Thermo Scientific Waterbook

innovation.
flexibility.
convenience.

Thermo
SCIENTIFIC

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trusted resource

For more than 130 years, Thermo Scientific pure water systems have been a trusted resource for science and industry.

Pure Water 101

Thermo Scientific Water Purification Products

pure water experts

Our complete line of water purification technologies includes solutions for your most critical and everyday application needs, from electrodeionization to reverse osmosis and distillation.

Thermo Scientific Barnstead pure water systems deliver:

innovation

Our water purification portfolio features advanced ergonomics and technology, including remote dispensing and UV intensity monitoring – that offer users full control with confidence.

flexibility

Laboratory environments often have limited bench space. Our portfolio offers numerous mounting options, small footprints and flexible dispensing options to provide you the luxury of designing a configuration that best suits your lab. Many water systems can be easily upgraded to allow for additional capacity.

convenience

Our Thermo Scientific H_20 Select Kit Analysis program and complete all-in-one box ordering gives you the confidence to select the right solution. Receive a complete water system using one part number and have the components you need to easily maintain your new water purification system.

innovations
that deliver accuracy

With innovative water monitoring technology, Thermo Scientific water purification systems eliminate expense and lost time which may occur with contaminated lab water.

Advanced feed water monitoring
Alerts the user to fluctuations in the feed water quality. Poor feed water will reduce cartridge life.

TOC measurements with UV intensity monitoring
Continuously monitoring and recording TOC measurements in real-time, this technology ensures ultrapure water that meets or exceeds even the most stringent requirements for sensitive applications. A photo sensor continually checks the intensity of the UV lamp. A drop in measured UV radiation can result in an incorrect TOC measurement.

EDI systems feature tank recirculation to maintain high quality pure water even during long periods of inactivity
Automatic recirculation of the water in the tank across a special polisher actively protects against bacteria growth even during long periods of inactivity.

flexibility
system design

Mounting flexibility
Installation options include under the cabinet, on the wall, on the bench, or free-standing units with wheels for added mobility.

Full system control at the Thermo Scientific xCAD remote dispenser
Eliminate the hassle of going back to the primary system to adjust parameters.

Upgradeable units
Growing the lab or planning for changing needs? Many of our systems can be upgraded to accommodate greater capacity.

Dual water quality
Need more than one type of water? Many of the systems produce two types of water from just one system.

convenience
with customized system selection

Based on the results of a FREE Thermo Scientific H_2O Select Analysis, we will recommend the best water system for your application based on your feed water quality, laboratory applications, daily volume requirements and budget. We do all the thinking for you.

How It Works:

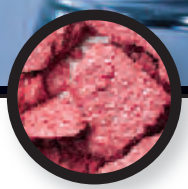
1. Contact your local sales representative for a free H_2O Select Analysis Kit.
2. Fill the sample bottle with your anticipated feed water.
3. Answer the short questionnaire pertaining to your water requirements, applications and budget.
4. Place the completed application and water sample bottle in the return box. Add postage and mail to the Thermo Scientific Barnstead Water Lab (return label included in box).

All-in-One-Box Ordering
Have confidence in knowing that there are no surprises with added post sale costs. Everything you need ships under one part number!

Easy Self Maintenance
The Aquastop quick connections make changing your cartridges quick and simple.

Common Water Impurities

Don't let impurities contaminate your sensitive experiments. Thermo Scientific Barnstead water purification systems are engineered to remove impurities that threaten your research so you can focus on what's important – your next discovery.



Suspended Particles

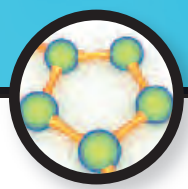
Sand, silt, clay and other suspended particles cause water to be turbid. These suspended particles can interfere with instrument operation, plug valves and other narrow flow paths, and foul reverse osmosis membranes. They typically range from 1 – 10 µm in size.

Colloids

Colloidal particles typically have a slightly net negative charge, range in size from 0.01 – 1.0 µm, and can be either organic or inorganic. Unlike suspended particles, colloids do not settle out by gravity, but remain suspended in the liquid that carries them. Colloids clog filters, interfere with instrument operation, foul reverse osmosis membranes and can bypass ion exchange resins, resulting in lower resistivity in deionized water systems.

Inorganic Ions

Impurities such as silicates, chlorides, fluorides, bicarbonates, sulfates, phosphates, nitrates and ferrous compounds are present as cations (positively charge ions) and anions (negatively charged ions). Water with a high concentration of ions will conduct electricity readily and have high conductivity and low resistivity, as conductivity and resistivity are inversely related. Ions will 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 the cartridge life in deionized water systems.



Dissolved Organics

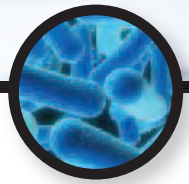
Organic solids are present from plant and animal decay and from human activity. They may include proteins, alcohols, chloramines and residues of pesticides, herbicides and detergents. They foul ion exchange resins, interfere with organic analyses including HPLC, gas chromatography and fluoroscopy. They will also hinder electrophoresis, tissue and cell culture.

Speaking the Language of Pure Water

Application and Interest Areas	Contaminants to Avoid in Your PURE Water						
	Particulates	Colloids	Ions	Dissolved gasses	Organics	Nucleases	Pyrogens
General Lab Purpose							
Autoclave	•	•	•				
Humidification	•	•	•				
Glassware washing/rinsing	•	•	•				
Media preparation	•	•	•				
Analytical							
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 Sciences							
Genomics (ex. PCR, mutagenesis)	•	•	•	•	•	•	•
Proteomics (ex. crystallography, electrophoresis)	•	•	•	•	•	•	•
Immunology (ex. monoclonal antibody production, blots)	•	•	•	•	•	•	•
Pharmacology	•	•	•	•	•	•	•
Cell and tissue culture	•	•	•	•	•	•	•
Drug discovery	•	•	•	•	•	•	•

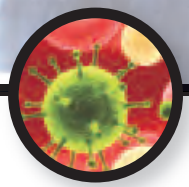
Dissolved Gases

Water naturally contains dissolved gasses such as carbon dioxide, nitrogen and oxygen. Carbon dioxide dissolves in water to form weakly acidic carbonic acid (H_2CO_3), which can alter the pH of the water. Additionally, oxygen, the most common non-ionized gas, may cause corrosion of metal surfaces.



Microorganisms

Bacteria, fungi and algae are found in all natural water sources. Chlorination eliminates harmful bacteria, but tap water still contains live microorganisms which interfere with sterile applications, such as cell and tissue culture.



Pyrogens and Viruses

Pyrogens or bacterial endotoxins are lipopolysaccaride molecules incorporated in the cell membrane of gram negative bacteria. Viruses are considered to be non-living nucleic acids. Both can adversely affect laboratory experiments often hindering cell and tissue growth in culture.

Nucleases

RNase and DNase are naturally occurring enzymes that are instrumental in regulating bodily functions. As important as these enzymes are to the life process, they can be devastating to nucleic acid experiments. If these contaminants are present in the pure water used, the ability to amplify DNA molecules will be severely limited. Likewise, experiments utilizing RNA can be ruined.

Thermo Scientific Barnstead Water Purification Technologies

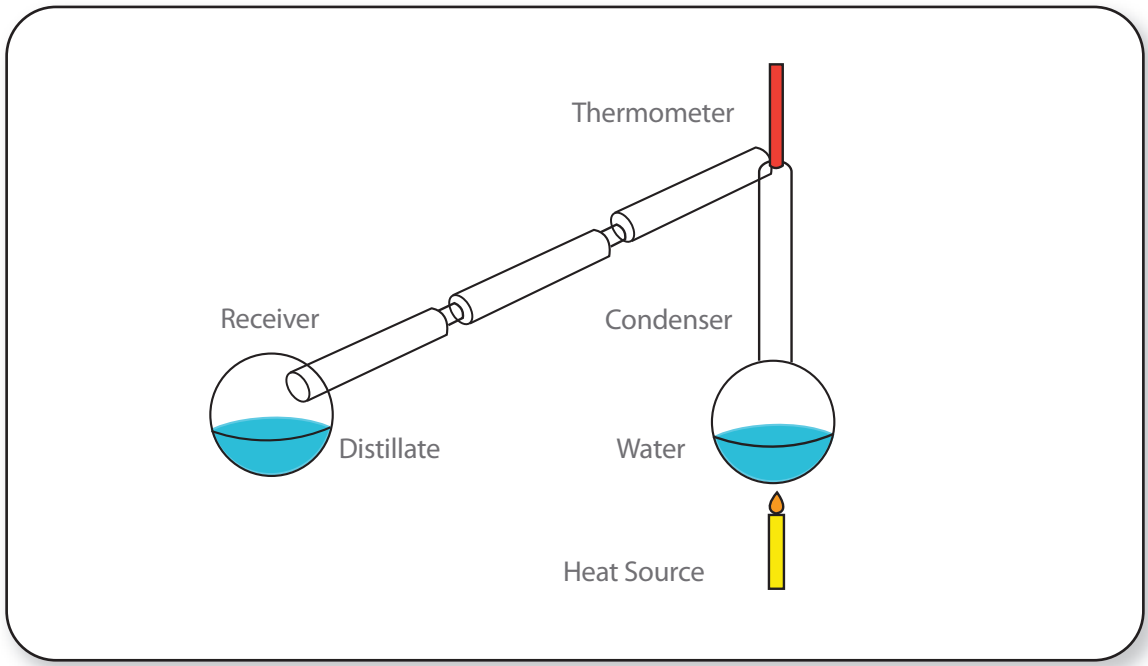
To make pure and ultrapure water, the impurities discussed on the previous page must be efficiently and effectively removed. Barnstead water purification systems employ multiple technologies, some synergistically, to remove impurities and give you consistently PURE water.

Water purification is a step-by-step process often requiring a combination of technologies, each of which varies in the ability to remove specific contaminants.

The table below illustrates which impurities are removed by each technology.

	Distillation	Reverse Osmosis	Deioization	Electro-deionization	Filtration	Ultrafiltration (UF)	Adsorption	Ultraviolet (UV) Oxidation	Combination UV/UF
Inorganic ions	Excellent	Good	Excellent	Excellent	Poor	Poor	Poor	Poor	Poor
Dissolved gasses	Good	Poor	Excellent	Excellent	Poor	Poor	Good	Poor	Poor
Organics	Good	Good	Poor	Poor	Poor	Poor	Excellent	Excellent	Excellent
Particles	Excellent	Excellent	Poor	Poor	Excellent	Excellent	Poor	Poor	Excellent
Bacteria	Excellent	Excellent	Poor	Poor	Excellent	Excellent	Poor	Excellent	Excellent
Pyrogens	Excellent	Excellent	Poor	Poor	Poor	Excellent	Good	Poor	Excellent
Nucleases	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Excellent

Excellent
Good
Poor



A basic distillation diagram.

Distillation

Distillation has the broadest removal capabilities of any single form of water purification.

Water is boiled and undergoes phase changes during the distillation process, changing from liquid to vapor and back to liquid. It is the change from liquid to vapor that separates the water (in various degrees) from many dissolved impurities, such as ions, organic contaminants with low boiling points < 100°C , bacteria, pyrogens and particulates. Distillation can not be used on its own to remove inorganic ions, ionized gases, organics with boiling points higher than 100°C , or dissolved non-ionized gases.

Benefits

- Offers the broadest removal capabilities of any single form of water purification
- Requires no consumables

Limitations

- Requires periodic maintenance and manual cleaning of system to maintain water purity
- Requires water for cooling

Systems that utilize this technology

- Thermo Scientific Barnstead Classic Stills and Mega-Pure Stills

Classic Stills

Thermo Scientific Barnstead Water Purification Technologies

Filtration

Barnstead water purification products offer both depth (nominal) and membrane (absolute) filters.

Depth filters are most commonly used as a pretreatment and are manufactured by winding fibers around hollow and slotted tubes. As water passes through the wound fiber matrix toward the center tube particles are retained on the fibers. Traditionally this type of filter removes most of the impurities above the rated pore size of the filter. Most often these filters are rated to remove larger particles (> 1 µm) to protect the technologies that follow.

Membrane filters are often termed absolute, meaning that they are designed to remove all particles above the rated pore size of the filter. These filters use a membrane, (in flat sheet or hollow fiber form), and are most often used at the end of a system to remove bacteria or other particles that are not removed by the preceding technologies. Traditionally membrane filters in laboratory water systems have a rated pore size below 0.45 µm, most often 0.2 µm.

Benefits

- Efficient operation
- Maintenance is change out only

Limitations

- Clogging
- Will not remove organics, nucleases, pyrogens, dissolved gases or dissolved inorganics

Systems that utilize this technology

- Thermo Scientific Barnstead Genpure, MicroPure, E-Pure, LabTower EDI, Smart2Pure, Pacific TII, LabTower TII water purification systems

Ultrafiltration (UF)

In water purification, ultrafiltration is used to remove pyrogens (bacterial endotoxins) and nucleases, which is critical for tissue culture, cell culture and media preparation.

Ultrafilters use size exclusion to remove particles and macromolecules. By design, ultrafilters operate similar to reverse osmosis membranes; particles are captured on the surface of the membranes and are flushed from the membrane via a reject stream. Ultrafilters are used at the end of systems ensuring the near total removal of macromolecular impurities like pyrogens, nucleases and particulates.

Benefits

- Effectively removes molecules (pyrogens, nucleases, microorganisms, particulates) above their rated size
- Long life
- Helps to remove pyrogens and nucleases

Limitations

- Will not remove dissolved inorganics, dissolved gases, and organics

Systems that utilize this technology

- Barnstead GenPure, MicroPure, and Smart2Pure water purification systems

Reverse Osmosis

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

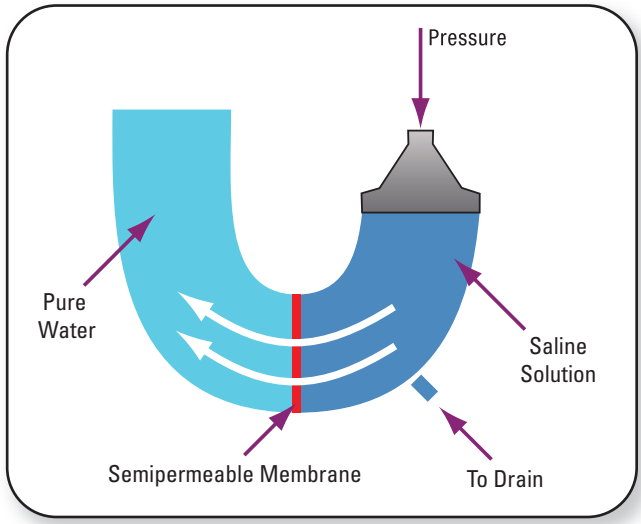
To understand reverse osmosis you must first understand osmosis. During natural osmosis, water flows from a less concentrated solution through a semipermeable membrane to a more concentrated solution until concentration and pressure on both sides of the membrane are equal.

In water purification systems, external pressure is applied to the more concentrated (feed water) 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 sent to drain and the water that passes through the membrane as product water is, for the most part, free of impurities.

A reverse osmosis membrane has a thin microporous surface that rejects impurities, but allows water to pass through. The membrane rejects bacteria, pyrogens and 90-95% of inorganic solids. Polyvalent ions are rejected easier than monovalent ions. Organic solids with a molecular weight greater than 200 Daltons are rejected by the membrane but dissolved gases are not as effectively removed.

Reverse osmosis is a percent rejection technology. The purity of the product water depends on the purity of the feed water. The product is typically 95-99% higher in purity than that of the feed water.

Due to the restrictive nature of the membrane, the flow rate is much slower than other purification technologies. This slow flow rate means that all RO systems require a storage reservoir to provide a constant supply of RO water ready when you need it.



Process of reverse osmosis

Pacific RO and Lab Tower RO water systems

Benefits

- To varying degrees, removes most types of contaminants, bacteria, pyrogens and 90-95% of inorganic ions
- Requires minimal maintenance

Limitations

- Limited flow rates through the membrane require intermediate storage devices to meet user demand
- Does not remove dissolved gases
- Requires pretreatment to avoid damaging the membrane
  - > Oxidation – Chlorine
  - > Scaling – $CaCO_3$
  - > Fouling – Organics and Colloids
  - > Piercing – Hard particles

Systems that utilize this technology

- Thermo Scientific Barnstead Smart2Pure, LabTower EDI, Pacific TII, LabTower TII, Pacific RO, LabTower RO water purification systems

Thermo Scientific Barnstead Water Purification Technologies

Deionization

Deionization is also referred to as demineralization or ion exchange.

The process removes ions from feed water with the use of synthetic resins. These resins are chemically altered to have an affinity for dissolved inorganic ions and are divided into two classifications: cation removal resins and anion removal resins.

Cations have a positive charge and include sodium (Na^+), calcium (Ca^{+2}) and magnesium (Mg^{+2}). Anions have a negative charge and include chloride (Cl^-), sulfates (SO_4^{-2}), and bicarbonates (HCO^{-3}). The ions are removed from the water through a series of chemical reactions. These reactions take place as the water passes through the ion exchange resin beds. Cation resin contains hydrogen (H^+) ions on the surface which are exchanged for positively charged ions. Anion resin contains hydroxide (OH^-) ions on its exchange sites which are exchanged for negatively charged ions. The final product of these two exchanges is H^+ and OH^-, which combine to form water (H_2O).

Deionization is the only technology which produces the resistivity requirement for Type 1 reagent grade water. In laboratory water systems, cation and anion resins are most often mixed together allowing them to achieve maximum ionic purity.

Two-bed deionization – The cation and anion resin are in separate halves of a cartridge. In general, this method is less effective deionizing water as compared to the mixed-bed deionization, however, it is more tolerant of other types of impurities.

Mixed-bed deionization – We use semi-conductor grade mixed bed deionization resin to achieve maximum resistivity and low TOC. Mixing the cation and anion resin drives the deionization to completion, making it more efficient and more effective at the removal of ions.

Benefits

- Removes dissolved inorganics ions very effectively
- Produces product water with a resistivity above 18 MΩ.cm

Limitations

- Finite capacity – once all ion binding sites are occupied ions are no longer retained and the cartridge must be replaced
- Does not remove organics, particles, pyrogens or bacteria

Systems that utilize this technology

- Thermo Scientific Barnstead GenPure, MicroPure, E-Pure, LabTower EDI, Smart2Pure, Pacific TII, LabTower TII, and the Bantam water purification systems, Hose Nipple, and B-Pure cartridges

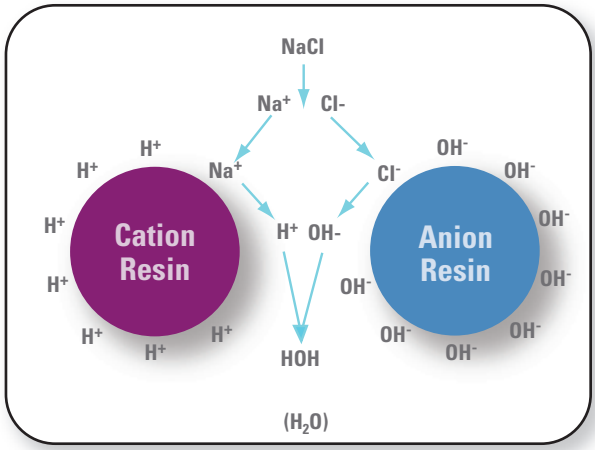
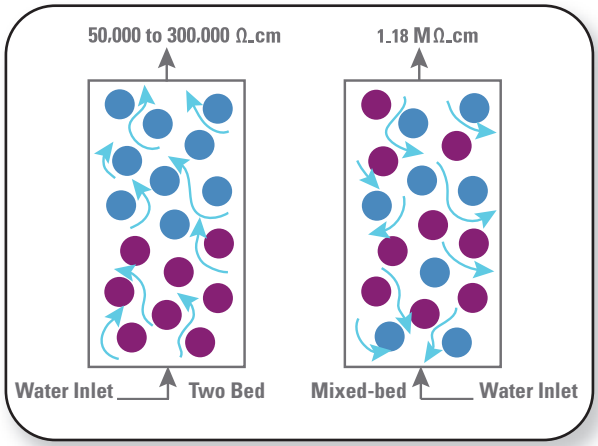
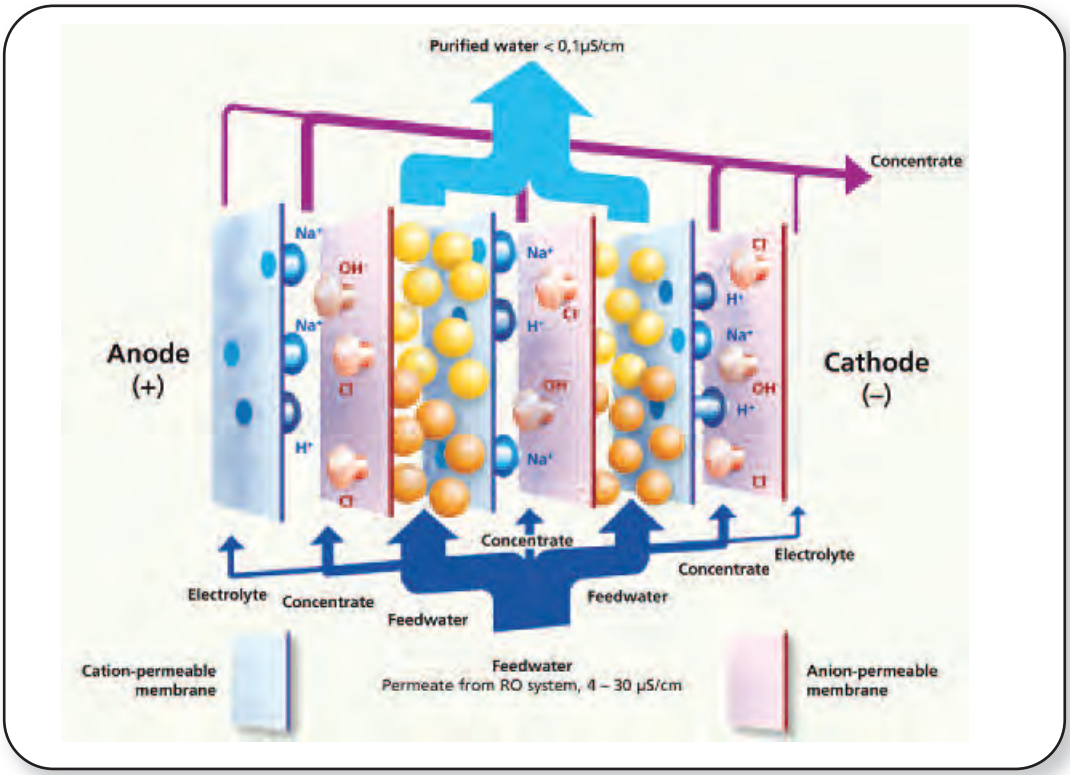


Diagram showing how cations and anions are exchanged on the resin



Two bed resin is shown on the left and mixed bed resin in on the right.



