene	<0.05
bromoform	<0.05	tetrahydrofuran	<0.5
bromomethane	<1	toluene	<0.05
carbon disulphide	<0.05	trans-1,2-dichloroethene	<0.1
carbon tatrachloride	<0.05	trans-1,3-dichloropropene	<0.05
chlorobenzene	<0.05	trichloroethene	<0.05
chlorodifluoromethane	<1	trichlorofluoromethane	<0.5
chloroform	<0.05	vinyl chloride	<0.2

Commentary:
This test detects volatile organics; that is compounds with a high-enough vapour pressure to be removed in a gas stream. The particular set of VOCs not detected and the limits of detection will depend on the laboratory carrying out the work. No additional components besides the EPA 524 standards were detected.

Note: Final water quality is affected by many factors; feedwater quality, sample preparation techniques, analytical instrumentation techniques, models and settings, sample preparation methods and standard operating procedures together with the laboratory environment can all differ from one laboratory to another. The data and conclusions included in this document was obtained by ELGA R&D scientists and chemists under certain laboratory conditions and using specific equipment and defined laboratory protocols. Your results may vary depending on your actual experimental conditions, equipment and procedures.

PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: Amines Analysis of Product Water

Test description: A PURELAB Quest UV was set up with a 30-litre 'external' reservoir, and fed with potable water (conductivity approx. 600 µS/cm, TOC approx. 700 ppbC) at 4 bar. The system was operated over a 1.5 month period and Type I and III product water was taken daily (10l and 30 l/day respectively) to simulate a typical usage pattern. Samples of Type I water were dispensed for analysis. Analyses were carried out by Balazs Analytical Services, California, USA.

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Results:

Quest UV

	ppt (µg/l)
Ammonium	<20
Tetramethylammonium	<50
Trimethylamine	<50

Commentary:

No traces of amines or ammonium originating from the ion-exchange resin could be detected.

PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: Endotoxin Test

Test description:

A PURELAB Quest UV was set up with a 30-litre 'external' reservoir, and fed with potable water (conductivity approx. 600 µS/cm, TOC approx. 700 ppbC) at 4 bar. The system was operated over a 3 month period and Type I and III product water was taken daily (10l and 30 l/day respectively) to simulate a typical usage pattern. Samples of Type I water were dispensed and analysed for endotoxin using a kinetic tube reader.

Date	Type I Water Endotoxin (EU/ml)
25/10/2019	<0.001
07/11/2019	<0.001
04/11/2019	<0.001
08/01/2019	<0.001

Results:

Samples were taken with an LC197 point-of-use filter fitted; Values were less than the detection limit of 0.001 EU/ml

Commentary:
The PURELAB Quest UV produces ultra-pure water for laboratory uses. Low endotoxin levels are key for many applications.

PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: RNase Test

Test description:

A PURELAB Quest UV was set up with a 30-litre 'external' reservoir, and fed with potable water (conductivity approx. 600 µS/cm, TOC approx. 700 ppbC) at 4 bar. The system was operated over a 2 month period and Type I and III product water was taken daily (10l and 30 l/day respectively) to simulate a typical usage pattern; During this period samples of Type I water were dispensed and analysed for RNase.

Experimental conditions and method used:

RNase was measured using a cleavable fluorescent-labelled RNase substrate. A modified RNA oligonucleotide was degraded by RNases and a green fluorescent probe released. This fluorescence was detected at 520nm using excitation at 490nm after 3 hours incubation at 37°C.

Date	Type I Water RNase Level (ng/ml)
07/11/2019	<0.001
20/11/2019	<0.001
19/12/2019	<0.001

Results:
Results were below the limits of detection of the test.

Commentary:
The PURELAB Quest UV produces ultra-pure water for laboratory use, especially suited for analytical, clinical, pharmaceutical and molecular biological applications. The use of ultraviolet light, ion-exchange and regular sanitization ensures RNase is maintained at extremely low levels.

PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: DNase Test

Test description:

A PURELAB Quest UV was set up with a 30-litre 'external' reservoir, and fed with potable water (conductivity approx. 600 µS/cm, TOC approx. 700 ppbC) at 4 bar. The system was operated over a 2 month period and Type I and III product water was taken daily (10l and 30 l/day respectively) to simulate a typical usage pattern. During this period occasional product-water samples were taken and analysed for DNase.

