BIOFIL®

Laboratory Water

Three water qualities
One clear solution

BIOFIL®

About Us

JET BIOFIL has a long and accomplished history in pure water. Whatever your specific requirements - from a few flasks of the highest purity water to a thousand litres of general grade water for your laboratory, we have the experience and technical expertise to support you.

We are now delighted to introduce our own family of UK designed and built products, which seamlessly integrate into your laboratory, serving your pure water requirements with the lowest production costs and the highest quality guaranteed.

This new range of pure water systems from JET BIOFIL simplifies the way you produce and utilise pure water in your laboratory. They were designed following extensive consultation with scientists in every type of laboratory situation. Key considerations were ease of use, producing only the volume of water required, low running costs, clear quality parameters and care-free maintenance.

The range comprises of four families of water purification systems, designed to cover all application requirements. Systems can be integrated to provide the optimum production rate and quality you require.

All equipment is supported by a national team of service engineers and technical staff who are experts in pure water. A dedicated UK telephone response team await your call. An experienced design team can plan your laboratory equipment projects.

We are proud to be certified to ISO 9001:2015 and accredited by UKAS to ISO 17025:2005 as well as having ***Safe Contractor*** status to reflect our commitment to the quality and service we provide to our customers.

4635 Certificate No. FS 558309

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Quick Guide Product Finder

Triple Red System	Water Quality	Typical Applications	Production / Dispense Rate
Puro	**TYPE 3** **Primary grade water** **RO water** **<20µS/cm**	Supply for: Higher purity water systems Final rinse glass washers Steam/humidity generators Growth/stability chambers	10-80 litres/hour Larger volumes available
Geno	**TYPE 2** **General laboratory grade water** **RO and DI water** **1-15MΩ-cm**	Many general laboratory applications requiring higher ionic purity Buffer make up Media production Sample dilution and reagent preparation General chemistry	10-50 litres/hour Larger volumes available
Alto	**TYPE 1** **Ultrapure water** **18.2MΩ-cm**	Many sensitive laboratory applications including: Cell and tissue culture Molecular biology Chromatography and spectroscopy	2 litres/minute (Fed from a local or ring main supply)
Duo	**TYPE 2** **1-15MΩ-cm** **TYPE 1** **18.2MΩ-cm**	Where ultrapure water is required in addition to laboratory grade water	Type 2: 10-20 litres/hour Type 1: 2 litres/minute

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Understanding water purification

In order to produce pure water suitable for use in scientific applications, water (usually mains supplied potable water) must pass through a series of technologies which remove impurities. Various laboratory applications require the removal of different impurities and therefore a range of technologies are utilised.

Filtration

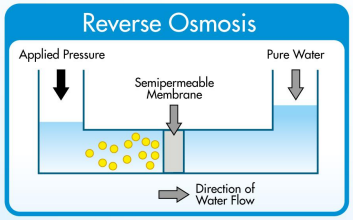
Depth filters are commonly used as a pre-treatment. Raw water passes through a series of winding fibres which attract and trap impurities. This offers protection to the purification technology that follows as less impurities pass through. Carbon is also used to bind chlorine ions which, if not removed, will cause rapid deterioration of RO membranes.

Membrane sub micron filters are traditionally used as a final step to remove bacteria and other particles which have not been dealt with by the preceding technologies.

Reverse Osmosis (RO)

This is the most economical method of removing up to 99% of feed water contaminants.

During natural osmosis, water flows from a less concentrated solution through a semipermeable membrane to a more concentrated solution until concentration and pressure on both sides of the membrane are equal.

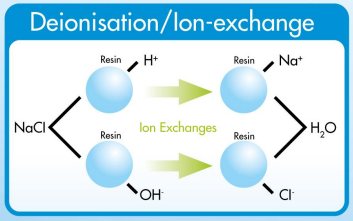


In water purification, external pressure is applied to the more concentrated side of the membrane to reverse the natural osmotic flow. This forces the feed water through the semipermeable membrane. The impurities are deposited on the membrane surface and flushed to drain. The pure water passing the membrane is referred to as the permeate.

Most RO systems will need a tank to store the purified water as the production rate is usually less than the peak demand.

Deionisation (DI)/ Ion exchange

This process removes ions from water, usually RO water, with the use of synthetic resins. The ions are removed from the water through a series of chemical reactions. These reactions occur as the water passes through the ion exchange resin beads. Gradually, all unwanted ions are replaced by hydrogen and hydroxyl ions which combine to form pure water.