Process of electrodeionization

Electrodeionization (EDI)

In contrast to conventional ion exchange in which resins are exhausted and must either be thrown away or chemically regenerated, EDI utilizes an electric current for continual resin regeneration.

How EDI works

Several layers of ion selective membranes are positioned between an anode and a cathode. Layered ion exchange resin beds and concentrate chambers are alternately positioned between them.

On applying an electric voltage, water (H_20) is split into H+ and OH– in the cell. The H+ and Na+ cations can migrate through the cation permeable membranes, anions through the anion permeable membranes.

The ions migrate in the direction of the applied voltage, i.e. anions to the positive pole (anode), cations to the negative pole (cathode). The water ions H+ and OH– that migrate through an ion exchange chamber displace salt ions retained by the ion exchanger resins and so continually regenerate the resins. The salt ions migrate through the appropriate ion selective membranes into the concentrate chambers and are flushed out of them by water. As all concentration chambers are flushed through one after the other, excess H+ and OH– ions can again combine to form H_20.

Benefits

- Effectively removes ions
- Continuously regenerates automatically

Limitations

- Limited capacity – feed water must be of high quality
- Does not remove organics, particles, pyrogens or bacteria

Systems that utilize this technology

- Barnstead LabTower EDI water purification system

Thermo Scientific Barnstead Water Purification Technologies

Adsorption

Adsorption uses high surface area activated carbon to remove organics and chlorine from feed water.

It is used as a first or second step in most water purification systems and may be used as a final step, in combination with ion exchange resins, to achieve ultra low Total Organic Carbon (TOC). Organics and chlorine adhere to the surface of the activated carbon and remain attached to the carbon.

Mixed-bed deionization and adsorption – We use a combination semiconductor grade mixed-bed deionization resins and synthetic carbon in a single cartridge to achieve maximum resistivity and low Total Organic Carbon (TOC).

Benefits

- Removes dissolved organics and chlorine
- Long life

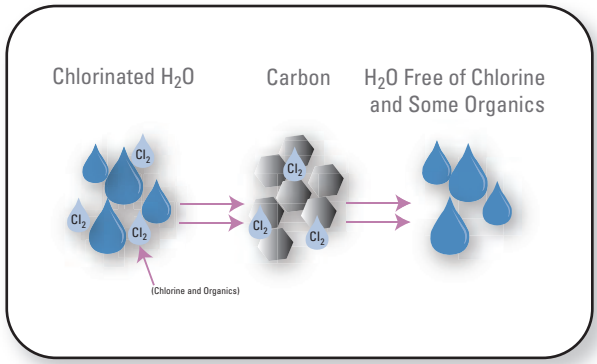
Limitations

- Will not remove ions and particulates

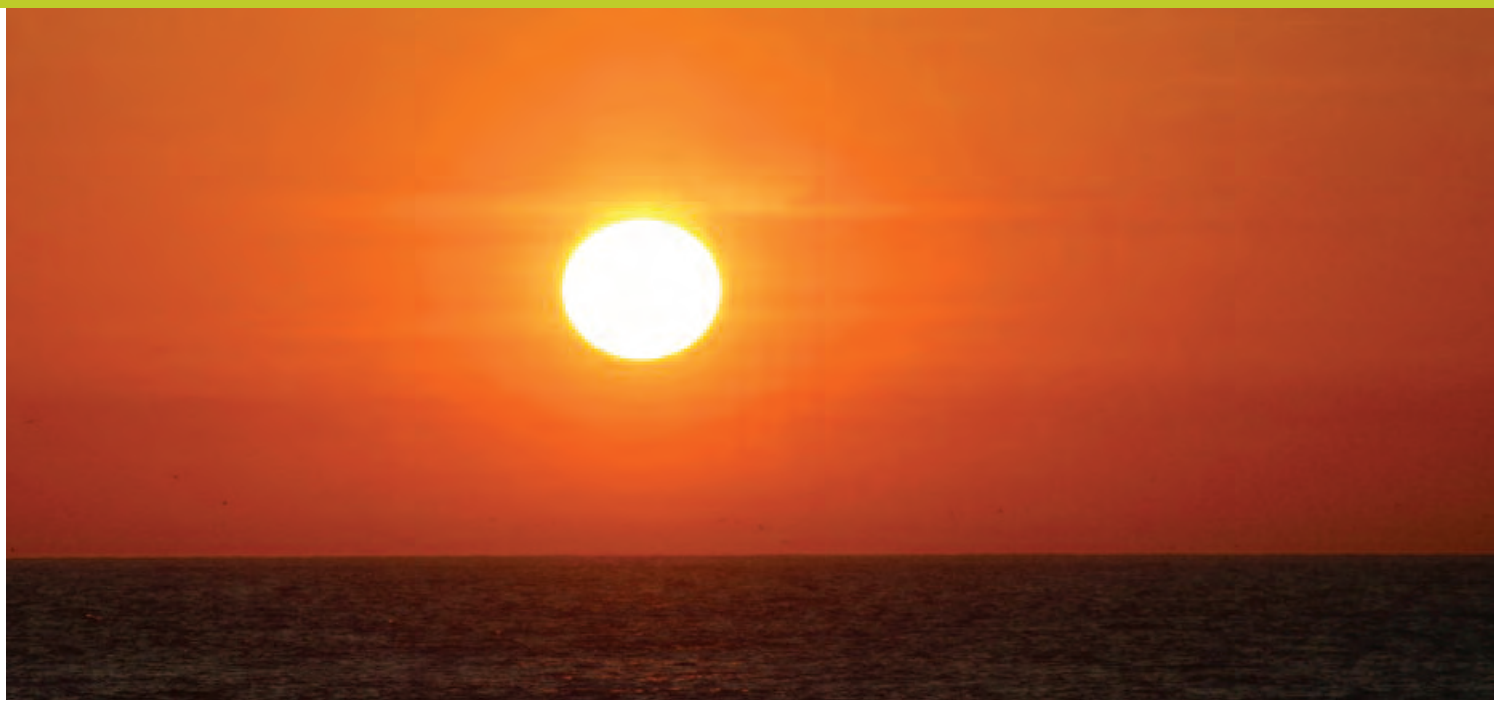
Systems that utilize this technology

- Barnstead GenPure, MicroPure, E-Pure, LabTower EDI, Smart2Pure, Pacific TII, LabTower TII, and the Bantam water purification systems, Hose Nipple, and B-Pure cartridges

Selection of high quality resins used in our cartridges.



Feed water with organic and chlorine contaminants come into contact with the activated carbon in the cartridge. The impurities adhere to the surface of the carbon, allowing purified water to be produced.



Ultraviolet (UV) Oxidation

Photochemical oxidation with ultraviolet light eliminates trace organics and inactivates microorganisms in feed water.

The UV lamps in our pure water systems generate light at two wavelengths, 185 and 254 nm. The light generated at 254 nm has the greatest anti-bacterial action, reacting with their DNA, resulting in inactivation. The combination 185/254 nm light oxidizes organic compounds, allowing for total oxidizable carbon levels of less than 5 ppb.

Benefits

- Effective method to prevent bacterial contamination
- Oxidizes organics to produce pure water with low TOC levels

Limitations

- Will not remove ions, colloids and particulates

Systems that utilize this technology

- Barnstead GenPure, MicroPure, LabTower EDI, Smart2Pure, Pacific TII, LabTower TII water purification systems

Combination Ultraviolet Oxidation and Ultrafiltration (UV/UF)

The use of ultraviolet oxidation and ultrafiltration technologies in conjunction with adsorption and deionization in the same system produces water virtually free of all impurities. These technologies have demonstrated the ability to remove nucleases such as RNase and DNase as well as pyrogens when challenged with known concentrations of the material. The Type 1 systems with UV/UF options produce reagent grade water with resistivity up to 18.2 MΩ.cm, TOC of 1-5 ppb, pyrogens <0.001 EU/ml and no detectable RNase, DNase or DNA.

Benefits

- Removes nucleases and DNA
- Produces water with low TOC and pyrogen levels

Limitations

- Must be used in the same system

Systems that utilize this technology

- Barnstead GenPure, MicroPure, and Smart2Pure water purification systems

International Water Standards

What does Type 1 water mean?

Reagent water has quantitative specifications that describe the level of purity for the water. These specifications have been described by ASTM (American Society for Testing and Materials) D1193, ISO (International Organization for Standardization) 3696 and CLSI®-CLRW. (Clinical and Laboratory Standards Institute-Clinical Laboratory Reagent Water). The most commonly used standards, ASTM D1193-6, are summarized in the tables below.

ASTM Standards for Reagent Water			
Measurement (unit)	**Type I**	**Type II**	**Type III**
Resistivity (MΩ.cm) at 25°C	>18	> 1	> 4
Total organic carbon (ppb)	< 50	< 50	< 200
Sodium (ppb)	< 1	< 5	< 10
Chloride (ppb)	< 1	< 5	< 10
Total silica (ppb)	< 3	< 3	< 500

The ASTM standards are further subdivided into A, B and C.
These standards can be used in conjunction with the Type of water.

ASTM Standards for Reagent Water			
Measurement (unit)	**A**	**B**	**C**
Heterotrophic bacteria count (CFU/ml)	10/1000	10/100	1000/10
Endotoxin (units per ml)	0.03	0.25	n/a

Here are some additional definitions of the parameters they use to indicate the water's purity.

Resistivity – the tendency of water without ions to resist conducting electricity.

The unit of measure is megohm-centimeter (MΩ.cm), often shortened to MΩ or "meg". It is generally used for high purity water. The theoretical maximum is 18.2 MΩ.cm at 25°C . The higher the ionic content – the lower the resistivity and the lower the ionic content – the higher the resistivity (high resistivity is good!). In ultrapure water systems this value is determined using an in-line meter. Conductivity and resistivity measurements are inversely related to each other.

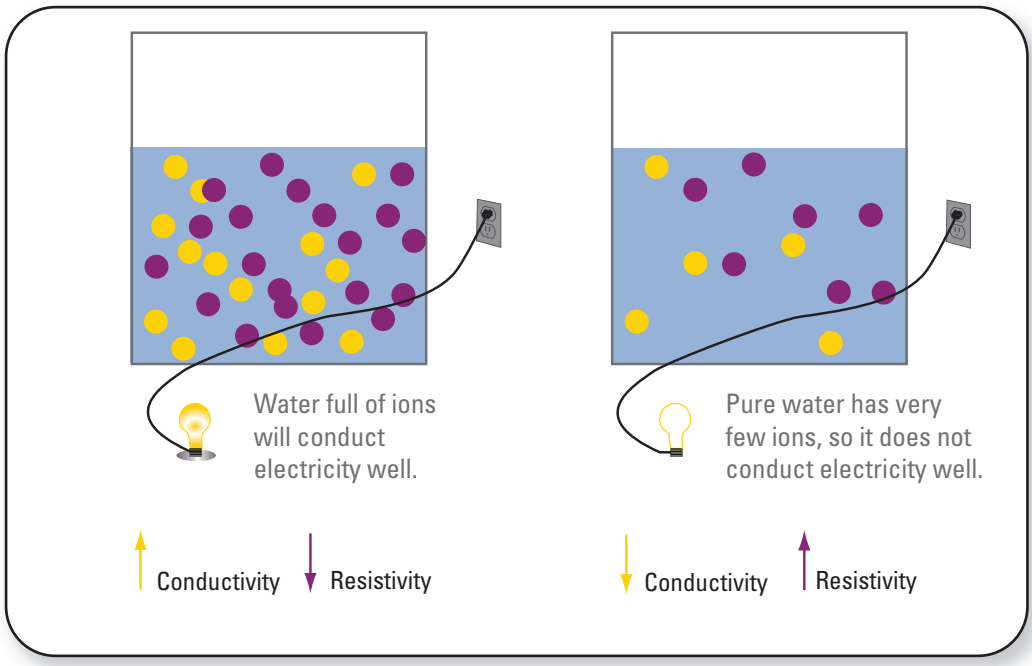
Conductivity – the tendency of water that contains ions to conduct electricity.

The unit of measure is microsiemens/centimeter (µS/cm) or microhm/cm. The measurement is used to measure feed water or lower quality treated water. The more ions present in the water, the higher the conductivity. This is measured by a conductivity meter.

Total Organic Carbon (TOC) – a measure of the organic contaminants found in water.

The unit of measure is parts per million (ppm) or parts per billion (ppb). Feed water can be in the 2-5 ppm range and the best high purity water should be in the 1-5 ppb range. Measurement of TOC is done using an in-line system.

Advanced Technology Used to Monitor Purity



Conductivity and Resistivity

Electrical conductance or resistance is measured by two in-line electrodes. Electrical current moves through water using ionic molecules as stepping stones. The fewer stepping stones, the more difficult the passage of electricity. This causes less electrical conductance and more electrical resistance. The temperature of the water also affects the conductivity/resistivity so readings are usually normalized to 25°C via temperature compensation.

We use resistivity to measure ion concentration in pure water. We understand water and realize that in order to achieve Type 1 water, meeting the most stringent requirements of our customers, multiple technologies must be used.

Building Your Water System

What Type of Water Do You Need?

When designing your water system, we suggest you take time to evaluate the applications and interest areas of the lab now and in the future. Take a look at the table below to determine what type(s) of water you need.

	Type of Water			
Application and interest areas	**Ultrapure Type 1**	**Pure Type 2**	**RO**	**Cartridge and filter systems**
General Lab Purpose				
Autoclave		•	•	•
Humidification		•	•	•
Glassware washing/rinsing		•	•	•
General lab equipment (water baths, incubators, etc.)		•	•	•
Feed water to Type 1 systems		•		
Media prep		•		
Buffer prep		•		
Chemical and biochemical reagent prep		•		
Analytical				
High performance liquid chromatography (HPLC)	•			
Gas chromatography (GC)	•			
Ion chromatography (IC)	•			
Inductively coupled plasma spectroscopy (ICP)	•			
Mass spectroscopy (MS)	•			
Atomic absorption (AA)	•			
Total organic carbon (TOC)	•			
Life Sciences				
Genomics (ex. PCR, mutagenesis)	•			
Proteomics (ex. crystallography, electrophoresis)	•			
Immunology (ex. monoclonal antibody production, blots)	•			
Pharmacology	•			
Cell and tissue culture	•			
Drug discovery	•			
Molecular biology	•			
Microbiology	•			

Building Your Water System

Barnstead GenPure
water purification system

What Thermo Scientific Barnstead water systems provide

Our water systems are engineered to be used independently or in conjunction with our other water systems for more flexibility. Below is a summary of our product lines for each water type.

Barnstead Smart2Pure
water purification system

Ultrapure (Type 1) Water

This grade of water is required for your most sensitive and critical laboratory applications. Type 1 water can be made pyrogen-, nuclease-, bacteria- and particulate-free. It has the highest purity, but is also the most expensive to generate.

If your applications require different types of water, let our experts assist with designing a water purification system specific to your needs.

The below systems provide you with the Type 1 water you need for your applications.

- Thermo Scientific Barnstead LabTower EDI water purification system
- Thermo Scientific Barnstead Smart2Pure water purification system
- Thermo Scientific Barnstead GenPure water purification system
- Thermo Scientific Barnstead MicroPure water purification system
- Thermo Scientific Barnstead E-Pure water purification system

The ultrapure systems differ in their features and daily volume output, so please see the Type 1 Section for complete information.

Pure (Type 2) Water

Type 2 water is most widely used in general laboratory applications, such as reagent preparation and glassware rinsing. It is also commonly used to feed our Type 1 systems to create a comprehensive water system.

The below systems provide you with the Type 2 water you need for your applications.

- Thermo Scientific Barnstead Pacific TII water purification system
- Thermo Scientific Barnstead LabTower TII water purification system
- Thermo Scientific Barnstead Mega-Pure Glass Stills water purification system
- Thermo Scientific Barnstead Classic Stills water purification system

Barnstead GenPure xCAD water purification system

Reverse Osmosis (RO) Water

RO is a percent removal technology, thus the purity of the product water is directly dependent on the quality of the feed water. Accordingly, it can not be generally classified as a specific “type” of water.

RO water is recommended for use in general laboratory equipment such as the sterilizer, dishwasher and water baths.

The below systems provide you with the RO water you need for your applications.

- Thermo Scientific Barnstead Pacific RO water systems
- Thermo Scientific Barnstead LabTower RO water systems

Cartridge and Filter Systems

Cartridges are a great option for laboratories either needing point of use polishing of pretreated water or single state treatment of tap water.

The below cartridge and filter systems are available for your specific application needs.

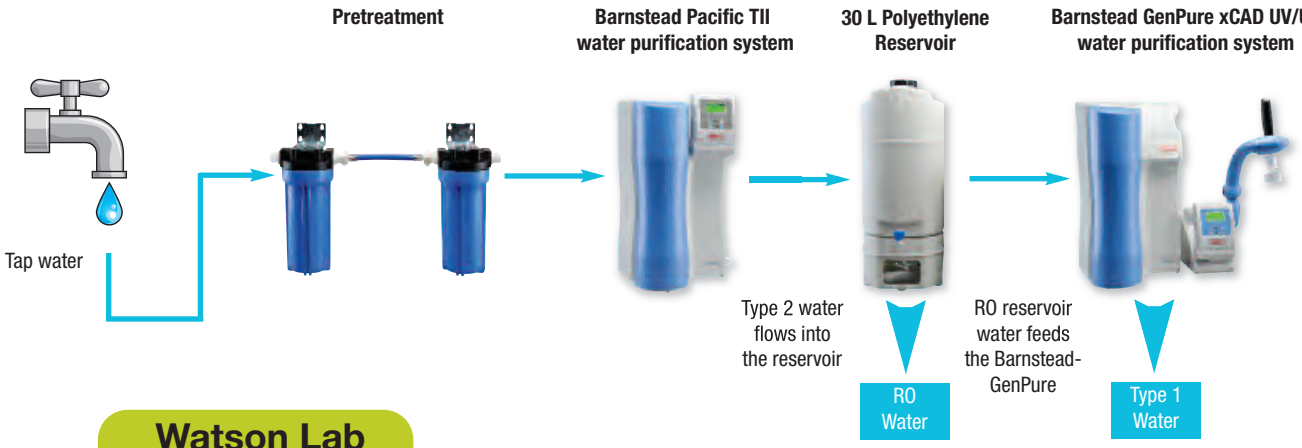
- Thermo Scientific Barnstead B-Pure water system
- Thermo Scientific Barnstead Hose nipple cartridges
- Thermo Scientific Barnstead Bantam deionizer
- Thermo Scientific Barnstead 1/2 Size B-Pure filters

Barnstead Hose Nipple Cartridge and Holder

Barnstead B-Pure Cartridge Holder

Barnstead Bantam Deionizer

Building Your Water System



Watson Lab

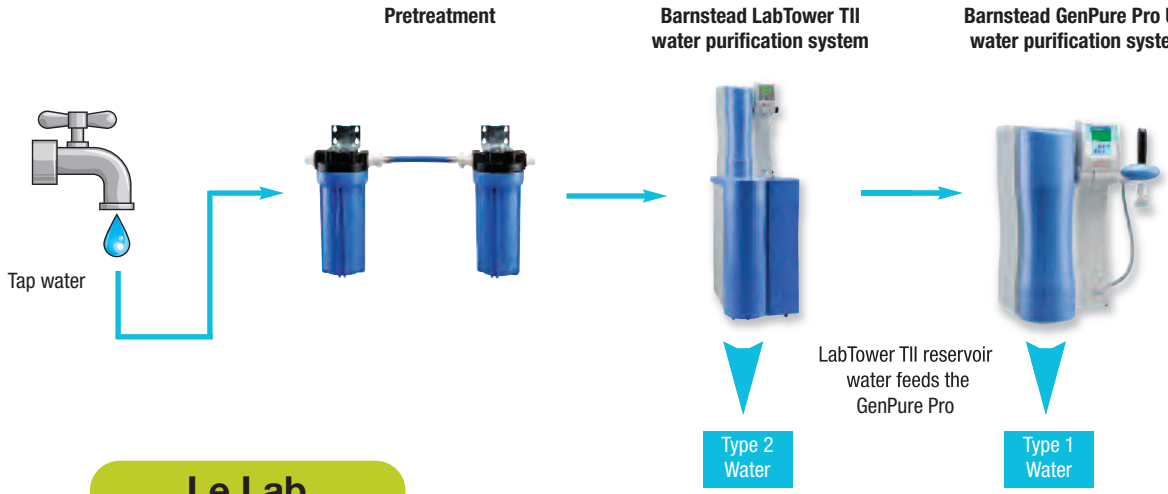
Applications in the Lab: **Cell and Tissue Culture, PCR, Media Prep and HPLC**

Water Type(s) Needed: **Type 1 (low organics, pyrogens and nucleases) and Type 2 water**

Solution: **Barnstead Pacific TII, 30 L reservoir, and Barnstead GenPure xCAD UV/UF**

The Watson Lab is a traditional cell and molecular biology lab, so they needed a system that is capable of producing Type 1 water free of nucleases, pyrogens and bacteria. Our Barnstead GenPure xCAD UV/UF system is perfect for their ultrapure water needs.