Experimental conditions and method used:

DNase was measured using a cleavable fluorescent-labelled DNase substrate. A modified DNA oligonucleotide was degraded by DNases and a pink fluorescent probe released. This fluorescence was detected at 556nm using excitation at 535nm after incubation at 37°C.

Date	Type I Water DNase Level (ng/ml)
07/11/2019	<0.005
20/11/2019	<0.005
19/12/2019	<0.005

Results:

Readings for DNase were below the limit of detection of the test.

Commentary:

The PURELAB Quest UV produces ultra-pure water for laboratory use, especially suited for analytical, clinical, pharmaceutical and molecular biological applications. The use of ultraviolet light, ion-exchange and regular sanitization ensures DNase is maintained at extremely low levels.

PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: Protease Test

Test description:

A PURELAB Quest UV was set up with a 30-litre 'external' reservoir, and fed with potable water (conductivity approx. 600 µS/cm, TOC approx. 700 ppbC) at 4 bar. The system was operated over a 2 month period and Type I and III product water was taken daily (10l and 30 l/day respectively) to simulate a typical usage pattern; Sample were taken and analysed for Protease concentration during this time.

Experimental conditions and method used:

Protease was measured by incubating the sample for 24 hours with FTC-casein at 37°C. Any protease activity cleaves the FTC-casein into smaller TCA-soluble, FTC-peptides. The reaction is stopped with TCA and precipitated FTC-casein removed by centrifuging. Assay buffer is added and the fluorescent intensity measured at 525 nm using 490 nm excitation. The intensity of the fluorescence is directly proportional to the total protease activity in the sample.

Date	Type I Water Protease Level (BAEE units (U) Trypsin)
26/11/2019	<0.1 mU/ml (<1ng/ml)
02/12/2019	<0.1 mU/ml (<1ng/ml)
10/12/2019	<0.1 mU/ml (<1ng/ml)

Results:

Results were typically below the level of the blank sample. The level is quoted as <0.0001 BAEE units of Trypsin/ml (<1ng/ml) which was the lowest standard tested.

Commentary:
The PURELAB Quest UV produces ultra-pure water for laboratory use. It is especially suited for analytical, clinical, pharmaceutical and molecular biological applications. The use of ultraviolet light, ion-exchange and regular sanitization ensures Protease is maintained at extremely low levels.

PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: Bacteria Test

Test description:

A PURELAB Quest UV was set up with a 30-litre 'external' reservoir, and fed with potable water (conductivity approx. 600 µS/cm, TOC approx. 700 ppbC) at 4 bar. The system was operated over a 3 month period and Type I and III product water was taken daily (10l and 30 l/day respectively) to simulate a typical usage pattern. Samples were regularly taken and analysed for total viable counts by filtration and incubation on R2A agar at 27ºC for 5 days.

Date	Type I Water Bacteria Level (CFU/ml)	Type II Water Bacteria Level (CFU/ml)	Type III Water Bacteria Level (CFU/ml)
17/10/2019	0.4	69	532
29/10/2019	0.8	49	708
28/11/2019	1.1	12	515
06/12/2019	0.95	2	155
12/12/2019	1.5	4	146
19/12/2019	1.4	17	284
03/01/2020	1.9	15	915
09/01/2020	0.7	38	231
10/01/2020	<0.1*	not tested	not tested
14/01/2020	1.3	4	265
07/01/2020	<0.1*	not tested	not tested
23/1/2020	1.6	6	295
24/01/2020	<0.1*	not tested	not tested

Results:

Counts were typically ≤1, <20 and <600cfu/ml for Type I, II and III waters respectively. When a point-of-use filter was fitted to the Type I outlet product water bacteria was measured at <0.1cfu/ml.

*= Point-of-use filter fitted.

Commentary:
The PURELAB Quest UV produces ultra-pure water for laboratory use. It is especially suited for analytical, clinical, pharmaceutical and molecular biological applications. Low bacteria levels are maintained by the use of ultraviolet light and regular sanitization; additional point-of-use filtration can be used to achieve extreme levels of purity.

PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: UV Bacterial challenge

Test description:

A high concentration of bacteria is produced by growing bacteria in weak nutrient conditions over a period of days and the level checked. The challenge was fed through the UV chamber and samples taken and analysed for total viable counts by filtration and incubation on R2A agar at 27ºC for 5 days

Sample	Bacteria Concentration (CFU/ml)
Pre UV	1700000
Post UV 1 Minute	<1
Post UV 2 Minutes	<1
Post UV 3 Minutes	<1
Post UV 4 Minutes	<1
Log_{10} Reduction	>6

Results:

When the UV is challenged with 1.7 million cfu/ml, TVC results were <1cfu/ml post UV at a flow rate of 2 l/min. This is equivalent to a > 6 log reduction.