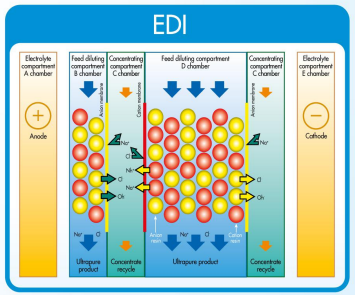


Deionisation is the only process which can produce the quality required for Type 1 water.

Electrodeionisation (EDI)

Electrodeionisation is an active purification technology which combines electrodialysis and ion exchange.

Within the EDI cell, water is passed between an anion permeable membrane and a cation permeable membrane. The cell chamber contains loosely packed ion exchange resin. Ions are attracted to the oppositely charged electrode and are flushed away before they reach it, removing them from the final water. Multiple EDI cells can be stacked within a unit.



The resin in the EDI cell is continuously regenerated thus removing the requirement for replacement cartridges and making it a long term cost effective technology for large water volumes.

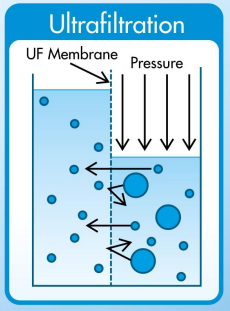
By passing an electrical current through water, the H_2O molecule is split into H^+ and OH^-. These ions continuously regenerate the resin.

Ultraviolet (UV) photo oxidation at 254nm and 185nm

Photochemical oxidation and ultraviolet light eliminate trace organics and inactivate microorganisms in feed water. The 254nm light reacts with bacterial DNA resulting in denaturation. The 185nm light breaks up long chain organics which can then be removed from the water by ion exchange.

Ultrafiltration (UF)

Utrafiltration is used to remove pyrogens (bacterial endotoxins) and nucleases. This process is critical when producing water for use in tissue or cell culture and media preparation. Ultrafilters use size exclusion to remove particles and macromolecules. The filter may also be charged to help attract contaminants. Particles are captured on the surface of the membrane and flushed to drain via a reject stream. Ultrafilters are usually employed at the end of the system to ensure near total removal of macromolecular impurities like pyrogens, nucleases and particulates.



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Puro Primary Grade Type 3 Water

Using high recovery reverse osmosis (RO) technology, Puro efficiently removes up to 99% of contaminants from mains feed water to produce primary grade water.

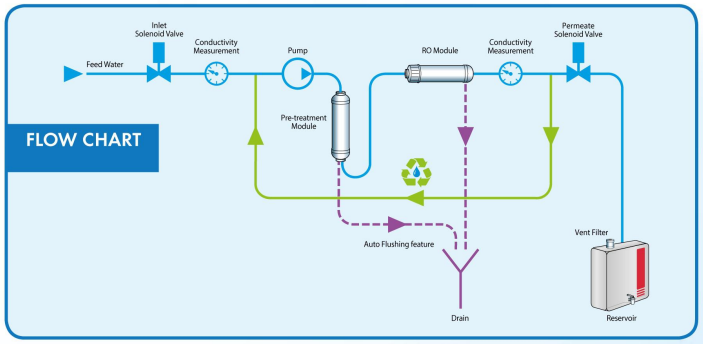
Puro is a small footprint solution to feed glass washers or other laboratory equipment.

Puro is suitable for Type 3/ RO water usage of 10-1000 litres per day. RO water is suitable for feeding glass-washers, autoclaves, steam generators and stability chambers, also to feed ultrapure water systems such as Alto. The integral boost pump simplifies installation and avoids unexpected costs or reduced flow rates due to poor inlet pressure. Puro is fed directly from your mains water supply.

FEATURES

- **Low running costs**
- **Make-up rates range from 10-80 litres per hour**
- **Novel recirculation loop extends membrane life**
- **Mount on the bench, wall or on top of the reservoir**
- **Choice of storage reservoir: 30, 60 or 100 litres**
- **One easy to change pre-filter**

		Puro 10	Puro 20	Puro 50	Puro 80
Production rate at 15˚C	l/hr	10	20	50	80
Overall rejection rate	%	98	98	98	98
Rejection rate for bacteria	%	>99	>99	>99	>99
Rejection rate for particles	%	>99	>99	>99	>99
Feed water pressure	bar	0.1-6	0.1-6	0.1-6	0.1-6



ENVIRONMENTALLY FRIENDLY

Puro has up to 50% recovery of water due to the innovative configuration of the RO membrane resulting in less waste water.