Our Barnstead Pacific TII, which will produce water for the general lab uses, will also serve as feed water for the GenPure xCAD UV/UF.



Le Lab

Applications in the Lab: **ICP/MS, GC/MS, HPLC, Chemical and Buffer Prep**

Water Type(s) Needed: **Type 1 (with low organics) and Type 2 water**

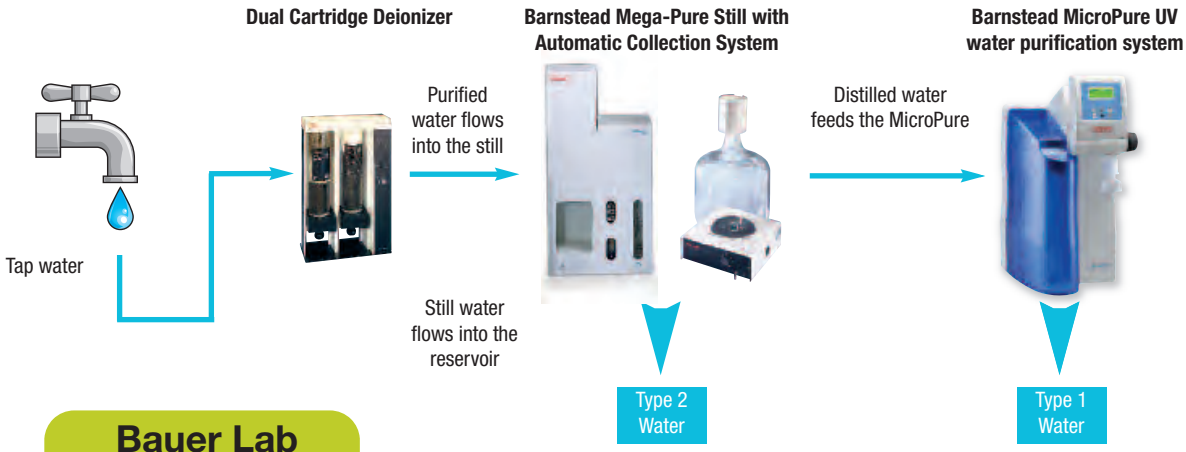
Solution: **Barnstead LabTower TII and the Barnstead GenPure Pro UV**

The Le Lab performs analytical experiments on a daily basis. They would like to make their own buffers and reagents, so we suggested a configuration that would give the lab both Type 1 and Type 2 water.

Our Barnstead LabTower TII converts tap water into Type 2 water, which is stored in the 100 L integrated reservoir. Water can be drawn from the reservoir or from our Barnstead GenPure Pro UV (which has a 0.2 µm on it to ensure bacteria-free water). The reservoir feeds our Barnstead GenPure Pro system, which will deliver ultrapure (Type 1) water.

Mix and Match for Greater Flexibility

Our water systems are designed to mix and match, as many laboratories have the need for multiple types of water. Here are some examples of our systems built for use in labs with diverse interest areas.



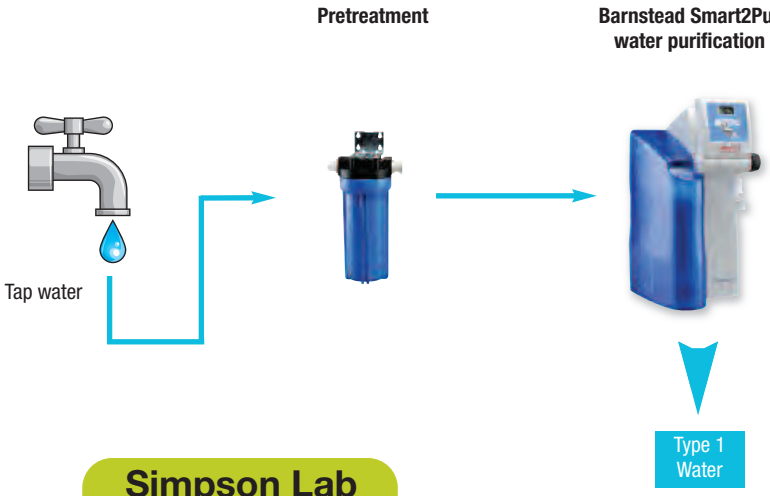
Bauer Lab

Applications in the Lab: **General lab use, rinsing of glass and plastic ware, media prep, HPLC**

Water Type(s) Needed: **Type 1 and Type 2 (distilled)**

Solution: **Barnstead Mega-Pure Still with Automatic Collection System and a Barnstead MicroPure UV**

The Bauer Lab needed Type 1 water for their HPLC and analytical experiments (estimated to be less than 15 L a day) and distilled water for general reagent preparation and glassware rinsing, thus our Barnstead MicroPure UV and a Barnstead Mega-Pure Still with Automatic Collection System were recommended. A dual cartridge deionizer was also suggested as pretreatment to the still as the lab's tap water was especially hard.



Simpson Lab

Applications in the Lab: **Protein purification and PCR**

Water Type(s) Needed: **Type 1**

Solution: **Barnstead Smart2Pure UV/UF**

Biochemical techniques such as protein purification and PCR are important for the Simpson Lab, but they have serious space constraints. Our Barnstead Smart2Pure UV/UF is the all-in-one solution for tap to Type 1 water. It converts tap water to ultrapure water and has a small foot print. The UV/UF option will provide the lab with nuclease free water, perfect for their sensitive applications.

TYPE 1

ultrapure
water purification systems

What sets Thermo Scientific Barnstead water purification systems apart?

Our Barnstead water purification portfolio includes a complete line of Type 1 systems to meet all your ultrapure water needs. Why so many options? For you to have a tailored system specifically for your needs. No need to pay for technologies that you won't use!

innovation

UV and feed water monitoring for maximum efficiency

EDI systems with reservoir recirculation maintains purity even between use

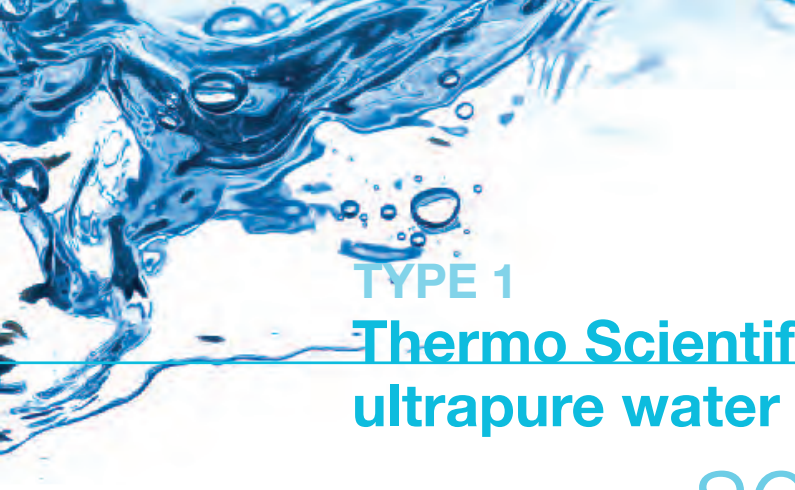
convenience

Quick-change cartridge design simplifies self maintenance

All required parts and accessories ship under one part number

flexibility

Full system control at the Thermo Scientific Barnstead GenPure xCAD remote dispenser



TYPE 1

Thermo Scientific Barnstead ultrapure water purification system selector guide

Select the water system that best fits your requirements		Benefits
Applications	Ultra-low organic levels, <5 ppb HPLC, TOC, GC/MS, ICP, ICP-MS	UV oxidation is necessary for the removal of organics in the feed water, reduces organic levels to >5 ppb, and protects against microorganisms
	Cell culture, monoclonal antibody production, electrophoresis	Ultrafiltration removes pyrogens from the feed water
	Nuclease and pyrogen-free applications such as PCR, 2-D electrophoresis, cell culture, blotting	UV/UF is the most common combination of technologies – used to reduce organics and remove pyrogens and nucleases
Technology	UV monitoring	Photosensor continually checks the intensity of the UV lamp. A decrease could result in an incorrect TOC measurement result.
	Feed water monitoring	Feed water monitoring alerts you to fluctuations in feed water quality
	Total Organic Carbon (TOC) monitor	Real-time monitor of the amount of organic materials in the product water shown on the display
Features	Volumetric Dispensing	Dispense at the push of a button. Control from 0.01-65 liters with an accurancy of <0.5%
	GenPure xCAD remote dispenser	Allows for full control of the system at the GenPure xCAD remote dispenser
	Under-the-bench mounting	Ideal when bench space is tight. System sits under the bench and out of sight.
	RS-232 data printing at pre-programmed intervals	Satisfies GLP guidelines, data available inprint
Capacity	Optimal amount of water to use daily to sustain reasonable cartridge life	Expands with your laboratory and application needs

TAP WATER FEED REQUIRED

PRETREATED WATER FEED REQUIRED







GenPure xCAD	GenPure Pro	GenPure	MicroPure	E-Pure	LabTower EDI	Smart2Pure
Full control at the GenPure xCAD remote dispenser	Flexible dispensing	Economical Type 1 water	Smaller capacity for optimal value	Simple design, great value	Produces Type 1 and 2 with EDI technology	Compact unit producing Type 1 and 2
✓	✓	✓	✓	–	✓	✓
✓	✓	✓	✓	–	–	✓
✓	✓	✓	✓	–	–	✓
✓	✓	✓	-	–	–	–
✓	✓	✓	✓	–	–	–
✓	✓	✓	–	–	–	–
✓	✓	–	–	–	–	–
✓	–	–	–	–	–	–
✓	–	–	–	–	–	–
✓	✓	✓	✓	–	✓	✓
200 L/day	200 L/day	200 L/day	15 L/day	100 L/day	200 L/day	1560 L/day

Thermo Scientific Barnstead GenPure xCAD water purification system

The Barnstead GenPure xCAD system delivers ultrapure 18.2 MΩ.cm water with consistent quality for the most demanding and sensitive applications. The xCAD remote dispenser provides flexibility and control.

APPLICATION INCLUDES:

Molecular Biology and Microbiology

- Cell and tissue culture
- PCR, DNA sequencing
- Electrophoresis

Analytical Chemistry

- HPLC
- GC, GC-MS, ICP-MS, AA
- TOC Measurements, IC

All GenPure™ systems exceed international standards ASTM Type I, ISO 3696 Grade 1, ASTM D1193 and CLSI-CLRW.

Integrated feed water monitoring

- Additional measuring cell monitors feed water conductivity. If the quality of the feed water drops below the set value, a fault message will immediately be displayed.

Online TOC measurement with UV intensity monitoring

- Real-time TOC monitoring for continual measurement of organic substances present in the water
- Continuous monitoring of UV intensity removes the risk of false TOC values due to diminished UV intensity
- Fault message alerts user when the UV lamp intensity is no longer sufficient for accurate TOC measurements

UV Photo-oxidation 185/254 nm

- High performance UV assembly reliably reduces the content of microorganisms and their metabolites

Ready-to-use

- Feed water pressure switch, wall bracket, UV lamp, ultrapure cartridge, sterile filter, all included in one part number

Measurement of conductivity/resistivity

- Conductivity cells are carefully calibrated prior to each measurement via built-in reference resistance with cell constants at 0.01 cm^{-1}
- Temperature measurements are made by a platinum chip sensor with ± 0.1°C accuracy

Quick-connect cartridge replacement

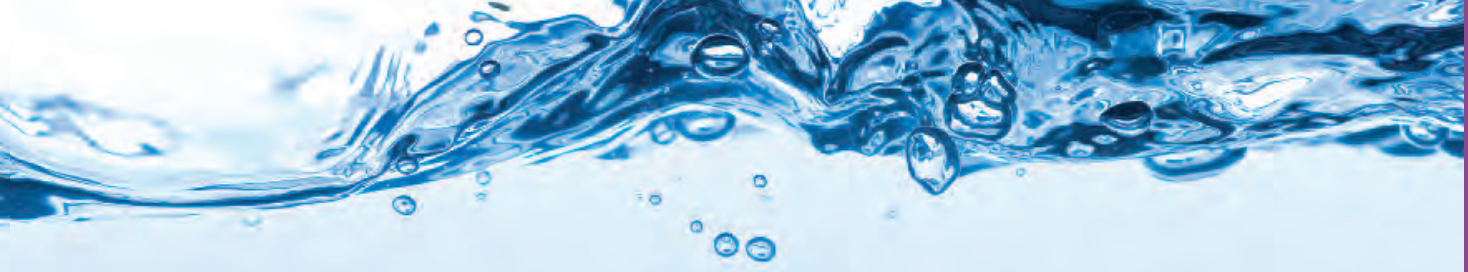
- Aquastop quick-connect capability enables cartridge replacement within seconds even mid-operation

Exact dosing

- Electronic dosing for fully automatic volume control of 0.01-65 L with < 0.5% accuracy

GLP-compliant documentation

- Real-time clock and code-protected operating system prevents unauthorized changes to system settings
- RS-232 interface with adjustable send-interval for safe data transfer of all measured data, faults, date and time to a PC computer or log printer
- Digital microprocessor control automatically monitors and stores faults from the last four weeks
- USP-compliant conductivity measurement with temperature compensation can be switched on or off



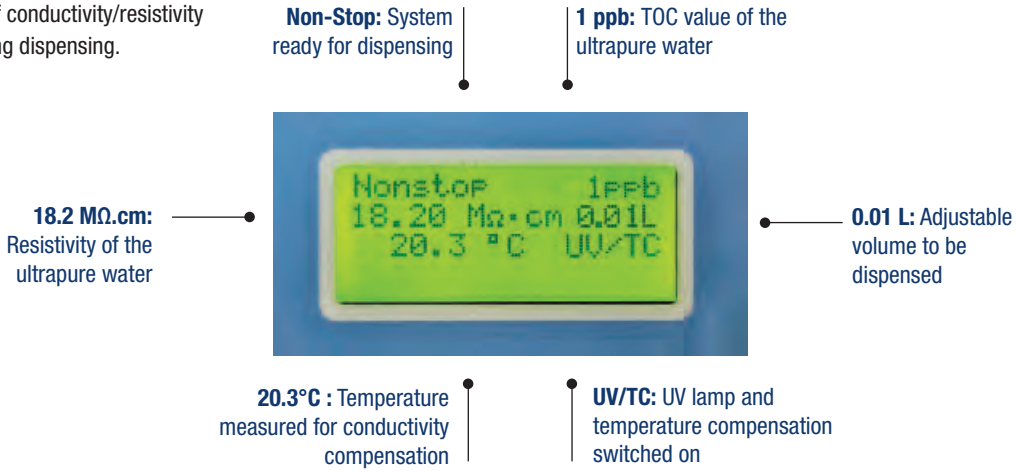
full control
extreme flexibility

Quick Look Comparison

	GenPure xCAD system	GenPure xCAD UV system	GenPure xCAD UF system	GenPure xCAD UV/UF system	GenPure xCAD UV - TOC system	GenPure xCAD UV/UF - TOC system
Applications	AA, IC, ICP, standard buffer	Inorganic and organic trace analysis, HPLC, ICP-MS, IC, TOC analysis	Molecular biology, microbiology, PCR, IVF, monoclonal antibodies	Molecular biology, PCR, DNA, monoclonal antibodies, cell culture media	Chemical analysis (trace analysis, HPLC, IC, ICP-MS, TOC measurements	Biosciences (cell and tissue culture media, PCR, DNA, monoclonal antibodies)
Resistance at 25°C, MΩ.cm	18.2	18.2	18.2	18.2	18.2	18.2
Conductivity, µS/cm	0.055	0.055	0.055	0.055	0.055	0.055
TOC, ppb	5-10	1-5	5-10	1-5	1-5	1-5
Bacteria, CFU/mL	<1	<1	<1	<1	<1	<1
Particles, 0.22 µm/mL	<1	<1	<1	<1	<1	<1
Endotoxines, EU/mL	n/a	n/a	<0.001	<0.001	n/a	<0.001
TOC monitor	n/a	n/a	n/a	n/a	standard	standard
Flow rate, L/min	up to 2	up to 2	up to 2	up to 2	up to 2	up to 2

Visible ultrapure water quality

Important measured values of conductivity/resistivity and TOC are easy to see during dispensing.



Thermo Scientific Barnstead GenPure xCAD water purification system (continued)

Our xCAD remote dispenser shown left. The GenPure system is under the bench (not pictured) freeing up valuable bench space.

Thermo Scientific xCAD remote dispenser – full system control in a compact design

- xCAD is short for “Extended Control and Dispenser.” The system provides more flexibility for ultrapure water dispensing with an action radius of 32 inches (80 cm)
- Ergonomic dispensing arm provides precise volume dosing at the press of a button
- Turned, height adjusted or extended towards your vessel, you’ll appreciate the flexibility of this dispenser
- One-of-a-kind design provides access to all system controls at your fingertips
- Specify bench-top or wall-mount xCAD dispenser for the installation option of your choice. The small footprint of the bench-top xCAD allows for more bench space while the wall-mount version completely frees up horizontal workspace.
- Adjustable controller makes handling more practical and provides a clear view of critical settings
- In addition to flexible xCAD installation options, GenPure systems can also be installed under the bench or wall-mounted with included mounting brackets

Complete water purification system control via the xCAD remote dispenser

xCAD Dimensions	
	Dimensions W x D x H in (mm)
Benchtop xCAD	10.2 x 21 x 28.5 (260 x 530 x 725)
Wall mount xCAD	10.2 x 21 x 25.8 (260 x 530 x 655)

Feed Water Requirements*	
Source	Potable tap water, pretreated by reverse osmosis, ion exchange or distillation
Feed water conductivity, µS/cm	< 2
TOC, ppb	max 50
Bacteria count, CFU/ml	< 100
Turbidity, NTU	< 1.0
Temperature, °C	2-35
Pressure, psi (bar)	1.4-87 (0.1-6)

* Please see user manual for complete list of feed water requirements

Product Specifications					
Flow rate	**Operating pressure min/max**	**Electrical requirements**	**Power consumption**	**Feed water connector**	**Dimensions W x D x H in (mm)**
up to 2 L/min	29-87 psi (2-6 bar)	90-240V, 50/60Hz	0.1kW	¾" hose connector	14.6 x 13 x 24 (372 x 330 x 615)

System Options		GenPure xCAD	GenPure xCAD UV	GenPure xCAD UF	GenPure xCAD UV/UF	GenPure xCAD UV - TOC	GenPure xCAD UV/UF - TOC
GenPure System All systems include a wall bracket, ultrapure polisher cartridge, sterile 0.2 µm filter, pressure regulator, UV lamp and/or ultrafilter where applicable	with xCAD bench version	50131286	50131254	50131250	50131252	50131296	50131298
	with xCAD wall version	50131300	50131317	50131302	50131315	50131321	50131323
Required Accessories							
Stainless steel DI cartridge, DI 1500 Required only when feed water is pretreated using reverse osmosis to meet feed water requirements and prolong cartridge life		02.1500	02.1500	02.1500	02.1500	02.1500	02.1500
Optional Accessories							
Disinfection cartridge		09.2201	09.2201	09.2201	09.2201	09.2201	09.2201
Printer Utilizes RS-232 interface for safe documentation of all measured values and faults with date and time in compliance with GLP guidelines	110V	AY1137X1	AY1137X1	AY1137X1	AY1137X1	AY1137X1	AY1137X1
	230V	09.2207	09.2207	09.2207	09.2207	09.2207	09.2207
Qualification documentation (IQOQ)		IOQDOCE5013318	IOQDOCE5013318	IOQDOCE5013318	IOQDOCE5013318	IOQDOCE5013318	IOQDOCE5013318
Storage reservoir, 30 L, to feed system Polyethylene tank, opaque to light 23.5 x 14.9 in (598 x 380 mm), H x W Wall mount accessory is 06.5015		06.5038	06.5038	06.5038	06.5038	06.5038	06.5038
Storage reservoir, 60 L, to feed system Polyethylene tank, opaque to light 35.9 x 14.9 in (912 x 380 mm), H x W Wall mount accessory is 06.5016		06.5068	06.5068	06.5068	06.5068	06.5068	06.5068
Replacement Consumables							
Ultrapure polisher cartridge		09.2005	09.2005	09.2005	09.2005	09.2005	09.2005
Sterile filter, 0.2 µm		09.1003	09.1003	09.1003	09.1003	09.1003	09.1003
Ultrafilter		n/a	n/a	50133980	50133980	n/a	50133980
UV lamp		n/a	09.2002	n/a	09.2002	09.2002	09.2002
Cleaning solution	Europe/ Asia Pacific	09.2202	09.2202	09.2202	09.2202	09.2202	09.2202
	North America	CMX25	CMX25	CMX25	CMX25	CMX25	CMX25

Thermo Scientific Barnstead GenPure Pro water purification system*

The Barnstead GenPure Pro system delivers ultrapure 18.2 MΩ.cm water with consistent quality. Suitable for the most demanding laboratory applications, this ultrapure water system will deliver water from a small footprint. The GenPure Pro system can be used on a laboratory bench or on a wall. The new flexible dispenser offers maximum freedom while dispensing ultrapure water up to 24 inches (60 cm) away from the unit.

APPLICATION INCLUDES:

Molecular Biology and Microbiology

- Cell and tissue culture
- PCR, DNA sequencing
- Electrophoresis

Analytical Chemistry

- HPLC
- GC, GC-MS, ICP-MS, AA
- TOC Measurements, IC

All GenPure systems exceed international standards ASTM Type I, ISO 3696 Grade 1, ASTM D 1193 and CLSI.

Dispensing for a variety of tasks

- New flexible dispenser offers a radius of 24 inches (60 cm) from the system for filling larger vessels or glassware washing

Integrated feed water monitoring

- An additional measuring cell monitors feed water conductivity. Any exceeding of the limiting value is immediately displayed to maximize cartridge life.