Commentary:

Low bacterial levels are a key specification for many clinical, pharmaceutical and molecular biological applications. Challenges are used to demonstrate the capability of the unit or its components to remove high levels in the feed or reservoir.

PURELAB Quest UV Performance Datasheet

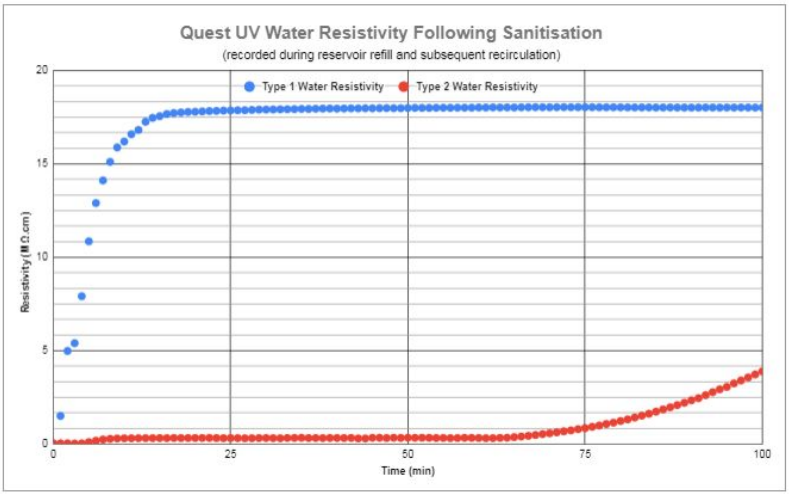
Product Name: **PURELAB Quest UV**

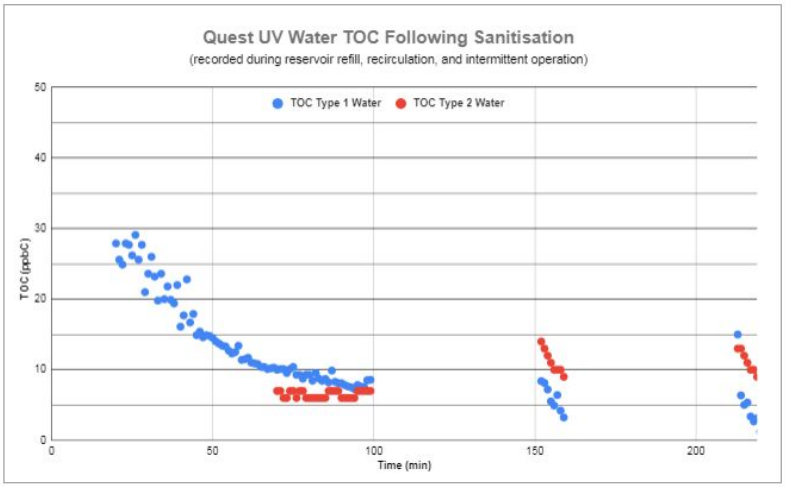
Performance Test: Rinse up after sanitization

Test description: TOC and resistivity of Type I and Type II water from a PURELAB Quest UV were recorded after carrying out a sanitisation procedure, to determine the time required for the unit to achieve high product water quality

Results:

Following sanitisation Type I and Type II water specifications for resistivity and TOC were quickly achieved through normal process operation.





Commentary:

Sanitisation cycles are available to help maintain microbiological performance or to recover water systems that have become contaminated with microorganisms. A chemical is distributed throughout the system during a sanitisation sequence. This chemical must subsequently be removed by the purification process before optimum inorganic and organic water purity is again achieved. For critical applications, this can be facilitated by dispensing water from the system at maximum flow following the process.