After the final conductivity measurement, water not meeting the required standard is recycled back around the system rather than sent to the drain.

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Geno Laboratory Grade Type 2 Water

With the addition of the Endure DI packs Geno takes RO water to the next level of purity, providing laboratory grade, Type 2 water in three convenient production rates of 10, 20 or 50 litres per hour. Select the reservoir size to suit your requirements. Geno combines all required technologies to produce Type 2 water in one box. The Endure DI packs are simple to change and long lasting.

Geno is suitable for Type 2/ DI water usage of 10-600 litres per day. DI water is suitable for buffer and media production, sample and reagent diluents, general chemistry, protein electrophoresis, histology, cytology and spectrophotometry. The integral boost pump simplifies installation and avoids unexpected costs. Geno is fed directly from your mains water supply.

		Geno 10	Geno 20	Geno 50
Resistivity	MΩ-cm	1-15	1-15	1-15
Production rate at 15˚C	l/hr	10	20	50
Overall rejection rate	%	98	98	98
Rejection rate for bacteria	%	>99	>99	>99
Rejection rate for particles	%	>99	>99	>99
Feed water pressure	bar	0.1-6	0.1-6	0.1-6

FEATURES

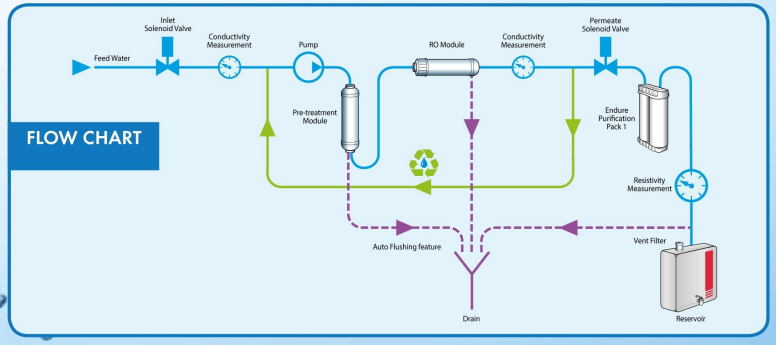
- Low running costs
- Integral boost pump
- Novel recirculation loop extends life of membranes and cartridges
- Choice of production rates
- Choice of storage reservoir: 30, 60 or 100 litres
- Bench, wall or reservoir top mounting
- Easy to change consumables with realistic costs

ENVIRONMENTALLY FRIENDLY

Endure Purification Packs are made from recyclable materials. They are simple to change and long lasting. Fewer consumable changes mean more savings.

Following the RO process, water which does not meet the required standard is recycled back through the RO rather than progressing along the purification pathway. The Endure Purification Pack is therefore only exposed to the acceptable grade of RO water, meaning that it lasts longer.

FLOW CHART



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Alto Ultrapure Type 1 Water

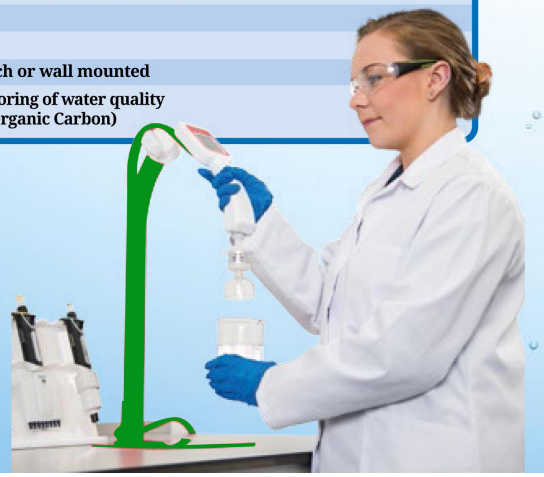
Alto provides 18.2MΩ-cm water on demand. The systems are fed from a pre-treated supply and produce Type 1 water instantly as required. The integrated dispenser or optional remote dispenser provides Type1 water at up to 2 litres per minute. Output is either continuous or volumetrically dispensed. Select the dispense rate required with the intuitive and simple software controls. Alto has quick-change, long-lasting consumables provided in the start up package.

Alto is suitable for Type 1 water usage of up to 120 litres per hour (adequate feed water must be available). Type 1 water is suitable for molecular biology, electrophoresis, cell and tissue culture, sequencing, HPLC, genomics, pharmacology and any other sensitive applications.