Online TOC measurement with UV intensity monitoring

- Real-time TOC monitoring for continual measurement of organic substances present in the water
- Continuous monitoring of UV intensity removes the risk of false TOC values due to diminished UV intensity
- Fault message alerts user when the UV lamp intensity is no longer sufficient for accurate TOC measurements

UV Photo-oxidation 185/254 nm

- High performance UV assembly reliably reduces the content of microorganisms and their metabolites

Ready-to-use

- Feed water pressure switch, wall bracket, UV lamp, ultrapure cartridge, sterile filter, all included in one part number

Measurement of conductivity/resistivity

- Conductivity cells are carefully calibrated prior to each measurement via built-in reference resistance with cell constants at 0.01 cm^{-1}
- Temperature measurements are made by a platinum chip sensor with ± 0.1°C accuracy

Quick-connect cartridge replacement

- Aquastop quick-connect capability enables cartridge replacement within seconds even mid-operation

Exact dosing

- High precision POM draw-off valve for dispensing with sterile filter
- Electronic dosing for fully automatic volume control of 0.01-65.0 L with < 0.5% accuracy

*Product not available in all areas. Speak to your representative about availability.

Push button simplicity for easy dispensing

GLP-compliant documentation

- Real-time clock and code-protected operating system prevents unauthorized changes to system settings
- RS-232 interface with adjustable send interval for safe data transfer of all measured data, faults, date and time to a PC computer or log printer
- Digital microprocessor control automatically monitors and stores faults from the last four weeks
- USP-compliant conductivity measurement with temperature compensation can be switched on or off

Tilting Control Panels for Easy Viewing

- Ergonomically designed controller tilts for ease-of-use and better visibility
- Illuminated four-line alpha-numeric display

Quick Look Comparison

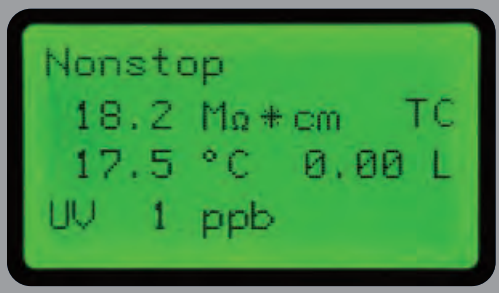
	GenPure Pro system	GenPure Pro UV system	GenPure Pro UF system	GenPure Pro UV/UF system	GenPure Pro UV - TOC system	GenPure Pro UV/UF - TOC system
Applications	AA, IC, ICP, standard buffer	Inorganic and organic trace analysis, HPLC, ICP-MS, IC, TOC analysis	Microbiology, IVF, monoclonal antibodies	Molecular biology, PCR, DNA, monoclonal antibodies, cell culture media	Chemical analysis (trace analysis, HPLC, IC, ICP-MS, TOC measurements)	Biosciences (cell and tissue culture media, PCR, DNA, monoclonal antibodies)
Resistance at 25°C, MΩ.cm	18.2	18.2	18.2	18.2	18.2	18.2
Conductivity, µS/cm	0.055	0.055	0.055	0.055	0.055	0.055
TOC, ppb	5-10	1-5	5-10	1-5	1-5	1-5
Bacteria, CFU/mL	<1	<1	<1	<1	<1	<1
Particles, 0.22 µm/mL	<1	<1	<1	<1	<1	<1
Endotoxines, EU/mL	n/a	n/a	<0.001	<0.001	n/a	<0.001
TOC monitor	n/a	n/a	n/a	n/a	standard	standard
Flow rate, L/min	up to 2	up to 2	up to 2	up to 2	up to 2	up to 2

flexible dispensing
precise purity monitoring

Thermo Scientific Barnstead GenPure Pro water purification system (continued)

Convenient dispensing for a variety of applications possible with flexible dispenser radius

Quick-connect cartridge replacement



Intuitive display shows important system parameters

Exact dosing from GenPure Pro water purification system with one touch dispensing

Feed Water Requirements*	
Source	Potable tap water, pretreated by reverse osmosis, ion exchange or distillation
Feed water conductivity, µS/cm	< 5
TOC, ppb	max 50
Bacteria count, CFU/ml	< 100
Turbidity, NTU	< 1.0
Temperature, °C	2-35
Pressure, psi (bar)	1.4-87 (0.1-6)

* Please see user manual for complete list of feed water requirements

Product Specifications					
Flow rate	**Operating pressure min/max**	**Electrical requirements**	**Power consumption**	**Feed water connector**	**Dimensions W x D x H in (mm)**
up to 2 L/min	29-87 psi (2-6 bar)	90-240V, 50/60Hz	0.1kW	8 mm o.d.	18.6 x 13 x 24.2 (472 x 330 x 615)

System Options		GenPure Pro	GenPure Pro UV	GenPure Pro UF	GenPure Pro UV/UF	GenPure Pro UV - TOC	GenPure Pro UV/UF - TOC
GenPure Pro System All systems include a wall bracket, ultrapure polisher cartridge, sterile 0.2 µm filter, pressure regulator, and UV lamp and/or ultrafilter where applicable		50131956	50131952	50131954	50131950	50131948	50131922
Required Accessories							
Stainless steel DI cartridge, DI 1500 Required only when feed water is pretreated using reverse osmosis to meet feed water requirements and prolong cartridge life		02.1500	02.1500	02.1500	02.1500	02.1500	02.1500
Optional Accessories							
Printer Utilizes RS-232 interface for safe documentationof all measured values and faults with date and time in compliance with GLP guidelines	110V	AY1137X1	AY1137X1	AY1137X1	AY1137X1	AY1137X1	AY1137X1
	230V	09.2207	09.2207	09.2207	09.2207	09.2207	09.2207
Qualification Documentation (IQOQ)		IOQDOCE50133919	IOQDOCE50133919	IOQDOCE50133919	IOQDOCE50133919	IOQDOCE50133919	IOQDOCE50133919
Storage reservoir, 30 L, to feed system Polyethylene tank, opaque to light. 23.5 x 14.9 in (598 x 380 mm), H x W. Wall mount accessory is 06.5015		06.5038	06.5038	06.5038	06.5038	06.5038	06.5038
Storage reservoir, 60 L, to feed system Polyethylene tank, opaque to light. 35.9 x 14.9 in (912 x 380 mm), H x W. Wall mount accessory is 06.5016		06.5068	06.5068	06.5068	06.5068	06.5068	06.5068
Disinfection cartridge		09.2201	09.2201	09.2201	09.2201	09.2201	09.2201
Replacement Consumables							
Ultrapure polisher cartridge		09.2005	09.2005	09.2005	09.2005	09.2005	09.2005
Sterile filter, 0.2 µm		09.1003	09.1003	09.1003	09.1003	09.1003	09.1003
Ultrafilter		n/a	n/a	50133980	50133980	n/a	50133980
UV lamp		n/a	09.2002	n/a	09.2002	09.2002	09.2002
Cleaning solution	Europe/ Asia Pacific	09.2202	09.2202	09.2202	09.2202	09.2202	09.2202
	North America	CMX25	CMX25	CMX25	CMX25	CMX25	CMX25

Thermo Scientific Barnstead GenPure water purification system

The Barnstead GenPure system delivers ultrapure 18.2 MΩ.cm water with consistent quality for the most demanding and sensitive applications.

APPLICATIONS INCLUDE:

Molecular Biology and Microbiology

- Cell and tissue culture
- PCR, DNA sequencing
- Electrophoresis

Analytical Chemistry

- HPLC
- GC, GC-MS, ICP-MS, AA
- TOC Measurements, IC

All GenPure systems exceed international standard ASTM Type I, ISO 3696 Grade 1, ASTM D1193 and CLSI-CLRW

Integrated feed water monitoring

- An additional measuring cell monitors feed water conductivity. Any exceeding of the limiting value is immediately displayed maximizing cartridge life

Online TOC measurement with UV intensity monitoring

- Real-time TOC monitoring for continual measurement of organic substances present in the water
- Continuous monitoring of UV intensity removes the risk of false TOC values due to diminished UV intensity
- Fault message alerts user when the UV lamp intensity is no longer sufficient for accurate TOC measurements

UV Photo-oxidation 185/254 nm

- High performance UV assembly reliably reduces the content of microorganisms and their metabolites

Ready-to-use

- Feed water pressure switch, wall bracket, UV lamp, ultrapure cartridge, sterile filter, all included with one part number

Measurement of conductivity/resistivity

- Conductivity cells are carefully calibrated prior to each measurement via built-in reference resistance with cell constants at 0.01 cm^{-1}
- Temperature measurements are made by a platinum chip sensor with ± 0.1°C accuracy

Quick-connect cartridge replacement

- Aquastop quick-connect capability enables cartridge replacement within seconds even mid-operation

GLP-compliant documentation

- Real-time clock and code-protected operating system prevents unauthorized changes to system settings
- RS-232 interface with adjustable send-interval for safe data transfer of all measured data, faults, date and time to a PC computer or log printer
- Digital microprocessor control automatically monitors and stores faults from the last four weeks
- USP-compliant conductivity measurement with temperature compensation can be switched on or off

Tilting control panels for easy viewing

- Ergonomically designed controller tilts for optimal key pressing and easy readability
- Illuminated four-line alpha-numeric display

basic configuration

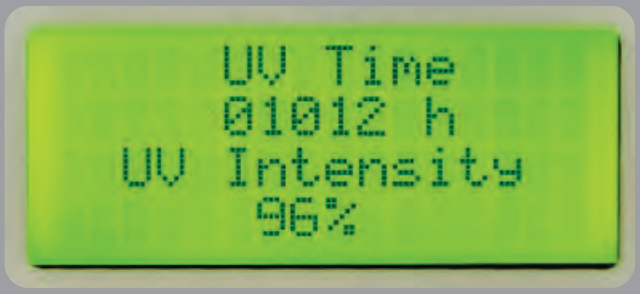
with options to meet your needs

Quick Look Comparison

	GenPure system	GenPure UV system	GenPure UF system	GenPure UV/UF system	GenPure UV - TOC system	GenPure UV/UF - TOC system
Applications	AA, IC, ICP, standard buffer	Inorganic and organic trace analysis, HPLC, ICP-MS, IC, TOC analysis	Microbiology, IVF, monoclonal antibodies	Molecular biology, PCR, DNA, monoclonal antibodies, cell culture media	Chemical analysis (trace analysis, HPLC, IC, ICP-MS, TOC measurements)	Biosciences (cell and tissue culture media, PCR, DNA, monoclonal antibodies)
Resistance at 25°C, MΩ.cm	18.2	18.2	18.2	18.2	18.2	18.2
Conductivity, µS/cm	0.055	0.055	0.055	0.055	0.055	0.055
TOC, ppb	5-10	5-10	1-5	1-5	1-5	1-5
Bacteria, CFU/mL	<1	<1	<1	<1	<1	<1
Particles, 0.22 µm/mL	<1	<1	<1	<1	<1	<1
Endotoxines, EU/mL	n/a	n/a	<0.001	<0.001	n/a	<0.001
TOC monitor	n/a	n/a	n/a	n/a	standard	standard
Flow rate, L/min	Up to 2	Up to 2	Up to 2	Up to 2	Up to 2	Up to 2

Thermo Scientific Barnstead GenPure water purification system (continued)

GenPure systems feature tilting control panels for optimal viewing



UV intensity monitoring provides superb reliability

Easy cartridge replacement

Feed Water Requirements*	
Source	Potable tap water, pretreated by reverse osmosis, ion exchange or distillation
Feed water conductivity, µS/cm	< 2
TOC, ppb	max 50
Bacteria count, CFU/ml	< 100
Turbidity, NTU	< 1.0
Temperature, °C	2-35
Pressure, psi (bar)	1.4-87 (0.1-6)

* Please see user manual for complete list of feed water requirements

Product Specifications					
Flow rate	**Operating pressure min/max**	**Electrical requirements**	**Power consumption**	**Feed water connector**	**Dimensions W x D x H in (mm)**
up to 2 L/min	29-87 psi (2-6 bar)	90-240V, 50/60Hz	0.1kW	¾" hose connector	14.6 x 13 x 24.2 (372 x 330 x 615)

System Options		GenPure	GenPure UV	GenPure UF	GenPure UV/UF	GenPure UV - TOC	GenPure UV/UF - TOC
GenPure system All systems include a wall bracket, ultrapure polisher cartridge, sterile 0.2 µm filter, pressure regulator, UV lamp and/or ultrafilter where applicable		50131211	20131243	50131235	50131217	50131229	50131256
Required Accessories							
Stainless steel DI cartridge, DI 1500 Required only when feed water is pretreated using reverse osmosis to meet feed water requirements and prolong cartridge life		02.1500	02.1500	02.1500	02.1500	02.1500	02.1500
Optional Accessories							
Printer Utilizes RS-232 interface for safe documentation of all measured values and faults with date and time in compliance with GLP-guidelines	110V	AY1137X1	AY1137X1	AY1137X1	AY1137X1	AY1137X1	AY1137X1
	230V	09.2207	09.2207	09.2207	09.2207	09.2207	09.2207
Qualification documentation (IQOQ)		IOQDOCE50133917	IOQDOCE50133917	IOQDOCE50133917	IOQDOCE50133917	IOQDOCE50133917	IOQDOCE50133917
Disinfection cartridge		09.2201	09.2201	09.2201	09.2201	09.2201	09.2201
Storage reservoir, 30 L, to feed system Polyethylene tank, opaque to light. 23.5 x 14.9 in (598 x 380 mm), H x W. Wall mount accessory is 06.5015		06.5038	06.5038	06.5038	06.5038	06.5038	06.5038
Storage reservoir, 60 L, to feed system Polyethylene tank, opaque to light. 35.9 x 14.9 in (912 x 380 mm), H x W. Wall mount accessory is 06.5016		06.5068	06.5068	06.5068	06.5068	06.5068	06.5068
Replacement Consumables							
Ultrapure polisher cartridge		09.2005	09.2005	09.2005	09.2005	09.2005	09.2005
Sterile filter, 0.2 µm		09.1003	09.1003	09.1003	09.1003	09.1003	09.1003
Ultrafilter		n/a	n/a	50133980	50133980	n/a	50133980
UV lamp		n/a	09.2002	n/a	09.2002	09.2002	09.2002
Cleaning solution	Europe/ Asia Pacific	09.2202	09.2202	09.2202	09.2202	09.2202	09.2202
	North America	CMX25	CMX25	CMX25	CMX25	CMX25	CMX25

Thermo Scientific Barnstead MicroPure water purification system

The Barnstead MicroPure system was designed for laboratories that require up to 15 L/day of ultrapure water such as HPLC or other instrumental analyses, sample preparation, glassware rinsing, or molecular biology work in which endotoxins and/or nucleases would interfere.

Smart features

- Backlit display tilts for easy viewing
- Variable speed dispensing
- Optional integrated 6 L feed water reservoir so you can place the system without direct access to a water line

Monitor feed water quality

- Good feed water quality leads to consistently ultrapure water and a longer cartridge service life to maximize cartridge life

Smart design

- Recirculation pump prevents bacterial growth during standstill and allows for constant monitoring of all system functions, allowing for the immediate display of fault messages if a problem is detected
- Systems ship fully equipped with pressure reducer, ultrapure cartridge and 0.2 µm sterile filter

Superior filters

- Ultrafilter is flushed automatically to assure the highest retention of endotoxins and nucleases, which produces a long two year lifetime
- Validated 0.2 µm final filter with folded membrane can be sterilized up to 5 times

APPLICATIONS INCLUDE:

Molecular Biology and Microbiology

- Cell and tissue culture
- PCR, DNA sequencing
- Electrophoresis

Analytical Chemistry

- HPLC
- GC, GC-MS, ICP-MS, AA
- TOC Measurements, IC

compact system

for small ultrapure water demands

Quick Look Comparison				
	MicroPure system	**MicroPure UV system**	**MicroPure UF system**	**MicroPure UV/UF system**
Applications	Instrumental analytical methods such as AAS, IC, ICP	High-sensitivity instrumental analytical methods, such as HPLC, ICP-MS, TOC-analyses	Molecular biology, PCR, DNA, cell culture, monoclonal antibodies	Microbiology, molecular biology, PCR, DNA, monoclonal antibodies, cell culture media
Resistance at 25°C, MΩ.cm	18.2	18.2	18.2	18.2
Conductivity, µS/cm	0.055	0.055	0.055	0.055
TOC, ppb	5-10	1-5	5-10	1-5
Bacteria, CFU/mL	<1	<1	<1	<1
Particles, 0.22 µm/mL	<1	<1	<1	<1
Endotoxines, EU/mL	n/a	n/a	<0.001	<0.001
Flow rate, L/min	1	1	1	1

18.2 MΩ.cm water
in a compact system

Thermo Scientific Barnstead MicroPure water purification system (continued)

Dispense water which allows for drop by drop or quick dispensing

One, two, three...

Rapid cartridge change with Aquastop Quick-connect design

The MicroPure-ST series includes an optional 6 L feed water reservoir for pretreated water storage.

Feed Water Requirements*	
Source	Potable tap water pretreated by reverse osmosis, ion exchange or distillation
Feed water conductivity, µS/cm	< 5
TOC, ppb	max 50
Turbidity, NTU	< 1.0
Temperature, °C	2-35
Pressure, psi (bar)	1.4-87 (0.1-6)

* Please see user manual for complete list of feed water requirements

Product Specifications						
Flow rate	**Operating pressure min/max**	**Electrical requirements**	**Power consumption**	**Feed water connector**	**Dimensions MicroPure (no reservoir) W x D x H in (mm)**	**Dimensions MicroPure-ST W x D x H in (mm)**
up to 1.5 L/min	29-87 psi (2-6 bar)	90-240 V, 50/60Hz	0.06kW	8 mm o.d.	12 x 11.8 x 21.5 (305 x 300 x 545)	12 x 15.7 x 21.5 (305 x 400 x 545)

System Options		MicroPure	MicroPure UV	MicroPure UF	MicroPure UV/UF
MicroPure system All systems include an ultrapure polisher cartridge, sterile 0.2 µm filter, pressure regulator, UV lamp and/or ultrafilter where applicable	Line fed units	50132366	50132373	50132368	50132370
	Integrated 6 L feed reservoir	50132367	50132374	50132369	50132372
Required Accessories					
Stainless steel DI cartridge, DI 1500 Required only when feed water is pretreated using reverse osmosis to meet feed water requirements and prolong cartridge life		02.1500	02.1500	02.1500	02.1500
Optional Accessories					
Wall mounting bracket		09.2212	09.2212	09.2212	09.2212
Qualification Documentation (IQOQ) - Line fed units		IOQDOCE50133913	IOQDOCE50133913	IOQDOCE50133913	IOQDOCE50133913
Qualification Documentation (IQOQ) - Integrated 6L feed reservoir		IOQDOCE50133914	IOQDOCE50133914	IOQDOCE50133914	IOQDOCE50133914
Disinfection cartridge		09.1102	09.1102	09.1102	09.1102
Replacement Consumables					
Ultrapure polisher cartridge		09.1006	09.1006	09.1006	09.1006
Sterile filter, 0.2 µm		09.1003	09.1003	09.1003	09.1003
Ultrafilter		n/a	n/a	50133981	50133981
UV lamp		n/a	09.1002	n/a	09.1002
Cleaning solution	Europe/Asia Pacific	09.2202	09.2202	09.2202	09.2202
	North America	CMX25	CMX25	CMX25	CMX25

Thermo Scientific Barnstead E-Pure water purification system

The Barnstead E-Pure economically produces Type 1 water with low operating costs. Large cartridges provide longer cartridge life and an impressive system flow rate.

Product Features

- Resistivities up to 18.2 MΩ.cm and TOC levels below 10 ppb
- Virgin polypropylene water pathways prevent recontamination
- Recirculation pump continuously recirculates water throughout the entire system to maintain water purity and reduce the quantity of waste water required for rinse-up
- Wall-mountable and completely assembled for easy installation
- Quarter turn quick release canisters allow for easy cartridge replacement
- 0.2 µm absolute final filter removes bacteria and particulates protecting the integrity of your results
- Digital resistivity meter is automatically temperature compensated to 25°C, preventing fluctuating readings due to temperature changes
- High-capacity cartridges provide low operating costs

Product Accessories

Remote dispenser

- Recirculates water through to tip of dispenser and includes a 0.2 µm final filter
- Delivers water up to 8 ft (2.4 m) from the system
- Ships with a mounting bracket for increased flexibility in choosing a mounting location

Low pressure pump protector

- If you are feeding your E-Pure system from a pressurized feed line, it is to your advantage to ensure that the pump is fully protected with the use of the low pressure pump protector
- Interrupts power if pressurized feed water line pressure falls below 5 psig (0.35 kg/cm²)
- Includes 6 ft (1.8 m) cord which plugs directly into the E-Pure
- Complete with 1/4 inch NPT “T” to install in your feed line

Low water level pump protector

- If feeding your E-Pure from a storage reservoir, it is recommended that a low water pump protector be added to the E-Pure system. This will ensure that the pump is protected in the event the reservoir does not have a sufficient quantity of water to satisfy the requirements of the system.
- Adaptable to most storage reservoirs, providing a 1/2 inch NPT connection is available. Includes 6 ft (1.8 m) cord which plugs directly into the E-Pure

APPLICATIONS INCLUDE:

Molecular Biology and Microbiology

- Cell culture
- Buffer preparation
- Electrophoresis

Quick Look Comparison	
Resistivity at 25°C, MΩ.cm	18.2
TOC, ppb	< 10
Bacteria, CFU/mL	< 1
Flow rate, L/min	2

simple to use
easy to maintain

Feed Water Requirements*	
Source	Depending on the cartridge pack chosen – potable tap water, or water treated by reverse osmosis, ion exchange or distillation
Temperature, °C (°F)	4-49 (40-120)
Pressure, psig max	100

* Please see user manual for complete list of feed water requirements

Product Specifications	Overall dimensions W x H x D	Feed water connector	Inlet water temperature
E-Pure 3-holder	29 x 28 x 7.5 in (73.7 x 71.1 x 19.1 mm)	1/4 in NPTF	40-120°F/4-49°C
E-Pure 4-holder	35 x 28 x 7.5 in (88.9 x 71.1 x 19.1 mm)	1/4 in NPTF	40-120°F /4-49°C

System Options	Electrical requirements	Max Flow Rates	3-Holder	4-Holder
E-Pure systems Ships with wall bracket and cartridge o-rings	**120V**	**2.5 L/min**	D4631	D4641
	240V	**2.5 L/min**	D4632-33	D4642-33
Required Accessories				
Cartridge kits Choose the cartridge pack according to your feed water and need for organic free water		**Tap feed**	D5029 D0835 Pretreatment (1) D5027 Ultrapure (2)	D5028 D0835 Pretreatment (1) D0803 High Capacity (1) D5027 Ultrapure (2)
		Tap feed, Organic free	D5022 D0836 Macropure (1) D5027 Ultrapure (1) D5021 Organic Free (1)	D5023 D0836 Macropure (1) D0803 High Capacity (1) D5027 Ultrapure (1) D5021 Organic Free (1)
		Pretreated feed	n/a	D50227 D0835 Pretreatment (1) D0809 Ultrapure (1) D5027 Ultrapure (2)
		Pretreated feed, Organic free	n/a	D50228 D0836 Macropure (1) D5027 Ultrapure (1) D0809 Ultrapure (1) D5021 Organic Free (1)
Optional Accessories				
Remote dispenser Recirculates water through to tip of dispenser and includes a 0.2 µm final filter. Delivers water up to 8 ft (2.4 m) from the system. Ships with a mounting bracket.			D8952	D8952
Low pressure pump protector Alerts the E-Pure of an inadequate feed water condition in a pressurized feed line			D2706	D2706
Low water level pump protector Alerts the E-Pure of an inadequate feed water condition when fed from a reservoir		**120V**	D0603	D0603
		240V	D0606	D0606
Replacement Consumables				
0.2 µm final filter			D3750	D3750
Cleaning cartridges Set of three.			D50223	D50223

Thermo Scientific Barnstead LabTower EDI water purification system

The Barnstead LabTower EDI is an integrated system combining purification with EDI technology and storage in one, as well as producing both Type 1 and Type 2 water. Stock high purity water safely and conveniently!