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PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

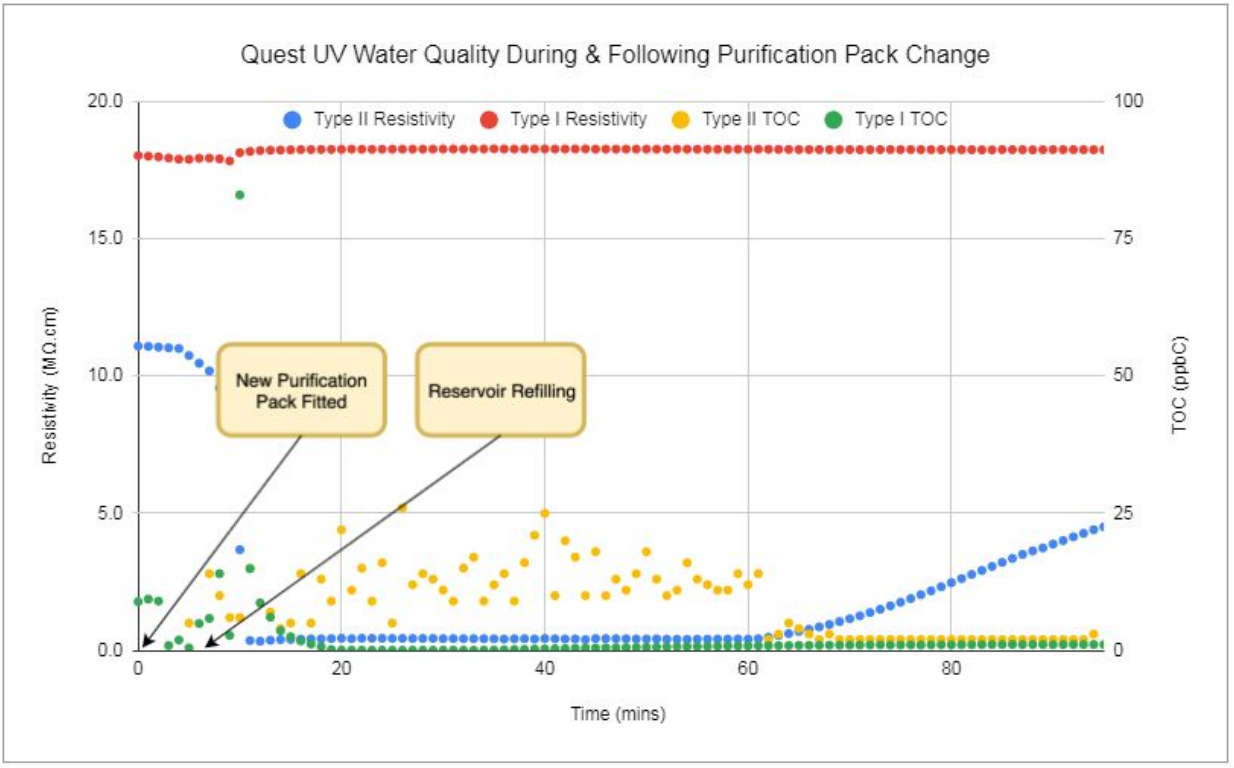
Performance Test: Time to reach optimum performance after fitting a new purification pack (LC292)

Test description:

Product water TOC and resistivity of a PURELAB Quest UV were recorded after installation of a new purification pack, to determine the time required for the unit to achieve high product water quality.

Experimental conditions and method used:

A new purification pack was fitted into the Quest UV system following the 'purification-pack change' procedure. TOC and resistivity of Type I and Type II water were logged while the system filled its reservoir, and during subsequent recirculation.



Results:
Type I and Type II water quickly met purity specifications after completion of the purification pack change procedure. Resistivity and TOC specifications for types 1 and 2 water, are respectively, up to 18.2MΩ.cm / <5ppbC, and >1MΩ.cm / <50ppbC.

Commentary:
The PURELAB Quest UV incorporates a purification pack that requires replacing as it becomes exhausted. On installation of a new purification pack chemicals used to preserve it during storage are released into the water and subsequently removed by the purification process. For critical applications, this can be facilitated by dispensing water from the system at maximum flow.

Note: Final water quality is affected by many factors; feedwater quality, sample preparation techniques, analytical instrumentation techniques, models and settings, sample preparation methods and standard operating procedures together with the laboratory environment can all differ from one laboratory to another. The data and conclusions included in this document was obtained by ELGA R&D scientists and chemists under certain laboratory conditions and using specific equipment and defined laboratory protocols. Your results may vary depending on your actual experimental conditions, equipment and procedures.