TOC monitoring is critical when organics will affect results so a real time TOC reading will provide absolute confidence in your water.

FEATURES

- **Fast dispense of ultrapure water – variable rate of up to 2 litres per minute**
- **Dual wavelength 185nm and 254nm UV in a quartz thimble**
- **Water on demand**
- **Endotoxin and nuclease free**
- **Remote dispenser available**
- **Quick-change consumables with realistic costs**
- **Easy to use software**
- **Quiet operation**
- **Under-bench, on-bench or wall mounted**
- **Comprehensive monitoring of water quality including TOC (Total Organic Carbon)**



GREEN INNOVATIONS

Alto's low energy consumption is the equivalent of running only a domestic light bulb. The system is therefore preserving precious natural resources reducing pollution and saving money.

		Alto TOC	Alto TOC UF
Dispense rate	l/min	2	2
Resistivity	MΩ-cm	18.2	18.2
TOC	ppb	1-5	1-5
RNase / DNase		-	free
Bacteria	cfu/ml	<1	<1
Endotoxins	EU/ml	-	<0.001
Feedwater quality	µS/cm	<30	<30
Feedwater pressure	bar	0.1-6	0.1-6

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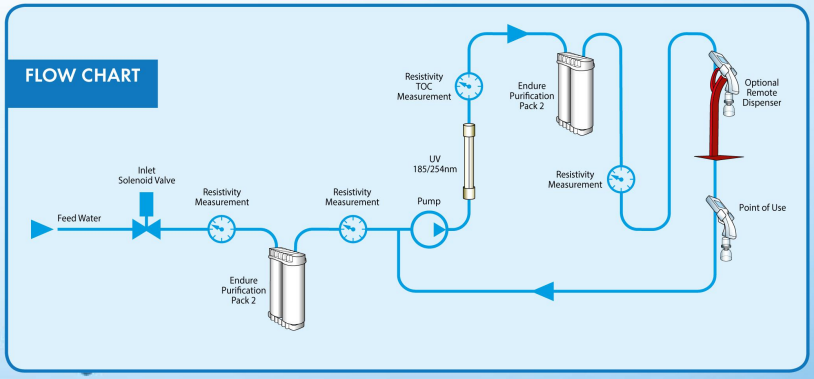

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Duo Dual Quality Type 2 AND Type 1 Water

The innovative and unique Duo provides two water qualities within one easy to use system. Save on space, initial outlay and consumable costs. Type 2 water is available from the reservoir whilst Type 1 water is ready to dispense from the unit or the remote dispenser.

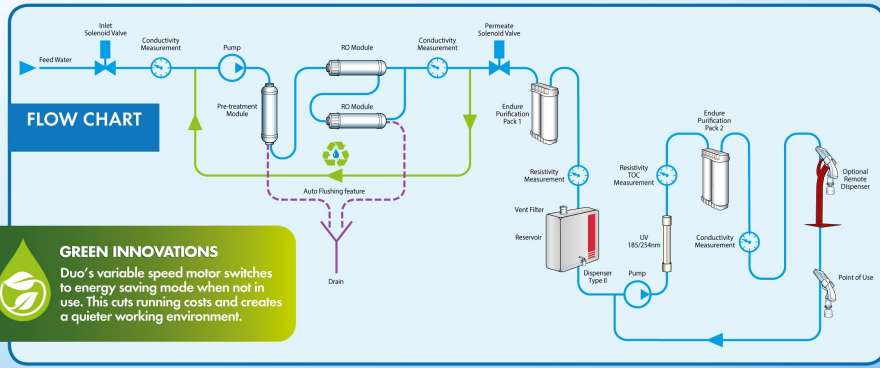
Duo is suitable for Type 2 water usage of 10-150 litres per day. Type 2 water is used for buffer and media production, sample and reagent diluent, general chemistry, protein electrophoresis, histology, cytology and spectrophotometry. Duo is also suitable for Type 1 water usage of up to 100 litres per day. Type 1 water is used for molecular biology, electrophoresis, cell and tissue culture, sequencing, HPLC, genomics, pharmacology and any other sensitive applications. TOC monitoring is critical when organics will affect results so a real time TOC reading will provide absolute confidence in your water quality.