Ultrapure water which exceeds ASTM Type I standards, with a resistivity of 18.2 MΩ.cm and TOC 1-5 ppb with optional UV lamp.

High purity water ASTM Type II water, with resistivity of 15-10 MΩ.cm, is ideal for daily needs of 100 to 500 L.

Two systems in one

- Unique systems with pretreatment plus polisher to produce both Type 1 and Type 2 water
- Type 2 water is stored in the integrated 100 L high purity water reservoir
- Water system sits on top of the reservoir saving critical bench space

Ready-to-use

- Feed water pressure switch, all filters and cartridges, sterile filter, all in one package

Two ways to draw water

- Dispense ultrapure water directly from the system via the dispenser with sterile filter. The water quality is measured immediately prior to the dispensing point.
- Type 2 water is accessible from the reservoir, which is an ideal supply for lab equipment such as autoclaves

Performance for your application feeds

- High performance reverse osmosis module is paired with an EDI module and polisher cartridge
- Two systems to choose from with capacities of 15 and 30 L per hour

APPLICATIONS INCLUDE:

Type 1 Water Applications

- Cell and tissue culture
- PCR, DNA sequencing
- Electrophoresis, TOC Measurements, IC
- HPLP, GC-MS, ICP-MS, AA

Type 2 Water Applications

- Rinsing lab glassware
- Supplying autoclaves and ultrapure water systems
- Preparing and diluting buffers, reagents, and media

Quick Look Comparison		
	LabTower EDI 15 system	**LabTower EDI 30 system**
Type 1 Water		
Resistivity at 25°C, MΩ.cm	18.2	18.2
Conductivity, µS/cm	0.055	0.055
TOC, ppb	1-5	1-5
Bacterial content in CFU/mL	<1	<1
Particles, 0.22 µm/mL	<1	<1
Flow rate at dispenser, L/min	1.5	1.5
Type 2 Water		
Pure water production at 15°C	15	30
Resistivity at 25°C	15-10	15-10
Conductivity	0.067-0.1	0.067-0.1

dual quality system
with EDI technology

Compact, stylish, mobile
- Free-standing unit takes up no bench space
- Easily relocated with bottom-mounted rollers

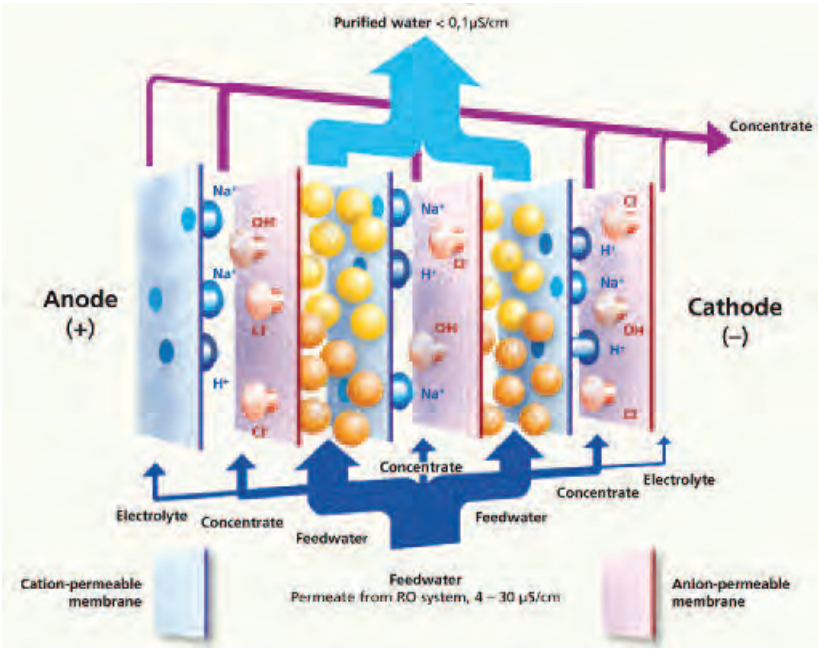
Safe operation
- Microprocessor control for automatic operation
- Continuous monitoring of all critical parameters
- Recirculation pump protects purified water from bacterial growth during standstill

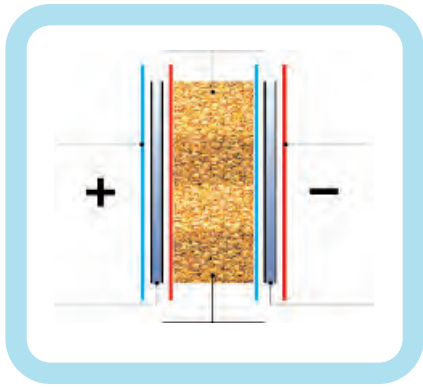
GLP-compliant documentation
- Real-time clock and code-protected operating system prevents unauthorized changes to system settings
- RS-232 interface with adjustable send-interval for safe data transfer of all measured data, faults, date and time to a PC computer or log printer
- Digital microprocessor control automatically monitors and stores faults from the last four weeks
- USP-complying conductivity measurement with temperature compensation that can be switched on or off

100 L Integrated polyethylene reservoir safely stores Type 2 water
- Automatic water recirculation in the reservoir moves water across a special polisher module ensuring fresh Type 2 water on demand
- High purity water reservoir outlet for convenient drainage
- Efficient cleaning and disinfection enhanced by conical bottom design for completely emptying reservoir
- Integrated reservoir provides 100 L of purified water storage
- Sterile vent filter and reservoir overflow prevents internal contamination by microorganisms from the surrounding air
- Optional CO_2 absorber prevents CO_2 adsorption into the water, which would increase the TOC
- Highly visible reservoir volume display on LabTower controller
- Customize volume stored in the reservoir via the controller

Quickly view reservoir level (volume in %) with highly-visible continuous monitor

Thermo Scientific Barnstead LabTower EDI water purification system (continued)





Electrodeionization, EDI, unites two proven technologies for producing ultrapure water: Electrodialysis and ion exchange. In contrast to conventional ion exchange in which resins must be either chemically regenerated or the cartridge discarded, EDI utilizes an electric current for continual resin regeneration.

Technologies that keep you one step ahead

- Constant high efficiency of the ion exchange layer bed produces consistently high quality water
- No regeneration chemicals required and no disposal of cartridges, making this technology friendly for the environment
- No exchange of spent resins or cartridges saves cost
- High purity water when you need it with no wait time

How EDI works

Several layers of ion selective membranes are situated between an anode and a cathode. Layered ion exchange resin beds and concentrate chambers are alternately positioned between them.

On applying an electric voltage, water (H_20) is split into H^+ and OH^- in the cell.

The H^+ and Na^+ cations can migrate through the cation permeable membranes, anions through the anion permeable membranes.

The ions migrate in the direction of the applied voltage, i.e. anions to the positive pole (anode), cations to the negative pole (cathode). The water ions that migrate through an ion exchange chamber displace salt ions retained by the ion exchange resins and so continually regenerate the resins.

The salt ions migrate through the appropriate ion selective membranes into the concentrate chambers and are flushed out by water. As all concentration chambers are flushed, excess H^+ and OH^- ions can again combine to form H_20.

Feed Water Requirements*	
Source	Potable tap water softened or hardness stabilized
Conductivity, µS/cm	<1500
Colloid index	< 3
pH-range	4-11
Temperature, °C	2-35
Pressure, psi (bar)	1.4-87 (2-6)

* Please see user manual for complete list of feed water requirements

Product Specifications					
Flow rate	**Operating pressure min/max**	**Electrical requirements**	**Power consumption**	**Feed water connector**	**Dimensions W x D x H in (mm)**
up to 2 L/min	29-87 psi (2-6 bar)	90-240V, 50/60Hz	0.25 kW	8 mm o.d.	17.7 x 22.8 x 59.1 (450 x 580 x 1500)

System Options		LabTower EDI 15	LabTower EDI 30
LabTower EDI system All systems include an ultrapure polisher cartridge, RO membrane, RO pretreatment filters (5 µm filter and hardness stabilizer), EDI module, UV lamp, sterile 0.2 µm filter, 10 inch 1 µm filter (reservoir outlet) and pressure regulator		50132395	50132396
Required Accessories			
Sterile overflow for reservoir Prevents the penetration of bacteria and other microorganisms		50132714	50132714
CO_2 absorber + sterile filter, 0.2 µm Combination sterile filter with CO_2 absorber will prevent CO_2 from entering the tank, saving cartridge life		06.5002	06.5002
Mix Multi Mini water softener Required if feed water silt density index (SDI) is greater than 3. Also required for purchase with a softener is the softener salt, hardness detection kit, and the 5 µm filter with carbon.	110V	50129892	50129892
	240V	06.1250	06.1250
Softener salt Required for use with the water softener	For North America	50129893	50129893
	For Europe and Asia	06.2000	06.2000
5 µm filter with carbon cartridge Required when Mixed Multi is purchased		50134022	50134022
Hardness detection kit – required with purchase of softener Alerts user when water is no longer softened	Europe	06.1000	06.1000
	North America/Asia	50134335	50134335
Optional Accessories			
Sterile 0.2 µm filter for reservoir outlet		06.5555	06.5555
Disinfection cartridge		09.2201	09.2201
Printer Utilizes RS-232 interface for safe documentation of all measured values and faults with date and time in compliance with GLP-Guidelines	110V	AY1137X1	AY1137X1
	230V	09.2207	09.2207
Qualification documents (IQOQ)		IOQDOCE50133916	IOQDOCE50133916
Replacement Consumables			
Ultrapure polisher cartridge		09.2005	09.2005
5 µm filter and hardness stabilizer		06.5204	06.5204
Sterile 0.2 µm filter for system		09.1003	09.1003
UV lamp for system		09.2002	09.2002
Cleaning solution	Europe/ Asia Pacific	09.2202	09.2202
	North America	CMX25	CMX25
Reverse osmosis membrane		22.0046 (requires 2)	22.0087 (requires 2)

Thermo Scientific Barnstead Smart2Pure water purification system

All in one! The Barnstead Smart2Pure system is a compact system which converts tap water to into both ASTM Type I and II water. The Smart2Pure 3 and 6 feature a built-in 6 L reservoir to store the Type 2 water. The Smart2Pure 12 offers the choice of a 30 or 60 L reservoir for customizable storage capacity.

APPLICATIONS INCLUDE:

Molecular Biology and Microbiology
- Cell and tissue culture
- PCR, DNA sequencing
- Electrophoresis

Analytical Chemistry
- HPLC
- GC, GC-MS, ICP-MS, AA
- TOC Measurements, IC

Routine Laboratory Work
- Preparing and diluting buffers and reagents
- Rinsing lab glassware
- Supplying autoclaves and other small lab equipment

Powerful performance
- Based on your requirements, choose from capacities of 3, 6 or 12 L/hr

Lasting economy
- Water purification progresses through independent cartridges with Aquastop quick-connect for fast replacement

Module 1 – Combination of pretreatment and the reverse osmosis membrane

Module 2 – Polishing cartridge contains high-quality ultrapure resin for consistent purity and long cartridge life

Easy-to-operate
- Dispensing is easy and features variable speed to control flow
- The display can be tilted for optimal reading
- Optional UV bulb and ultrafilter to customize ultrapure water quality

Placement options
- Position on laboratory bench
- Mount it on the wall

Smart2Pure 3 and 6 features smart, integrated 6 L reservoir
- Constructed with pigment-free materials
- Conical bottom outlet allows for complete draining and efficient cleaning and disinfection

Smart2Pure 12 offers reservoir options, either 30 or 60L
- Large opening for easy and effective cleaning by hand
- Sterile venting filter/reservoir overflow protects against contamination by microorganisms
- Optional CO_2 absorber prevents TOC value increases from drawn-in CO_2
- Polyethylene reservoir is opaque to light
- Recirculation pump protects the high purity water from bacterial growth during standstills and maintains the low conductivity value
- Wall-mount optional for simple space-savings
- Conical bottom outlet allows for complete draining and efficient cleaning and disinfection

compact
dual quality system

Quick Look Comparison	Smart2Pure system	Smart2Pure UV system	Smart2Pure UF system	Smart2Pure UV/UF system
Type 1 Water				
Applications	AA, IC, ICP, standard buffer	Inorganic and organic trace analysis, HPLC, ICP-MS, IC, TOC analysis	Microbiology, IVF, monoclonal antibodies	Molecular biology, PCR, DNA, monoclonal antibodies, cell culture media
Resistivity at 25°C, MΩ.cm	18.2	18.2	18.2	18.2
Conductivity, µS/cm	0.055	0.055	0.055	0.055
TOC value, ppb	5-10	1-5	5-10	1-5
Bacterial content, CFU/mL	<1	<1	<1	<1
Particles, µm/mL	<1	<1	<1	<1
Endotoxines, EU/mL	n/a	n/a	<0.001	<0.001
Flow rate, L/min	1	1	1	1
Type 2 Water				
Pure water production at 15°C, L/h	3, 6 or 12	3, 6 or 12	3, 6 or 12	3, 6 or 12
Resistivity at 25°C, MΩ.cm	15-10	15-10	15-10	15-10
Conductivity, µS/cm	0.067-0.1	0.067-0.1	0.067-0.1	0.067-0.1

Feed Water Requirements*	
Source	Potable water acc. to DIN 2000
pH range	4-11
Temperature, C°	2-35
Pressure, psi (bar)	1.4-87 (1-6)

* Please see user manual for complete list of feed water requirements

Space-Saving Design
Simply stand the Smart2Pure system on the benchtop or mount it directly to the wall, as shown by the Thermo Scientific MicroPure, for more bench space

Thermo Scientific Barnstead Smart2Pure water purification system (continued)

Economical Design

The RO membrane with pretreatment cartridge is separate from the DI cartridge, ensuring you only replace each cartridge as needed

UV-Oxidation 185/254 nm

Optional UV-oxidation for reducing the content of microorganisms and their metabolites

Sterile

Ultrapure water is dispensed through an autoclavable 0.2µm filter

Flexible Storage

Store high purity water safely and conveniently in either a 30 or 60 L reservoir (only for Smart2Pure 12)

Product Specifications – Storage Reservoirs		
Volume	**Material**	**Dimensions H x D in (mm)**
30 L	Polyethylene, ultrapure water resistant, opaque to light	23.5 x 15 598 x 380
60 L		35.9 x15 912 x 380

Storage Reservoir Options for Smart2Pure 12 System Only	30L	60L
Tank Choose a tank to meet your capacity needs	06.5040	06.5070
Required Accessories		
Sterile overflow for reservoir	06.5001	06.5001
CO_2 absorber + sterile filter, 0.2 µm	06.5002	06.5002
Optional Accessories		
UV lamp assembly for the tank, 230V Ships complete with assembly and UV lamp	06.5006	06.5006
Wall mounting bracket	06.5015	06.5016
Replacement Consumables		
Replacement UV lamp (reservoir), 230V	09.5002	09.5002

Product Specifications - Smart2Pure 3, 6, 12 L/hr					
Flow rate	**Operating pressure min/max**	**Electrical requirements**	**Power consumption**	**Feed water connector**	**Dimensions W x D x H in (mm)**
up to 1 L/min	29-87 psi 2-6 bar	90-240V, 50/60Hz	0.06kW	1/4 in o.d.	12 x 15.7 x 21.5 (305 x 400 x 545)

System Options for Smart2Pure	Permeate flow at 15°C	Smart2Pure Standard	Smart2Pure UV	Smart2Pure UF	Smart2Pure UV/UF
Smart2Pure System 3 and 6 L/hr All systems include an RO/pretreatment cartridge, ultrapure polisher cartridge, sterile 0.2 µm filter, pressure regulator, UV lamp and/or UF filter where applicable. The 3 and 6 lph models also include an internal 6L tank with vent filter.	**3 L/hr**	50129869	50129872	50129870	50129688
	6 L/hr	50129873	50129885	50129874	50129887
Required Accessories					
Pretreatment filter Required to prolong cartridge life. Ships with a filter housing and 1µm filter.		09.4003	09.4003	09.4003	09.4003
Optional Accessories					
Wall mounting bracket		09.2212	09.2212	09.2212	09.2212
Qualification documents (IQOQ)		IOQDOCE50133911	IOQDOCE50133911	IOQDOCE50133911	IOQDOCE50133911
Replacement Consumables					
RO membrane with integrated pretreatment	**3 L/hr**	09.2003	09.2003	09.2003	09.2003
	6 L/hr	09.2006	09.2006	09.2006	09.2006
Ultrapure polisher cartridge		09.1020	09.1020	09.1020	09.1020
Sterile 0.2 µm filter for system		09.1003	09.1003	09.1003	09.1003
Ultrafilter		n/a	n/a	50133981	50133981
System UV-lamp		n/a	09.1002	n/a	09.1002
Cleaning solution	Europe/Asia Pacific	09.2202	09.2202	09.2202	09.2202
	North America	CMX25	CMX25	CMX25	CMX25

System Options for Smart2Pure 12	Smart2Pure 12 Standard	Smart2Pure 12 UV	Smart2Pure 12 UF	Smart2Pure 12 UV/UF
Smart2Pure System 12 L/hr Systems include an RO/pretreatment cartridge, an ultrapure polisher cartridge, sterile 0.2 µm filter, pressure regulator, UV lamp and/or UF filter where applicable	50129888	50129890	50129889	50129845
Required Accessories				
Smart2Pure Reservoir Choose a reservoir that fits your needs	See “Storage Reservoir Options”			
Pretreatment filter Required to prolong cartridge life Ships with a 10 inch filter housing and 1 µm filter	09.4003	09.4003	09.4003	09.4003
Optional Accessories				
Wall mounting bracket for the system	09.2212	09.2212	09.2212	09.2212
Qualification documents (IQOQ)	IOQDOCE50133912	IOQDOCE50133912	IOQDOCE50133912	IOQDOCE50133912
Replacement Consumables				
RO membrane with integrated pretreatment	09.2012	09.2012	09.2012	09.2012
Ultrapure polisher cartridge	09.1020	09.1020	09.1020	09.1020
Sterile 0.2 µm filter for system	09.1003	09.1003	09.1003	09.1003
System UV-lamp	n/a	09.1002	n/a	09.1002
Ultrafilter	n/a	n/a	50133981	50133981
Cleaning solution Europe/Asia Pacific	09.2202	09.2202	09.2202	09.2202
North America	CMX25	CMX25	CMX25	CMX25

TYPE 2

pure

water purification systems

Pure water for a wide range of applications

Type 2 pure water is an essential part of creating consistently pure chemical reagents, microbiological buffers and media. Type 2 water is also recommended as a pretreatment for Type 1 ultrapure systems.

innovation

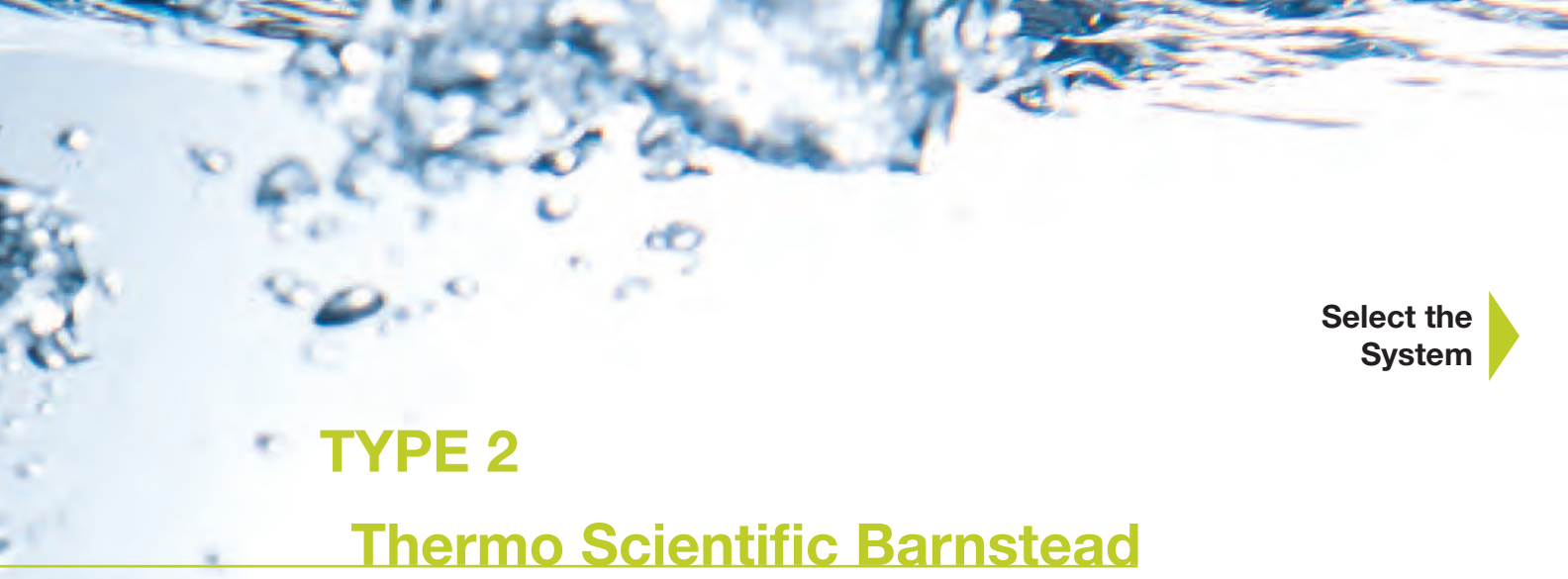
Advanced feed water monitoring alerts user to fluctuations in feed water quality to optimize cartridge

convenience

Aquastop connections allow users to quickly change the cartridge and minimize downtime

flexibility

Gain more space with numerous installation options – on the bench, wall or standalone



TYPE 2

Thermo Scientific Barnstead pure water purification system

selector guide

	Technology / Feature	Benefits
Capacity	Optimal amount of water to use daily to sustain reasonable cartridge life	Take into account any new techniques you will introduce in the coming years or new volume demands you may have
Technology	UV Oxidation	Protects against microorganism
Features	Automatic operation	Total operation of the system is automatic
	Multiple choices of dispense	Flexible options for dispensing
	Upgradable	If capacity needs increase, the system can be upgraded

REVERSE OSMOSIS AND DEIONIZATION		DISTILLATION		
				
Pacific TII water purification system	**LabTower TII water purification system**	**Mega-Pure Stills**	**Cabinetized Stills**	**Classic Stills**
Multiple capacities available	Flexible dispensing	All glass design	Classic tin-lined still with space saving design	Tin-lined
3-40 L/hr	20-40 L/hr	1.4-13 L/hr	7.6-19 L/hr	1.9-38 L/hr
Optional	Optional	—	Optional for reservoir	Optional for reservoir
Standard	Standard	Optional	Standard	Optional
—	Standard	—	—	—
Standard	Standard	—	—	—

Thermo Scientific Barnstead Pacific TII water purification system

The Barnstead Pacific TII water purification system converts tap water into high purity water. The ultimate system for the automatic and economical production of Type 2 water, the Pacific TII system supports daily requirements from 20 to 200 liters.