PURELAB Quest UV Performance Datasheet

Product Name: PURELAB Quest UV

Performance Test: Commissioning Cycle

Test description:

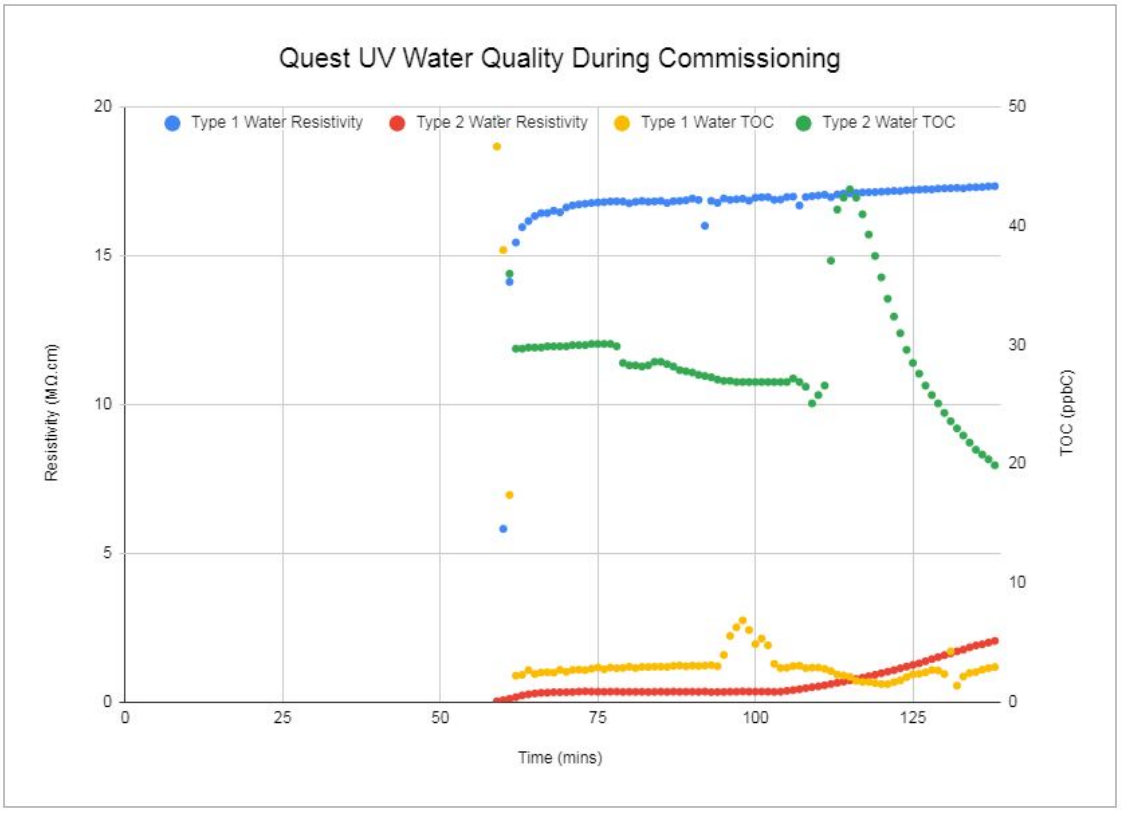
Product water TOC and resistivity of a PURELAB Quest UV were recorded during installation of a new Quest purifier, to demonstrate the effectiveness of the process and time required for the unit to achieve high product water quality.

Experimental conditions and methods used:

The commissioning cycle of a new Quest I system was activated while monitoring TOC and resistivity of water at the dispense tap (Type I) and immediately after the recirculation pump (Type II). Mettler Toledo / Thornton conductivity equipment and GE Check-point analysers were used.

Results:

The purification process polished water to Type I and Type II quality quickly; All resistivity and TOC purity specifications were achieved after approximately 100 minutes of operating following starting the commissioning cycle. Resistivity and TOC specifications for Type I and Type II waters are respectively >18 and >1 MΩ.cm and <5 and <50 ppbC.



Commentary:
Installation of the Purelab Quest 1 is completed by an automated commissioning cycle that prepares the system for use.
This cycle is included within the software and will automatically activate on supplying electrical power to a new Quest purifier.

Note: Final water quality is affected by many factors; feedwater quality, sample preparation techniques, analytical instrumentation techniques, models and settings, sample preparation methods and standard operating procedures together with the laboratory environment can all differ from one laboratory to another. The data and conclusions included in this document was obtained by ELGA R&D scientists and chemists under certain laboratory conditions and using specific equipment and defined laboratory protocols. Your results may vary depending on your actual experimental conditions, equipment and procedures.