FEATURES

- Fast variable dispense of ultrapure water – up to 2 litres per minute
- Quick-change consumables with realistic costs
- Novel recirculation loop extends life of membranes and cartridges
- Easy to use software
- Dual wavelength 185nm and 254nm UV in a quartz thimble
- Bench, wall or reservoir top mounting
- Choice of production rates
- Choice of storage reservoir: 30, 60 or 100 litres
- Comprehensive monitoring of water quality including TOC (Total Organic Carbon)
- Integral boost pump
- Space saving with 2 water qualities from one unit

		Duo 10 TOC	Duo 10 TOC UF	Duo 20 TOC	Duo 20 TOC UF
Production rate (into reservoir)	l/hr	10	10	20	20
Dispense rate (Ultrapure)	l/min	2	2	2	2
Resistivity	MΩ-cm	18.2	18.2	18.2	18.2
TOC	ppb	1-5	1-5	1-5	1-5
RNase / DNase		-	free	-	free
Bacteria	cfu/ml	<1	<1	<1	<1
Endotoxins	EU/ml	-	<0.001	-	<0.001
Feedwater pressure	bar	0.1-6	0.1-6	0.1-6	0.1-6

FLOW CHART



GREEN INNOVATIONS

Duo's variable speed motor switches to energy saving mode when not in use. This cuts running costs and creates a quieter working environment.

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Consumables

Regular maintenance is important to the longevity of the high quality systems we supply. All cartridge changes are simple and can easily be carried out by the end user. Deionisation cartridge changes are dictated by quality measurements rather than fixed time intervals. Our qualified engineers can demonstrate the maintenance procedures during commissioning and training.

- Competitive pricing
- Comprehensive economical packages of annual consumables
- Constructed from recyclable materials
- Easy change cartridges

ENVIRONMENTALLY FRIENDLY

Consumable life in Puro, Geno, Duo and Alto is optimised by utilising the latest microprocessor controls, ensuring every last drop of water is produced before they require changing. This saves the environment and makes maximum use of your budget.

Reservoirs

Puro, Geno and Duo are all supplied with a choice of reservoir. Each reservoir has a pressure sensor level control, clearly displaying the water level and a 0.2µm microbiological air vent filter, with an optional CO_2 filter. The 30 and 60 litre reservoirs are wall mountable and the 100 litre reservoir comes with a distribution pump if required. The high grade stainless steel pump is designed to provide water at the correct flow and pressure for many laboratory applications, including glass washers, autoclaves and remote take-off points.

- Made from high quality virgin polyethylene
- Designed to be fully drainable
- Smooth, crevice free interior
- Connections to feed a laboratory dishwasher
- Dispense tap can be mounted in the middle of the unit or at the bottom
- Optional UV light

ENVIRONMENTALLY FRIENDLY

All the reservoirs are manufactured from recyclable polyethylene.

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Installation, Maintenance & Service

Triple Red employs a dedicated UK based team of service co-ordinators as well as qualified specialist service and installation engineers to ensure comprehensive support to all customers. Our Service Contract options range from preventative maintenance to 24/7 cover with guaranteed call out response times for customers with more critical applications. This is all made possible by our nationwide team of engineers.

Installation and commissioning of new equipment is carried out by Triple Red engineers. All your installations are completed to the highest professional standards and full training is provided on-site.

- Planned preventative maintenance
- 24/7 cover with on call services
- Guaranteed call out times
- Servicing of stand-alone water systems and distribution ringmains
- Nationally based experienced engineers

For a full range of Service Contract packages to suit your needs, a free Site Survey or a Quotation please call 01844 201142 or email service@triplered.com

"Triple Red gave great advice on our needs and the sales manager was exceptional. The installation was faultless and the after sales service again has been exceptional".

Charles McGinness
Analytical Chemistry,
University of the West of Scotland

"The service engineers are very competent and often will go that bit further to assist, so that the job is completed on the first visit".

Sonia Buckingham, UCL

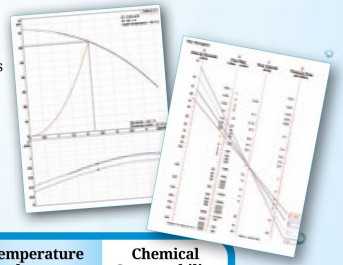
ENVIRONMENTALLY FRIENDLY

Our engineers' fleet of vehicles is continuously tracked to guarantee only essential journeys are made, ensuring the carbon footprint is kept to a minimum.

Ringmain Design & Installations

Our qualified design and projects team are able to offer a full design and installation service for all your water distribution needs. With experience in supply and installed systems throughout the UK, Triple Red will see the project through from the design stages to the completion of a new or refurbished laboratory.