ROUTINE LABORATORY WORK

- Rinsing lab glassware
- Supplying autoclaves and ultrapure water systems
- Preparing and diluting buffers, reagents, and media

Multiple options for Type 2 water

- Five system options with permeate flows of 3, 7, 12, 20, or 40 L/hr
- Future system upgrades accommodate greater capacities to meet growing water demands
- Space-saving design permits benchtop installation or wall mounting with integrated mounting bracket

Operational reliability

- Microprocessor controlled for automatic operation with continuous monitoring of all critical parameters
- Automatic return to “operating” mode ensures recirculation during standstill periods
- Optional UV lamp prevents biological contamination

Easy-to-operate

- Resistivity/conductivity clearly displayed on large back-lit control panel that tilts for optimum viewing
- Status of current operating mode clearly indicating “production”, “stand-by”, “cleaning” or “disinfection” modes
- Reservoir fill-level shown as %
- System parameters are code-protected to prevent accidental changes to set points

GLP-Compliant documentation

- Optional printer connects to RS-232 port for data recording and traceability
- Cell constant of 0.01cm^{-1} ensures precise conductivity measurements
- Temperature compensation for the conductivity measurement has an accuracy of ±0.1°C (in conformity with USP 645)

Volume display

- Water level % in reservoir is shown automatically on the Pacific TII display

Clear information

Large, illuminated four-line display is easy to read and provides information on:

- Operating mode status, such as production, stand-by, disinfection
- Reservoir volume in %
- Temperature in °C

type 2 water system
with ultimate flexibility

Quick Look Comparison					
	Pacific TII 3 L/hr system	**Pacific TII 7 L/hr system**	**Pacific TII 12 L/hr system**	**Pacific TII 20 L/hr system**	**Pacific TII 40 L/hr system**
Pure water production at 15°C, L/hr	3	7	12	20	40
Resistivity at 25°C, MΩ·cm	15-10	15-10	15-10	15-10	15-10
Conductivity, µS/cm	0.067-0.1	0.067-0.1	0.067-0.1	0.067-0.1	0.067-0.1
TOC, ppb	<30	<30	<30	<30	<30
Removal, bacteria and particles, %	99	99	99	99	99
Silicate removal, %	> 99.9	> 99.9	> 99.9	> 99.9	> 99.9

Technologies that produce high purity water —

Reverse osmosis membrane

The high performance reverse osmosis membrane removes approximately 98% of inorganic ions and 99% of all dissolved organic substances as well as microorganisms and particles.

High purity water cartridge

This cartridge further purifies the reverse osmosis permeate to produce high purity water as required by international standards (ASTM Type II, CAP, ISO 3696, BS 3997 and CLSI).

UV lamp (UV version only):

The 254 nm UV transmission ensures optimal UV irradiation. Light of wavelength 254 nm acts as germicide.

Recirculation

Recirculation of the water between the storage reservoir and Pacific TII is important for maintenance of the water quality. Water from the reservoir is cycled through the high purity water cartridge and the UV chamber, then back to the reservoir.

Thermo Scientific Barnstead Pacific TII water purification system (continued)

The Barnstead Pacific TII system converts tap water to 15-10 MΩ·cm high purity water.

Pacific TII reservoirs
- Store high purity water safely and conveniently!

Large opening
- For easy and effective cleaning by hand

Optional safety filters:
- A CO_2 absorber prevents conductivity increases from drawn-in CO_2
- Sterile overflow prevents microorganisms from entering and contaminating reservoir water

Polyethylene reservoir
- Constructed with inert materials opaque to light

Recirculation pump
- Recirculation pump protects high purity water from bacterial growth during standstill while maintaining a low conductivity value

Wall mount
- Simple and space-efficient wall mounting

Conical bottom outlet
- Allows complete draining and efficient cleaning and disinfection

Specifications and Ordering Information

Feed Water Specifications*	
Source and pre-treatment	Tap water, softened or hardness stabilized
Conductivity, µS/cm	< 1500
Free chlorine concentration, mg/L	< 0.1
pH-Range	4-11
Temperature, °C	2-35°C
Pressure, psi (bar)	29-87 (2-6)

*complete list of feed water specifications can be found in the operational manual

Pacific TII System					
Operating pressure	**Electrical requirements**	**Power consumption**	**Feed water connector**	**Dimensions W x D x H**	**Ambient temperature**
29-87 psi (2-6 bar)	90-240V, 50/60Hz	0.08kW	R 3/4 in	14.6 x 13 x 23.7 in (372 x 330 x 603 mm)	2-35°C

Storage Reservoir		
Volume	**Material**	**Dimensions**
30 L	Polyethylene, ultrapure water resistant, opague to light	23.5 x 14.9 in (598 x 380 mm)
60 L		35.9 x 14.9 in (912 x 380 mm)
100 L		49.2 x 14.9 in (1249 x 380 mm)

System Options	UV option	Pacific TII 3	Pacific TII 7	Pacific TII 12	Pacific TII 20	Pacific TII 40
Pacific TII Systems All systems have a built-in wall bracket and include an RO membrane, a high purity water cartridge, pressure regulator, and UV lamp where applicable	**System with UV**	50132129	50132131	50132132	50131982	50132133
	System without UV	50132121	50132123	50132124	50132125	50132127
Required Accessories						
Pacific TII Reservoir Choose a reservoir that fits your needs		**See "Storage Reservoir Options" below**				
Double cartridge pretreatment system A 5 µm filter with activated carbon cartridge and a hardness stabilizer cartridge ship complete with two 10 inch filter housings to control chlorine, organic impurities and control hardness <250ppm TIS For full pretreatment options, see p. 86		09.4000				
Optional Accessories						
Qualification documents (IQOQ)		IOQDOCE50133915	IOQDOCE50133915	IOQDOCE50133915	IOQDOCE50133915	IOQDOCE50133915
Water watcher Alerts the user to leaks – available as 230V only		16.0129	16.0129	16.0129	16.0129	16.0129
Printer Utilizes RS-232 interface for safe documentation of all measured values and faults with date and time in compliance with GLP-Guidelines	110V	AY1137X1	AY1137X1	AY1137X1	AY1137X1	AY1137X1
	230V	09.2207	09.2207	09.2207	09.2207	09.2207
Replacement Consumables						
High purity water cartridge		09.4011	09.4011	09.4011	09.4011	09.4011
Reverse Osmosis membrane Pacific TII 3, 7, 12 only require a single RO membrane Pacific TII 20 and 40 require two membranes as indicated		22.0046	22.0046	22.0046	22.0046 (order 2)	22.0087 (order 2)
System UV lamp		09.4002	09.4002	09.4002	09.4002	09.4002
Cleaning solution	Europe/Asia Pacific	09.2202	09.2202	09.2202	09.2202	09.2202
	North America	CMX25	CMX25	CMX25	CMX25	CMX25
Activated carbon cartridge with 5 µm prefilter		06.5201	06.5201	06.5201	06.5201	06.5201
Hardness stabilizing cartridge		06.5452	06.5452	06.5452	06.5452	06.5452

Storage Reservoir Options for Pacific TII		30 L	60 L	100 L
Reservoir Choose a tank to meet your capacity and pump	with level display	06.5033	06.5063	06.5083
	with level display and recirculation pump	06.5032	06.5062	06.5082
Required Accessories				
Sterile overflow for reservoir		06.5001	06.5001	06.5001
Vent filter Choose the vent filter for your application needs	Sterile filter, 0.2 µm	06.5003	06.5003	06.5003
	Sterile filter, 0.2 µm + CO_2 absorber	06.5002	06.5002	06.5002
Optional Accessories				
UV lamp assembly for reservoir with lamp, 230V		06.5006	06.5006	06.5006
Wall mounting bracket		06.5015	06.5016	na
Replacement Consumables				
Replacement UV lamp (Reservoir)		09.5002	09.5002	09.5002

Thermo Scientific Barnstead LabTower TII water purification system

The Barnstead LabTower TII converts tap water into high purity water and provides water storage for a complete Type 2 water solution.

ROUTINE LABORATORY WORK

- Rinsing lab glassware
- Supplying autoclaves and ultrapure water systems
- Preparing and diluting buffers, reagents, and media

Consistent water quality

- Type 2 laboratory water meets ASTM Type II, CSLS-CLRW and ISO 3696 international standards
- Designed to continuously recirculate purified reservoir water to preserve water quality even during periods of inactivity

Compact mobile design

- Two system options with permeate flows of 20 or 40 L/hr
- Stand-alone design with integrated 100 L reservoir takes up zero bench space
- Castors allow easy re-location
- Systems can be upgraded later to accommodate growing water demands

Two ways to dispense water

- Dispense directly from the system via the dispensing valve for calibration solutions, reagent preparation, filling of containers, general rinsing purposes, etc.
- Dispense from the reservoir to supply autoclaves, dishwashers, ultrapure water systems, etc.

Integrated 100 L reservoir

- Up to 100 L of high purity water ready for dispensing when needed
- High purity polypropylene reservoir is opaque to light
- Conical bottom allows complete emptying for efficient cleaning and disinfection
- Adjustable setting for reservoir volume can be programmed for times when demand is low, allowing you to only store water that you can use

Clear information on system display

- The large four-line display is code-protected to prevent accidental changes in system settings
- Illuminated and easily readable, the display provides information on resistivity or conductivity, operating mode status, such as “production”, “stand-by” or sanitization, and volume of the reservoir in %

GLP-compliant documentation

- Developed to meet or exceed GLP requirements
- Recorded and traceable data can be obtained by print-out via the RS-232 interface and accessory printer
- Highly qualified and precise measurement of the conductivity is ensured by the cell constant of 0.01 cm^{-1} to an accuracy of ± 0.1°C

pure water system
with integrated 100 L tank

Quick Look Comparison		
	LabTower TII system	**LabTower TII + UV system**
Pure water production at 15°C, L/hr	20 or 40	20 or 40
Resistivity at 25°C, MΩ·cm	10-1	10-1
Conductivity, µS/cm	0.1-1	0.1-1
Bacteria content, CFU/mL, with sterile filter	< 1	< 1
Particle content (0.2 µm) per mL with sterile filter	< 1	< 1

Pretreatment

- 5 µm prefilter and activated carbon in the combi-filter cartridge protects the RO membrane from chlorine and particles
- Hardness stabilizing cartridge protects the reverse osmosis stage from hard water

Reverse osmosis and reservoir

- Pretreated water is pressure-forced through the permeable reverse osmosis module removing 97– 99% of all inorganic ions, 99% of dissolved organic substances as well as microorganisms and particles
- The built-in 100 L reservoir has a conical bottom outlet to optimize cleaning and sanitization

Ion exchange and UV

- RO membrane removes up to 99% of impurities. All remaining ions are removed by the low TOC, high-purity resins in the ion exchange cartridge.
- Irradiation with UV light (TII units with UV option only) eliminates any bacteria or germs that are present

Thermo Scientific Barnstead LabTower TII water purification system

Specifications and Ordering Information

Feed Water Specifications*	
Source	Potable tap water softened or hardness stabilized
Blocking index (SDI)	< 3, with higher values, an upstream pretreatment (model no. 09.4000) is to be installed
Conductivity, µS/cm	< 1500
Prefiltration	5 µm + activated carbon + hardness stabilization
Free chlorine, mg/L	< 0.1
Colloid index	< 3
ph-Range	4-11
Temperature, °C	2-35
Pressure, psi (bar)	29-87 (2 -6)

*complete list of feed water specifications can be found in the operational manual.

LabTower TII					
Operating pressure	**Electrical requirements**	**Power consumption**	**Feed water connector**	**Dimensions W x D x H in (mm)**	**Ambient temperature**
29-87 psi (2-6 bar)	90-240V, 50/60Hz	0.12kW	R 3/4 in	17.7 x 22.8 x 59 (450 x 580 x 1500)	2-35°C

System Options	UV option	LabTower TII 20	LabTower TII 40
LabTower TII Systems All systems include an RO membrane, a high purity water cartridge, 10 inch hardness stabilizing cartridge, pressure regulator, integrated 100 L reservoir and UV lamp where applicable	**System with UV**	50132193	50132141
	System without UV	50132191	50132196
Required Accessories			
LabTower TII Pretreatment Both cartridges are required for complete pretreatment	5µm filter with activated carbon and a 10" filter housing	50134022	50134022
	1µm filter with a 10" filter housings	09.4003	09.4003
Sterile vent filter for reservoir		06.5003	06.5003
Sterile overflow for reservoir		50132714	50132714
Optional Accessories			
UV lamp assembly for reservoir, 230V only Includes holder and UV lamp		06.5006	06.5006
Water watcher Alerts the user to leaks. Available as 230V only		16.0129	16.0129
Printer Utilizes RS-232 interface for safe documentation of all measured values and faults with date and time in compliance with GLP-Guidelines	110V	AY1137X1	AY1137X1
	230V	09.2207	09.2207
Qualification documents (IQ/OQ)		IOQDOCE50134156	IOQDOCE50134156
Replacement Consumables			
High purity water cartridge		02.2850-LAB	02.2850-LAB
Reverse Osmosis membrane LabTower TII 20 and 40 systems require two membranes as indicated		22.0046 (must order 2)	22.0087 (must order 2)
System UV-lamp		09.4002	09.4002
Sterile 0.2 µm filter		09.1003	09.1003
Cleaning solution	Europe/Asia Pacific	09.2202	09.2202
	North America	CMX25	CMX25
Activated carbon cartridge with 5 µm prefilter		06.5201	06.5201
Hardness stabilizing cartridge		06.5452	06.5452
Replacement UV lamp (reservoir, 230V only)		09.5002	09.5002

Thermo Scientific Barnstead Mega-Pure Glass Stills

Barnstead Mega-Pure Glass Stills effectively remove inorganic solids, organics with boiling points higher than water, bacteria, and pyrogens. The stills are constructed of non-leaching components to ensure high purity water.

Product Features

- Contact with only glass, quartz and Teflon® components ensures ultimate purity and eliminates cross-contamination
- Choice of five production capacities
- Units are easily wall- or bench-mounted
- Vertical condenser design provides maximum purity
- High temperature cut-off shuts down the still if the temperature is too high, preventing heating element burnout
- Quick release cover provides easy cleaning access
- Connection to Automatic Collection System (ACS) assures a 24-hour automatic system
- Includes feed water solenoid valve for automatic operation
- Produces water with a resistivity of 1-10 MΩ·cm, depending on feed water purity

MP-1

- Compact, easy-to-use 1 L/hr glass still available with or without a storage bottle

MP-3A, MP-6A and MP-11A

- Ideal for larger volume demands with storage and options

MP-12A

- Built-in deionizer for pretreated feed to boiler. Distillate cooler allows product water to be used as it is produced, cooling it from 85-55°C for ease of handling. No need to wait for cooling

ROUTINE LABORATORY WORK

- Rinsing lab glassware
- Supplying autoclaves and ultrapure water systems
- Preparing and diluting buffers, reagents, and media

Quick Look Comparison

	MP-1	MP-3A	MP-6A	MP-11A	MP-12A
System features	Compact, easy-to-use	Stills for larger volume demands			Deionizer and distillate cooler
Product water capacity, L/hr	1	3	6	13	12
Cooling water capacity, L/hr	11.3	30.3	53	130	130
Number of heaters	1	1	2	4	4
Resistivity at 25°C, MΩ·cm	1-10	1-10	1-10	1-10	1-10

glass stills ideal for biological applications

Product Accessories

Automatic Collection System (ACS)

- All glass system designed to collect water from the Mega-Pure Glass Stills and control their operation
- Generous 45 L capacity
- Easy wall- or bench-mount
- Preset to shut off the power to the heaters and the water supply to the still after the bottle has collected approximately 45 L
- The system will automatically restart the still and refill the collection system when the purified water supply has been depleted to approximately 38 L

Pretreatment for hard water

- Allows for pretreating feed water to Mega-Pure Glass Stills
- Mega-Pure single or dual cartridge deionizer reduces scale build up and increases distillate purity
- Greater flexibility in meeting varying feed water qualities
- Temperature-compensated purity meter measures water quality and indicates when cartridges are exhausted
- Built-in drain valve for simple cartridge changes
- Large cartridge capacity for extended cartridge use
- Unit can be wall- or bench-mounted

Plastic Bottle (413964)

Glass Bottle (410535)

Automatic Collection System

Mega-Pure Deionizer D2

Thermo Scientific Barnstead Mega-Pure Glass Stills (continued)

Specifications and Ordering Information

Product Specifications				
Inlet water temperature°C (°F)	**Vent temperature°C (°F)**	**Auto drain**	**Inlet pressure (psig)**	**Auto start/stop controls**
4-37 (39.2-98.6)	85-96.7 (185-206)	No	20-100	Yes

System Options								
	Volume output (L/hr)*	**Overall dimensions W x H x D in (mm)**	**Electrical (50/60 Hz)**			**Model number**	
			Volts	**Amps**	**Phase**	**Unit**	**6 L bottle included**
MP-1	1.4	18 x 34 x 9.75 (45.7 x 86.4 x 24.8)	120	9	1	A440266	A440267
			240	4.5	1	A7981	A7982
MP-3A	3.4	23 x 45 x 12 (58.4 x 114.3 x 30.5)	240	11	1	A440367	–
			208	13	1	A440696	–
MP-6A	6	23 x 45 x 12 (58.4 x 114.3 x 30.5)	240	21	1	A440518	–
			208	25	1	A440697	–
MP-11A	13	29.2 x 53 x 14.4 (74.2 x 134.6 x 36.6)	240	42	1	A440118	–
			208	49	1	A440117	–
MP-12A* Built-in deionizer (holds two cartridges) and distillate cooler	12	29.2 x 53 x 14.4 (74.2 x 134.6 x 36.6)	240	42	1	A442011	–
			208	49	1	A442012	–

Required Accessories		Model Number
Dual solenoid Required if using pretreated boiler feed water and untreated cooling water	MP-1 (240V), MP-3, MP-6A and MP-11A	4402362
	MP-1 (120V)	RY798X2A
Deionization cartridges Required for MP-12A. See Optional Accessories		
Storage solutions See Storage Options		

Optional Accessories		Model Number
Single cartridge deionizer (D1) Single cartridge deionizer removes inorganic contaminants. Order one deionization cartridge to complete your system. Dimensions: W x H x D – 10.5 x 25.5 x 7.5 in (26.7 x 64.8 x 19 cm)		D440046
Dual cartridge deionizer (D2) Provides increased capacity with chlorine and organic removal. Order two deionization cartridges to complete your system. Dimensions: W x H x D – 16.75 x 25.5 x 7.5 in (42.6 x 64.8 x 19 cm)		D440066
Deionizer accessories	**Still adapter kit** Required to connect the Deionization System to any Mega-Pure Glass Still	440376
	Solenoid valve accessory kit For use with the D1 or D2 when used as stand alone units	440375
Deionization cartridges	**High purity cartridge** Used in the MP-12A, D1 and D2 unit for high purity	D400377
	High capacity cartridge Used in MP-12A, D1 and D2. Removes ionized solids for extended capacity	D400499
	Organic removal cartridge Used in D2 for organic and chlorine removal	D440265

*Volume Output for 208V units can be reduced up to 25% less than specified.