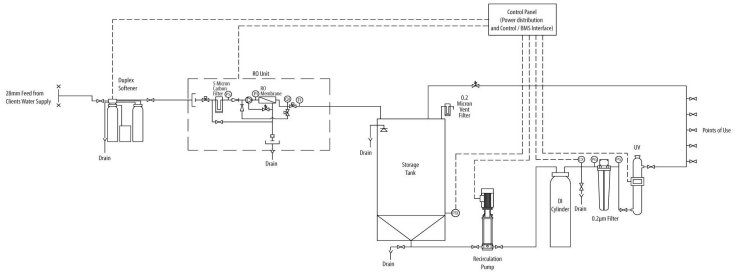
- Experienced consultants to support the planning process
- Turnkey project management
- Computer aided design plans can be integrated with site plans
- Costs calculated to your budget
- Implementation by qualified engineers
- Commissioning and validation
- Ongoing support for all installations



Commonly used pipe materials

	Jointing method	Mechanical strength	Temperature tolerance	Chemical Compatability
ABS Plastic	Solvent weld	Good	Poor	Very Good
PVC Plastic	Solvent weld	Good	Poor	Good
Polypropylene	Heat weld	Poor	Poor	Excellent
PVDF	Heat weld	Poor	Good	Excellent
Stainless steel	Weld	Excellent	Excellent	Excellent

Typical Triple Red ringmain design project



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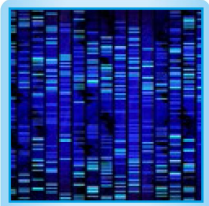
Why choose a JET BIOFIL Water Purification System?

The JET BIOFIL range is designed, built and tested in the UK. From concept to laboratory bench, Triple Red systems meet all the demands of your research.

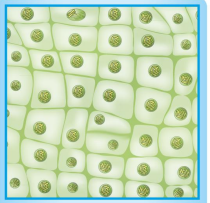
From initial outlay to annual consumable costs, maintenance and electrical consumption, Triple Red will offer the most suitable and economical solutions for all your requirements.

Choosing the right purity for your experiments



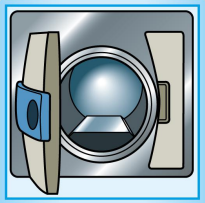
Type 1
Ultrapure -18.2MΩ-cm

Molecular biology
Electrochemistry
Critical cell & tissue culture
(GF)AAS, HPLC, IC, ICPMS, GC, MS
DNA sequencing
Genomics
Proteomics
Immunology
Pharmacology



Type 2
General grade

Buffer & media prep
Glassware washing / rinsing
Sample dilution & reagent prep
Photometry
Protein electrophoresis
Cytology & histology



Type 3
Primary grade

Autoclave feed
Feed to ultrapure systems
Steriliser feed
Hydroponics
Steam generators

No hidden extras

All Triple Red water purification systems fed by potable (tap) water include an integral boost pump, a full set of start up consumables and the necessary brackets to wall mount if required. There are no hidden costs as the systems are up and running out of the box.

Alto and Duo 18.2MΩ-cm systems have an integral dispenser included, with an optional remote dispenser.

Innovation

Prior to periods of "Standby", Puro, Geno and Duo rinse the RO membrane with pure water, ensuring no dissolved salts precipitate and foul the membrane. The added advantage of this process is that upon start up the water from the RO is always of the highest quality.

Attention to detail

All water produced in Alto is passed through two ion exchange cartridge packs separated by the dual wavelength UV light (254nm and 185nm). This ensures that all long chain organics are broken down and then absorbed by the second cartridge pack before being dispensed, keeping the TOC to a minimum.

All reservoirs are available with optional UV light to prevent build up of biofilm. They have smooth crevice free interiors and 100% drainage capability making sanitisation simple.

Energy saving

Duo and Alto 18.2MΩ-cm systems include intelligent variable recirculation pumps. During periods of inactivity energy consumption is decreased reducing electricity bills and environmental impact.

Flexibility in design

All products can be bench or wall mounted. Duo and Alto can also be located under the bench with the remote dispenser delivering water at point of use which saves valuable laboratory space. The choice of reservoirs also gives flexibility, with the 100 litre version providing a pressure feed to glass washers and several points of use including polishers.

Local technical support

Our national team of sales staff can recommend and specify which products are correct for your applications, followed by a comprehensive site survey. The team of locally based engineers can then install, commission and fully train you on your water purification products. Bespoke after-sales solutions including economical annual cartridge packs and service options are available for the lifetime of your equipment.

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