Storage Options		Model Number
Storage bottles For manual operation	**Plastic bottle, 6 L capacity** For use with MP-1 and MP-3A stills	413964
	Glass bottle, 9 L capacity For use with MP-1 and MP-3A stills	410535
	Glass bottle, 13 L capacity For use with any Mega-Pure Glass Still	413934
	Glass bottle, 45 L capacity For use with any Mega-Pure Glass Still	410164
Automatic collection system (ACS) For use with any Mega-Pure Glass Still. Collects up to 45 L of water and controls the still. Dimensions: W x H x D 16.25 x 38 x 16.25 in (41.3 x 96.5 x 41.3 cm)	**Automatic collection system (ACS) unit**	B440704
	Flexible tubing adapter kit Needed when the supplied glass tubing is either too long or too short to reach still. Flexible tubing is not included. 0.5 inch Teflon tubing able to handle 80-90°C water is recommended	440138
	ACS wall mounting bracket	400634
	Adapter for ACS washer hook-up for glassware washers	440241

Thermo Scientific Barnstead Classic Stills

Barnstead Classic Stills effectively remove inorganic solids, organics, bacteria, and pyrogens. The stills are constructed of copper and bronze with a coating of pure tin. The inert nature of tin prevents any leaching of contaminants into the water.

ROUTINE LABORATORY WORK

- Rinsing lab glassware
- Supplying autoclaves and ultrapure water systems
- Preparing and diluting buffers, reagents, and media

Product Features

- Double-walled boiler and preheating of feed water conserves electricity
- Vented condenser allows for stripping of gaseous impurities
- Unique de-concentrator removes scale forming impurities from the boiler
- Unique Thermo Scientific Q-Baffle ensures high quality pyrogen free water by stripping contaminant laden water droplets from steam
- Space-saving horizontal condenser
- Metal construction withstands years of use
- Units are easily floor and bench mountable, depending on model
- Inert pure tin pathways assure product water quality
- Controller unit can be wall mounted

Portable Stills

- Requires no permanent plumbing or electrical connections, allowing quick set-up
- Includes low water cut-off for safety protection
- Bench-mounted

Floor Model Electric Stills

- Come standard with floor mounting stand
- New over temperature protection system improves safety
- New plug-and-play hardware allows for easier installation
- Capacities from 1 to 10 gal/hr
- Low water cut-off protects heating elements when water supply is interrupted
- Optional fully automatic controls allow for unattended operation
  - Stops still when storage reservoir is full, starts still when water level falls below preset level
  - Drains still boiler at selected 2, 4, 8, 16-hour intervals to reduce scale formation

Steam Still

- Utilize available in-house steam as heat source
- Optional automatic controls allow for unattended operation
  - Stops still when storage reservoir is full, starts still when water level falls below preset level
  - Drains still boiler at selected 2, 4, 8, 16-hour intervals to reduce scale formation

Quick Look Comparison

	Portable Electric Stills	Floor Model Electric Stills				Steam Stills
Product water capacity, gal/hr	1/2	1	2	5	10	10
Mounting	Bench	Floor				Floor

Specifications and Ordering Information

Tin-Coated Storage Reservoir Specifications

		Output gal/hr(L/hr)	Cooling water gal/hr (L/hr)	KW	Electrical (50/60 Hz) Volts	Electrical (50/60 Hz) Amps	Phase	Dimensions W x H x D in (cm)			Model number
Electric stills Floor stand included (except A1007)	**1/2 gal/hr Portable**	0.5 (1.9)	4 (15)	1.3	120	12	1	21 (52)	19 (49)	10 (26)	A1007
	1 gal/hr	1 (3.8)	8 (30)	2.6	120	23	1	22 (56)	66 (168)	10 (25)	A1011-A
		1 (3.8)	8 (30)	2.6	240	12	1	22 (56)	66 (168)	10 (25)	A1011-B-61
	2 gal/hr	2 (7.6)	16 (61)	6	240	26	1	23 (58)	68 (173)	11 (28)	A1013-B-61
		2 (7.6)	16 (61)	6	208	17	3	23 (58)	68 (173)	11 (28)	A1013-C
	5 gal/hr	5 (19)	40 (151)	13	240	57	1	35 (89)	77 (196)	14 (36)	A1015-B-61
		5 (19)	40 (151)	13	208	36	3	35 (89)	77 (196)	14 (36)	A1015-C
	10 gal/hr	10 (38)	80 (303)	26	240	66	3	37 (94)	89 (226)	14 (36)	A1016-D
Steam stills		**Output gal/hr (L/hr)**	**Cooling water gal/hr (L/hr)**	**Steam pressure (PSI)**		**Boiler horsepower**	**Steam lb/hr (kg/hr)**	**Dimensions W x H x D in (cm)**			**Model Number**
	10 gal/hr	10 (38)	38 (144)	35-50		3.5	90 (41)	90 (229)	150 (330)	19 (48)	A1213

Required Accessories		Model Number
Steam still floor stand	For 10 gal/hr steam stills only	G1000
Storage reservoir	Choose a storage reservoir that best fits your needs – go to Thermo Scientific Barnstead Classic Still Storage Reservoirs and Accessories on pages 70-71	
Optional Accessories		
Fully automatic controls 120V (50/60Hz) includes feedwater and drain solenoid valves, manual valves, piping and level monitor	For use with 1 and 2 gal/hr electric stills	G2100
	For use with 5 gal/hr electric stills	G2110
	For use with 10 gal/hr electric still	G2125
	For use with 10 gal/hr steam still	G2020

tin lined for pure water

Thermo Scientific Barnstead Classic Still Storage Reservoirs and Accessories

Select a Barnstead Classic Still Storage Reservoir and mounting option that will best fit your needs. The Ventgard Air Filter, Water Seal and UV Light Assembly are required accessories that will protect your pure water during storage.

Storage reservoirs

- Available in 10 to 200 gallon reservoir options
- Crafted from copper and hand-wiped with pure tin to ensure the purity of the distilled water
- All reservoirs include a removable cover, water level sight glass and a tin coated draw-off faucet with serrated hose nipple
- Connections provide for optional accessories including pumps and fully automated controls
- Requires a floor stand or wall bracket (10 and 25 gallon reservoirs only) for proper installation

Required Accessories

Floor stand and wall bracket

Choose either a floor stand or wall bracket for proper installation of reservoir

Floor stands

- 10, 25 and 50 gallon reservoir stands are fabricated from heavy gauge sheet metal and have adjustable feet
- 100 and 200 gallon reservoir stands are fabricated of thick steel angle-iron

Wall brackets

- 10 gallon reservoir brackets are fabricated from heavy gauge aluminum
- 25 gallon reservoir brackets are fabricated of thick steel angle-iron

Ventgard air filter and water seal

- Protects the stored water against airborne particulates, organics and CO_2
- Water seal works as a one-way valve to allow distilled water into reservoir
- Prevents air from entering the reservoir via the condenser atmospheric vent

UV light assembly

- Maintains sterility in the reservoir
- UV lamp is enclosed by a tubular, transparent, inert sheath
- When lamp changes are necessary, only the lamp needs to be removed. The reservoir cover and sheath remain in place eliminating any exposure of water to contamination from the air

Storage Reservoir
Floor Stand

Storage Reservoir
Wall Bracket

Specifications and Ordering Information

System Options

Reservoir options	Distribution outlet (NPT)	Drain outlet (NPT)	Overall dimensions in (cm)			Model number
			W	H	D	
10 gal	1/2 in	n/a	10.25 (26)	29 (74)	17 (43)	B3043
25 gal	1/2 in	n/a	18 (46)	29 (74)	25 (64)	B3045
50 gal	1 in	1/2 in	22 (56)	36 (91)	28 (71)	B3046
100 gal	1 in	1/2 in	29 (74)	43 (110)	35 (89)	B3047
200 gal	1 1/2 in	1 in	38 (96)	50 (128)	45 (114)	B3049

Required Accessories

Mounting options Choose the mounting option that best suits your needs.	**Floor stands**	For the 10 gal reservoir	11 (28)	27 (69)	11 (28)	H1000
		For the 25 gal reservoir	19 (48)	27 (69)	19 (48)	H1001
		For the 50 gal reservoir	22 (56)	20 (51)	22 (56)	H1002
		For the 100 gal reservoir	29 (74)	11 (28)	29 (74)	H1003
		For the 200 gal reservoir	39 (99)	22 (56)	39 (99)	H3230
	Wall brackets	For the 10 gal reservoir				H3240
		For the 25 gal reservoir				H3242
UV light assembly Maintains water sterility in reservoir. Includes housing, on/off switch, 6 ft. cord, lamp and ballast						H4005
Ventgard air filter and water seal						H3111

Replacement Consumables

Replacement UV lamp	04141
Ventgard air filter Protects stored water against airborne particulates, organics and CO_2	H3120
Replacement water seal Prevents air from entering storage reservoirs via condenser atmospheric vent	H3130
Ventgard filter element The consumable portion of the Ventgard filter assembly	25001-DB

Thermo Scientific Barnstead Cabinetized Stills

Our Barnstead Cabinetized Stills include a still and an appropriately matched tin-coated storage reservoir in a compact storage cabinet. This space saving design uses less space than conventional units and allows for faster installation.

all-in-one
tin-lined still and reservoir

The inside of a Barnstead Cabinetized Still

Product Features

- Choice of two sizes; 2 or 5 gal/hr
- Q-Baffle ensures high quality pyrogen free product water
- Fully automatic operation allows for unattended operation. Still turns off when the reservoir is full and restarts when reservoir empties. Automatically drains the boiling chamber every time the unit is off and every 4 hours of operation, helping to keep your still clean.

Model 210 Still – 2 gal/hr with 10 gallon reservoir

- Purity meter alerts user of distilled water purity in storage reservoir
- Includes low water cut-off for safety protection

Model 525 Still – 5 gal/hr with 25 gallon reservoir

- Purity meter alerts user of distilled water purity in storage reservoir
- Optional recirculation pump and base mounting stand available
- Storage tank equipped with a UV lamp for improved bacterial control

ROUTINE LABORATORY WORK

- Rinsing lab glassware
- Supplying autoclaves and ultrapure water systems
- Preparing and diluting buffers, reagents, and media

Quick Look Comparison

	Model 210	Model 525
Flow rate	2 gal/hr	5 gal/hr
Storage reservoir	10 gal	25 gal

Optional Accessories

Bench stand Model 210 only.	A1066
Floor stand For Model 525 only. L x W x D: 36 x 18.8 x 35 in (93 x 48 x 89 cm)	A1521
Recirculation pump For Model 525 only. Floor stand (A1521) included.	A1522

Specifications and Ordering Information

Product Specifications

System options	Output gal/hr (L/hr)	Voltage (50/60 Hz)		Amps	Phase	Wire	Dimensions W x H x D	Model number
		Controller	Heating element					
210 still 2 gal/hr	2 (7.6)	120	240	26	1	2	24 x 41 x 15.25 in (60 x 103 x 39 cm)	A1065-B
	2 (7.6)	120	208	17	3	4	24 x 41 x 15.25 in (60 x 103 x 39 cm)	A1065-C
	2 (7.6)	120	240	15	3	3	24 x 41 x 15.25 in (60 x 103 x 39 cm)	A1065-D
525 still 5 gal/hr	5 (19)	120	240	55	1	2	36.5 x 48 x 18.75 in (91 x 122 x 48 cm)	A1085-B
	5 (19)	120	208	36	3	4	36.5 x 48 x 18.75 in (91 x 122 x 48 cm)	A1085-C
	5 (19)	120	240	33	3	3	36.5 x 48 x 18.75 in (91 x 122 x 48 cm)	A1085-D

distillation 101

Distillation effectively removes most inorganic solids, all organics with a boiling point greater than water (100°C), all bacteria and pyrogens. Gases and low molecular weight organics are not effectively removed by distillation.

Thermo Scientific Barnstead products include a broad range of stills

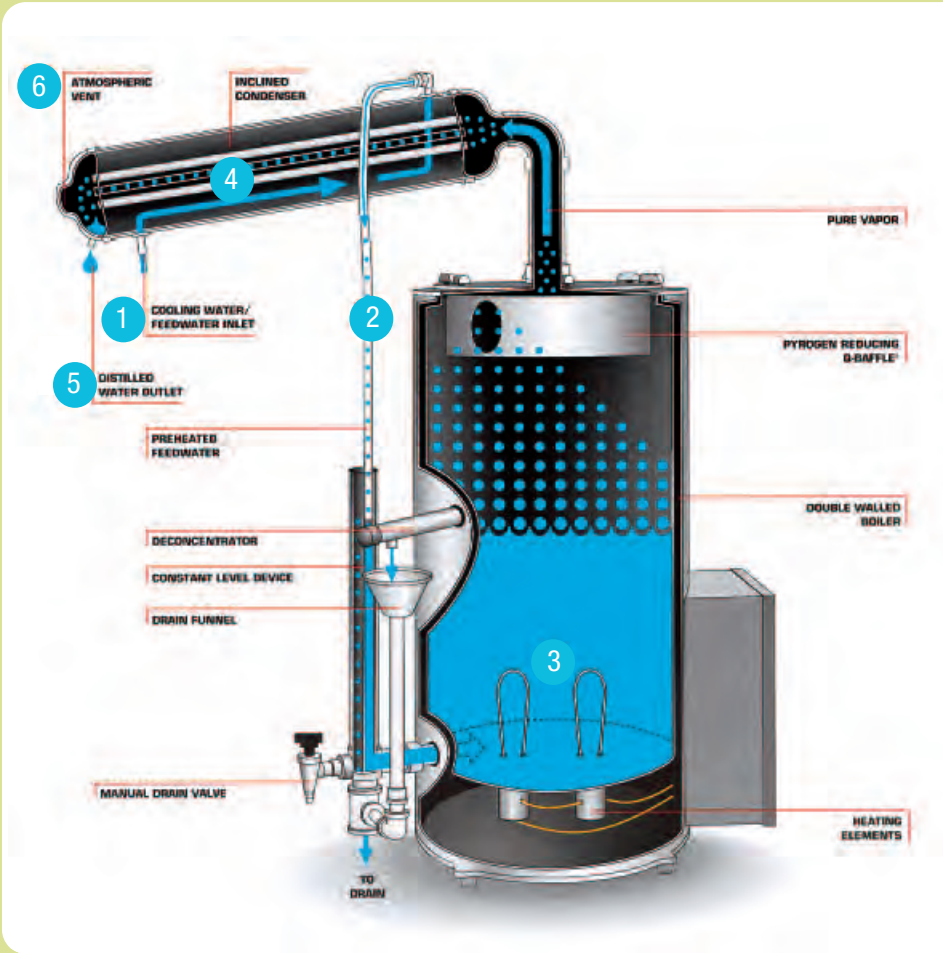
Our stills range in size from 1.4 to 38 L/hr. Select from stills constructed of tin or glass. Many models offer fully automatic options or pretreatment options to minimize scaling.

Still components

A still includes a boiling chamber (boiler), electric or steam immersion heaters, pyrogen reducing baffle, condenser, constant level device and low water cutoff. Options include pretreatment solutions and fully automatic controls that allow stills to work automatically with pretreated feed water and a storage reservoir.

Step-By-Step technologies used in distillation systems

1. Feed water enters the still through the Cooling Water/Feed Water Inlet. As the water passes through the Inlet, it becomes warmed as it makes its way to the boiler. It in turn cools the vapor entering the condenser.
2. Water flows from the condenser into the constant level device, then into the boiler.
3. The water in the boiler is heated. Impurities with a boiling point higher than water (100°C / 212°F) remain in the boiler, while water and impurities with a boiling point equal to or lower than water are converted to water vapor. The pure vapor moves up the boiler through a pyrogens-reducing baffle and into the condenser.
4. In the condenser, the pure vapor is transported through the condenser where it contacts tubes or coils containing cooling water. The pure vapor contacts these tubes and coils and is condensed to produce pure water.
5. The distilled water exits the condenser and is stored in a reservoir through the Distilled Water Outlet.
6. Atmospheric vent allows for volatile contaminants to be vented, increasing the purity of the distilled water.



reverse osmosis

water purification systems

Water purified using reverse osmosis is useful in supplying water to lab equipment such as water baths, dishwashers, and autoclaves.

innovation

Thermo Scientific Barnstead LabTower RO system allows the tank level to be set manually

convenience

Dispense easily from the tank

flexibility

Endless mounting choices – on the bench, on the wall, or free-standing

reverse osmosis

Reverse osmosis is economical

Reverse osmosis is the most economical method to remove up to 99% of impurities in feed water. The RO membrane is semi-permeable with a thin microporous surface that rejects virtually all dissolved materials including inorganic solids, organics, particles and microorganisms.

Reverse osmosis water is versatile

RO water can be used to prepare microbiological buffers and chemical reagents. Additionally, it is a great option for use in general laboratory equipment, such as water baths, humidifiers, and autoclaves.

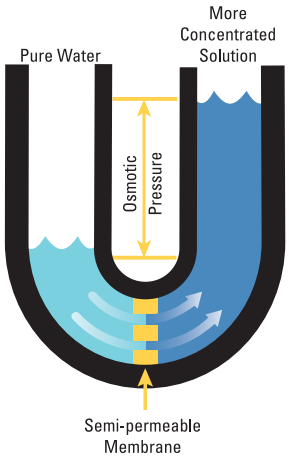
Reverse osmosis is effective

As the feed water passes through the RO membrane, impurities deposit on the surface of the RO membrane and are flushed away to the drain. The result is purified product water free of up to 99% of its impurities. The specific rejection rates of all the impurities are shown in each of the product specifications.

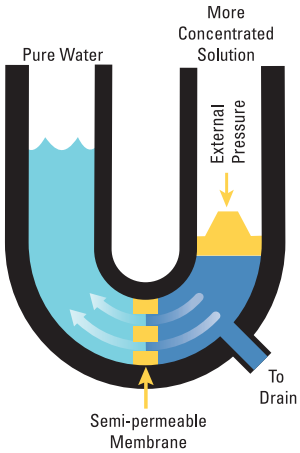
Feed water factors

Certain characteristics of your feed water directly relate not only to membrane performance and lifetime but also directly impact the quality of your product water.

Take advantage of our Thermo Scientific H_2O Select Analysis Kit, our free comprehensive testing program which will analyze your feed water to ensure optimum RO performance.



Osmosis



Reverse Osmosis

The natural osmosic flow of water through a semi-permeable membrane from less concentrated solutions to more concentrated solutions. Reverse osmosis is achieved when external pressure is applied to reverse this natural flow, as shown on the right.

Our technical service experts are a great resource for any feed water questions you might have.

Here is an explanation of key characteristics impacting RO performance:

Temperature

Volumes listed for the reverse osmosis product water are based on a feed water temperature of 15°C (59°F). For every 1°C below 15°C (59°F), the quantity of product water is reduced by 3%. Additionally, if the feed water temperature goes beyond 25°C (77°F), the RO membrane may be damaged. We recommend a hot and cold water mixing valve to regulate the temperature to 15°C (59°F).

Alkalinity and calcium

Carbonates, bi-carbonates, hydroxides and calcium impurities in your feed water contribute to RO membrane scaling. Both the Thermo Scientific Barnstead Pacific RO and Thermo Scientific Barnstead LabTower RO systems have pretreatment solutions to prevent this. Included in the pretreatment system is a hardness stabilizer cartridge which binds calcium, thereby protecting the RO membrane.

Chlorine

Chlorine can damage the RO membrane and reduce its performance and useful life. Again, both Pacific RO and LabTower RO have solutions to pretreat the water, which includes a 5 µm prefilter + activated carbon cartridge to prevent entry of particles > 5 µm and high concentrations of free chlorine.

Turbidity

The turbidity level indicates the amount of suspended solids present. This suspended material can shorten the life of filters and reverse osmosis membranes if not removed. Our Pure Water Experts can recommend pretreatment options if turbidity is an issue with your feed water. RO membranes show very little fouling when the feed water has a turbidity of less than 1 NTU.

SDI (Silt Density Index)

Suspended solids and colloidal materials in feed water are one of the biggest problems in reverse osmosis systems. In order to have some measure of the degree of this fouling problem, a concept called Silt Density Index is used. Here a 0.45 µm filter is exposed to the feed water under pressure and filtration rates are calculated. A SDI of <5 is considered acceptable for the reverse osmosis systems.

Thermo Scientific Barnstead

reverse osmosis purification system

selector guide

	Technology / Feature	Benefits
Capacity	Optimal amount of water to use daily to sustain reasonable cartridge life	Choosing the right system will give you the most value. Take into account any new applications you will introduce in the coming years or new volume demands you may have.
Features	Upgradable	If capacity needs increase, the system can be upgraded
	Feed water monitoring	Alerts you to fluxuations in feed water quality
	Integrated 100 L Reservoir	Offers a stand-alone configuration for labs with little bench space
	Pretreatment integrated into system	Pretreatment integrated into system

Pacific RO	LabTower RO
Flexible mounting options	Integrated 100 L Reservoir
3, 7, 12, 20, 40 L/hr	20, 40 L/hr
Standard	Standard
Standard	Standard
—	Standard
—	Standard

Thermo Scientific Barnstead LabTower RO water purification system

The Barnstead LabTower RO Converts Tap Water into RO Water and stores it in an integrated 100 L reservoir

ROUTINE LABORATORY WORK:

- Rinsing lab glassware
- Supplying autoclaves, water baths, incubators and glassware washers
- Preparing and diluting buffers and reagents
- General biotechnology

Advanced technology in a mobile design

- An ultra-modern controller provides easy-to-read system parameters
- Completely drainable integrated 100 L high-purity water reservoir has a low-noise pressure booster as a standard component
- Mounted on casters, the compact LabTower RO system is an ideal pure water supply for any laboratory. Ideally suited as a feed water source for dishwashers, autoclaves and general laboratory use
- A built-in pretreatment unit, consisting of a hardness stabilizer for protection of the reverse osmosis module from hardness formers
- An activated carbon/5µm combi-cartridge protects the system against free chlorine and particles, ensures the long service life of downstream purification stages

Compact and mobile design

- Two system options with permeate flows of 20 or 40 L/h
- Stand-alone design with integrated 100 L tank takes up ZERO bench space
- Casters allow for easy relocation
- Systems can be upgraded later to accommodate growing water capacity demands

Integrated 100 L reservoir

- 100 L RO water storage in a high-purity polyethylene PE opaque reservoir
- Adjustable reservoir volume can be programmed for times of low demand
- Dispense from the reservoir to supply autoclaves, glassware washers, incubators, etc

Easy-to-operate clear display

- Resistivity/conductivity clearly displayed on large back-lit control panel that tilts for optimum viewing
- Status of current operating mode clearly indicating “production”, “stand-by”, or “cleaning” modes
- Reservoir fill-level shown as %
- System parameters are code-protected to prevent accidental changes to set points

GLP-compliant documentation

- Developed to fulfill GLP requirements
- Recorded and traceable data can be obtained by print out via the RS-232 interface and accessory printer
- Highly qualified and precise measurement of the conductivity is ensured by the cell constant of 0.16 cm^{-1}

Quick Look Comparison	LabTower RO 20	LabTower RO 40
Pure water production at 15°C , L/hr	20	40
Withdrawal performance from reservoir at 1.5 bar, L/hr	180	180
Retention quota for inorganics, %	> 98	> 98
Bacteria content, %	> 99	> 99
Retention quota for particles, %	> 99	> 99

RO water delivered
from an integrated system

Feed Water Requirements*	
Source	Potable tap water that has been softened or hardness stabilized
Silt density index (SDI)	< 5. With higher values a pretreatment (model no. 09.4000) must be installed upstream of the system.
Conductivity, µS/cm	< 1500
Free chlorine, mg/L	<0.1
pH-Range	4-11
Temperature, °C	2-35

*complete list of feed water specifications can be found in the operational manual

LabTower RO Product Specifications					
Operating pressure	**Electrical requirements**	**Power consumption**	**Feed water connector**	**Dimensions W x D x H**	**Temperature**
29-87 psi (2-6 bar)	90-240V, 50/60Hz	0.25kW	8 mm o.d.	17.7 x 22.8 x 59 in (450 x 580 x 1500 mm)	2-35°C

System Options		LabTower RO 20	LabTower RO 40
LabTower RO Systems All systems include an RO membrane(s), 10 inch 5µm filter with hardness stabilizer cartridge, integrated 100 L reservoir, and pressure regulator		50132390	50132391
Required Accessories			
Pretreatment cartridges Both are required for complete pretreatment solution	5µm filter with activated carbon and a 10 inch filter housing	50134022	50134022
	1µm filter with a 10 inch filter housings	09.4003	09.4003
Sterile vent filter for reservoir		06.5003	06.5003
Sterile overflow for reservoir		50132714	50132714
Optional Accessories			
Printer Utilizes RS-232 interface for safe documentation of all measured values and faults with date and time in compliance with GLP guidelines	110V	AY1137X1	AY1137X1
	230V	09.2207	09.2207
UV lamp assembly for the reservoir with lamp, 230V only		06.5006	06.5006
Water watcher Alerts the user to leaks. Available as 240V only.		16.0129	16.0129
Replacement Consumables			
Reverse Osmosis membrane LabTower TII 20 and 40 require two membranes as indicated		22.0046 (must order 2)	22.0087 (must order 2)
10" 5um filter with hardness stabilizer cartridge		06.5204	06.5204
Replacement reservoir UV Lamp (230V only)		09.5002	09.5002
Cleaning solution	Europe/Asia Pacific	09.2202	09.2202
	North America	CMX25	CMX25

Thermo Scientific Barnstead Pacific RO water purification systems

The Barnstead Pacific RO system is a modularly designed laboratory reverse osmosis system specifically developed for functional and economical production of high-purity water.

ROUTINE LABORATORY WORK:

- Rinsing lab glassware
- Supplying autoclaves, water baths, and incubators
- Preparing and diluting buffers and reagents
- General biotechnology

Product Features

- Five system options with permeate flows of 3, 7, 12, or 20, or 40 L/h
- Space-saving design allows system to sit on the laboratory bench or be mounted on the wall
- RO membrane removes organic and inorganic contaminants, microorganisms, particles and colloids
- Simple system upgrade accommodates future pure water capacity requirements

Reliable operation

- Microprocessor control offers automatic operation with continual monitoring of all important parameters

Easy-to-operate clear display

- Resistivity/conductivity clearly displayed on large back-lit control panel that tilts for optimum viewing
- Status of current operating mode clearly indicates “production”, “stand-by”, or “cleaning” modes
- Reservoir fill-level shown as %

Integrated feed water monitoring

- Good quality feed water is a prerequisite for high purity water and extends cartridge service life

GLP-compliant documentation

- Real-time clock records system errors and faults
- Ongoing data storage collects four weeks information displayed in clear text
- Operating system is code-protected to prevent unauthorized changes to system settings
- RS-232 interface with adjustable sender interval allows for customized timing of data transmission of measured values and faults to a PC or data printer
- Cell constant of 0.16 cm^{-1} ensures precise conductivity measurements

Pacific RO pretreatment

- Two 10 inch (25.4 cm) cartridge filter housings with a 5 µm prefilter + activated carbon to prevent entry of particles > 5 µm and high concentrations of free chlorine. Also includes hardness stabilizer cartridge which binds calcium and prevents its precipitation.

Worry-free pure water storage

- Reservoir are constructed of pigment-free polyethylene
- Conical bottom allows for easy cleaning, disinfecting and complete emptying

flexible configurations
for your RO water needs

Quick Look Comparison	Pacific RO 3 L/hr systems	Pacific RO 7 L/hr systems	Pacific RO 12 L/hr systems	Pacific RO 20 L/hr systems	Pacific RO 40 L/hr systems
Pure water production at 15°C , L/h	3	7	12	20	40
Salt retention, %	98	98	98	98	98
Retention, bacteria and particles, %	99	99	99	99	99

Feed Water Requirements*	
Source	Potable tap water that has been softened or hardness stabilized
Silt density index (SDI)	< 5, With higher values, a pretreatment (model no. 09.4000 must be installed upstream of the system)
Conductivity, µS/cm	< 1500
Prefiltration	5 µm + activated carbon
Free chlorine, mg/L	< 0.1
pH-range	4-11
Temperature, C°	2-35

*complete list of feed water specifications can be found in the operational manual

Thermo Scientific Barnstead Pacific RO water purification system (continued)

Storage Reservoir		
Volume	**Material**	**Dimensions**
30 L	Polyethylene, opague to light	23.5 x 14.9 in (598 x 380 mm)
60 L		35.9 x 14.9 in (912 x 380 mm)

Pacific RO Product Specifications					
Operating pressure, psi (bar)	**Electrical requirements**	**Power consumption**	**Feed water connector**	**Dimensions W x D x H**	**Temperature**
29-87 (2-6)	90-240 V, 50/60Hz	0.1 kW	R 3/4 in	14.6 x 13 x 23.7 in (372 x 330 x 603 mm)	2-35°C

Ordering Table		Pacific RO 3	Pacific RO 7	Pacific RO 12	Pacific RO 20	Pacific RO 40
Pacific RO Systems All systems have an integrated wall bracket and include an RO membrane and pressure regulator		50132385	50132386	50132387	50132388	50132389
Required Accessories						
Pacific RO Pretreatment Includes two 10 inch (25.4 cm) cartridge housings, a 5 µm prefilter + activated carbon cartridge and hardness stabilizer cartridge		09.4000	09.4000	09.4000	09.4000	09.4000
Pacific RO Reservoir Choose a reservoir that fits your needs		See "Storage Reservoir Options" the next page				
Optional Accessories						
Water watcher Alerts the user to leaks. Available as 230V only.		16.0129	16.0129	16.0129	16.0129	16.0129
Replacement Consumables						
Reverse Osmosis membrane Pacific RO 3, 7, 12 only require a single RO membrane. Pacific RO 20 and 40 require two membranes as indicated.		22.0046	22.0046	22.0046	22.0046 (order 2)	22.0087 (order 2)
5 uM prefilter + actived carbon 10 inch cartridge		06.5201	06.5201	06.5201	06.5201	06.5201
Hardness stabilizing 10 inch cartridge		06.5452	06.5452	06.5452	06.5452	06.5452
Cleaning solution	Europe/Asia Pacific	09.2202	09.2202	09.2202	09.2202	09.2202
	North America	CMX25	CMX25	CMX25	CMX25	CMX25

Storage Reservoir Options for Pacific RO		30 L	60 L	100 L
Reservoir	with level display	06.5033	06.5063	06.5083
	with level display and pressure pump	06.5034	06.5064	06.5084
Required Accessories				
Sterile overflow for reservoir		06.5001	06.5001	06.5001
Vent filter Choose the vent filter for your application needs	Sterile filter, 0.2 µm	06.5003	06.5003	06.5003
	Sterile filter, 0.2 µm + CO_2 absorber	06.5002	06.5002	06.5002
Optional Accessories				
UV lamp assembly for the reservoir with lamp, 230V only		06.5006	06.5006	06.5006
Wall mounting bracket		06.5015	06.5016	na
Replacement Consumables				
Replacement UV lamp (Reservoir)		09.5002	09.5002	09.5002

pretreatment

Not all feed water sources are equal!

Pretreatment is sometimes necessary to maximize the effectiveness of water purification systems. Poor water quality can also shorten the life of water system consumables.

Mixed Multi Water Softener

- Ideal system to treat hard feed water
- Not only softens the water, but also protects the RO membrane from blockage
- Removes calcium, magnesium, iron, and manganese and a great variety of suspended matter and organic material
- Combination of multiple stages, from porous polymeric adsorbers to ion exchangers
- Necessary for feed water with a silt density index (SDI) that is greater than 3 or the total ionized solids (TIS) is greater than 250 ppm

Single Pretreatment Cartridge

- Easy-to-use pretreatment cartridge protects the RO membrane in a system against particles
- Ships with 10 inch filter housing and a 1 µm filter
- Ideal when feed water Silt Density Index (SDI) is 2-3

Double Pretreatment System

- Ships with two 10 inch filter housings, a combi-cartridge which contains a 5 µm filter and activated carbon, and a hardness stabilizer cartridge
- Removes chlorine, organics, and hard ions

Triple Pretreatment System

- Ships with three 10 inch filter housings a combi-cartridge which contains a 5 µm filter and activated carbon, and a hardness stabilizer cartridge, and a 1 µm filter
- An effective triple pretreatment system removes chlorine, organics, hard ions, and particles larger than 1 µm

Mixed Multi
Water Softener

Double Pretreatment System

Not sure what you need?

Request a FREE! Thermo Scientific H_2O Select Analysis kit and let us analyze your feed water. Your report will include a recommendation of any pretreatment system needed for your water purification system.

Thermo Scientific Barnstead pretreatment selector guide

Use pretreatment when your feed water quality doesn't match the requirements for your system.

Water Type	Solutions	Voltage	Descriptions	Model Number
RO Water	**DI 1500 cartridge** RO water quality can vary, so it is recommended that systems fed with RO water have additional ion removal.		stainless steel cartridge >	02.1500
Deionized or Distilled Water	**Deionized and distilled water** will meet the feed water requirements for the Thermo Scientific GenPure and Micropure families. No pretreatment is typcially required.			
Tap Water	**Pacific TII and reservior or LabTower TII** Utilize a Type 2 system to pretreat the Genpure and Micropure families			see pages 56-63
	Pretreatment Filter, 1 um filter		10 inch 1 µm filter with housing >	09.4003
	Mix Multi Mini Water softener The softener is required for most customers who have unsoftened tap water, or a TIS of more than 10ppm. Additionally, you will need to replace the hardness stabilizer cartridge that ships with the unit with a 5 µm filter with activated carbon.	110V	Mixed multi softener > 5 µm filter with activated carbon >	50129892 06.5201
		230V	Mixed multi softener > 5 µm filter with activated carbon >	06.1250 06.5201
Tap Water	**Pretreatment Filter, 1 µm filter** Ships with two 10 inch filter housings *It is ideal to place largest pore filter before smaller, so put the 5 µm filter with hardness stabilizer (ships with the unit) before the 1µm filter for optimal performance. Designed for customers without chlorine in their tap water – typically Europe and Asia*		10 inch 1 µm filter with housing >	09.4003
	Pretreatment Filter with carbon **5 µm filter with activated carbon, 1 µm filter** Ships with two 10 inch filter housings *Designed for customers with chlorine in their tap water – typically North America and UK*		5 µm filter with carbon > 10 inch 1 µm filter with housing >	50134022 09.4003
	Single Pretreatment System **5 µm filter with hardness stabilizer cartridge** Ships with two 10 inch filter housings *Great option for customers with little/no chlorine in their tap water – typcially Europe and Asia*		5 µm filter with hardness stabilizer >	09.4001
	Double Pretreament System **5 µm filter with activated carbon cartridge, hardness stabilizer cartridge** Ships with two 10 inch filter housings *Designed for customers with chlorine in their tap water – typcially North America and UK*		5 µm filter with carbon and a hardness stabilizer cartridge >	09.4000
	Triple Pretreatment System **5 µm filter with activated carbon cartridge, hardness stabilizer cartridge, 1µm filter** Ships with two 10 inch filter housings		5 µm filter with carbon and a hardness stabilizer cartridge > 1um filter >	09.4000 09.4003
Hard Tap Water	**Mix Multi Mini Water softener** The softener will remove hardness and protect the RO membrane. Additionally, you will need to add a 5 µm filter with activated carbon and a 1 µm filter. Ships with two 10 inch filter housings	110V	Mixed multi softener > 5 µm filter with activated carbon > 1µm filter >	50129892 50134022 09.4003
		230V	Mixed multi softener > 5 µm filter with activated carbon > 1µm filter >	06.1250 50134022 09.4003
	Mix Multi Mini Water softener The softener will remove hardness to protect the RO membrane. Additionally, you will need to replace the hardness stabilizer cartridge that ships with the unit with a 5 µm filter with activated carbon.	110V	Mixed multi softener > 5 µm filter with activated carbon >	50129892 06.5201
		230V	Mixed multi softener > 5 µm filter with activated carbon >	06.1250 06.5201

TYPE 1		TAP TYPE 1		TYPE 2		RO	
							
GenPure	MicroPure	Smart2Pure	LabTower EDI*	Pacific TII	LabTower TII*	Pacific RO	LabTower RO*
✓	✓						
✓	✓						
		✓					
			✓				
					✓		✓
					✓		✓
				✓		✓	
				✓		✓	
				✓		✓	
				✓		✓	
					✓		✓

*Ships with 5µm filter with hardness stabilizer


1000 mL
± 5%
900
800
700
600
500
400

pretreatment selector guide
(continued)

Replacement Consumables			
Pretreatment Description	**Pretreatment Model Number(s)**	**Component Description(s)**	**Component Model Numbers**
Single Pretreatment Cartridge	09.4001	10 in (25.4 cm) 5 µm filter and hardness stabilizer	06.5204
Single Pretreatment System	09.4003	10 in (25.4 cm) 1 µm filter	06.5101
Double Pretreament System	09.4000	10 in (25.4 cm) Activated carbon cartridge with 5 µm filter	06.5201
		10 in (25.4 cm) Hardness stabilizing cartridge	06.5452
Triple Pretreatment System	09.4000 09.4003	10 in (25.4 cm) 5 µm filter with activated carbon cartridge	06.5201
		10 in (25.4 cm) Hardness stabilizing cartridge	06.5452
		10 in (25.4 cm) 1 µm filter	06.5101
Mix Multi Mini, 230V	06.1250	Salt, 25kg	06.2000
		Hardness measurement kit	06.1000
		5 µm filter with carbon	06.5201
Mix Multi Mini, 110V	50129892	Salt, 40 lb	50129893
		Hardness measurement kit	50134335
		5 µm filter with carbon	06.5201

Mix Multi Mini, 230V	
Max flow rate, L/h	500
Filter volume, L	5
Capacity, m³ at 10 °dH	2
Salt storage, kg	20
Operating pressure, psi (bar)	20-87 (1.4-6)
Water temperature max, °C	40
Controller	time controlled
Dimensions, W x D x H, in (mm)	9 x 17.7 x 22 (230 x 450 x 560)
Model number	06.1250

What is SDI?

SDI stands for silt density index (SDI). When the SDI of feed water is >3, it can quickly ruin your RO membrane

- SDI is a measure of the fouling capacity of water in RO systems
- The test measures the rate at which a 0.45 µm filter is plugged when subjected to a constant water pressure of 30 psi
- SDI gives the percent drop per minute in the flow rate of the water through the filter, averaged over a period of time such as 15 minutes

cartridges
and filter systems

We offer a complete line of cartridge and filter systems for all your single step purification and pretreatment needs. Use the Thermo Scientific Bantam Deionizer, Hose Nipple Cartridges or B-Pure cartridges for simple, single step purifications.

innovation

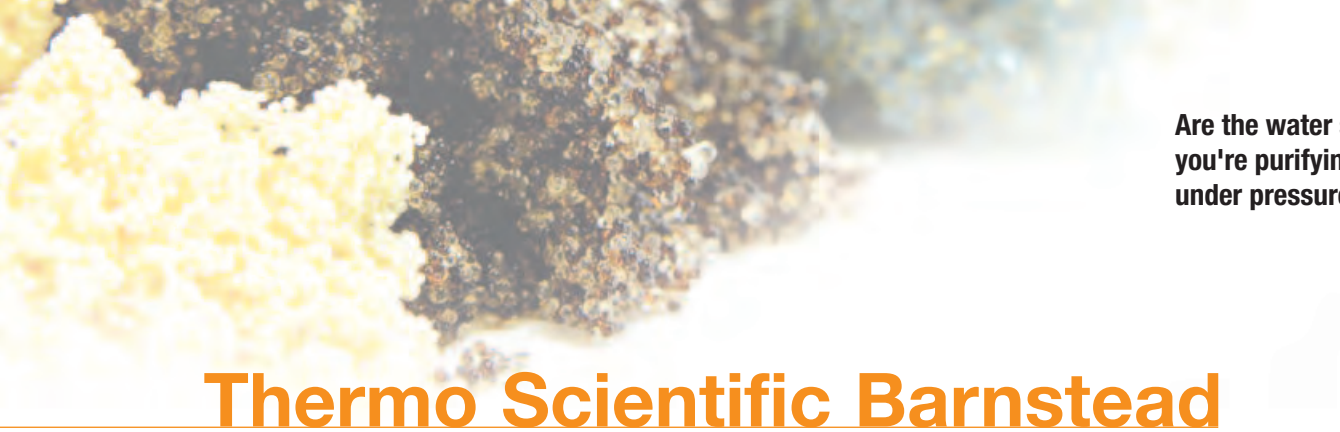
Joints and seams are ultrasonically welded to prevent contamination from chemical adhesives

convenience

Quick-release designs provide easy cartridge change-outs and simplify maintenance, bypassing the costs of service calls

flexibility

Versatile configurations meet an array of specific applications



Are the water systems you're purifying under pressure?

Thermo Scientific Barnstead cartridge & filter selector guide

Choose the feature you need	Technology / Feature	Benefits
Purity Indicators	Digital Purity Indicator	Digital purity indicator features real-time readout of resistivity values; useful with more sensitive applications
	Pura-Lite "Go/No Go" / Analogue Resistivity Indicator	Quick glance monitoring to notify user when it's time to install a new cartridge. Useful if cartridge system feeds a piece of lab equipment, such as an autoclave, where real time resistivity is not required.
	Color Change – Cartridge	Color change indicates when the cartridge is beyond it's useful life and must be replaced. Useful for general lab applications.
Added Features	Remote Dispenser	Hand dispense water from the cartridge system. Ideal for rinsing glassware or filling a waterbath.
	Wall Mounted	Saves laboratory bench space. Ideal configuration for autoclaves and dishwashers where no bench space exists.
	Quick Release Canisters	Allows for fast and simple cartridge change-outs.
	Maximum Flow Rate L/min	

PRESSURIZED SYSTEMS

NON-PRESSURIZED WATER SYSTEMS







B-pure Double Holder	B-pure Single Holder	B-Pure Half Size Holder	Harvey DI+	Economical Filter Holder	Hose Nipple	Bantam Deionizer
Expanded purification with full features	Single step purification	Smaller capacity for optimal value	Complete system with dispenser and cartridge	Economical choice for particle filtration	Simple system for nonpressurized applications	Complete nonpressurized system
✓						
✓	✓	✓	✓			✓
					✓	
			✓			
✓	✓	✓	✓	Requires hard piping to support unit	✓	✓
✓	✓	✓	✓			
4	4	2	4	2	0.75	0.63

Thermo Scientific Barnstead B-Pure water system

The Barnstead B-Pure is an economical laboratory grade water system with flow rates up to 4 L/min that can be customized to meet your specific applications. Choose from single or double holders depending on your application needs.

- Customize your water system to meet your application needs. Modular design provides the ability to add additional holders when the need arises
- Produces up to four L/min
- Quarter turn quick release canisters make changing cartridges simple
- Accepts Thermo Scientific Barnstead Pura-Lite purity indicator or digital purity meter to monitor water quality
- Available in full or half-size cartridge configurations supporting space constraints

Single holder

- Produces up to four L/min
- Simple system without a draw-off valve or purity indicator

Double holder

- Produces up to four L/min
- Complete with draw-off valve
- Choose from models with digital purity meter or Pura-Lite™ “Go/No Go” resistivity indicator

Half-size holder

- Produces up to 2 L/min
- Easily attaches to full size B-Pure systems
- Small size allows for flexibility in mounting location

APPLICATIONS INCLUDE:

- Pretreatment
- Deionization
- Organic and chlorine removal
- Feeding laboratory equipment

Quick Look Comparison	
Resistivity reading	**Flow rate**
1-10 MΩ.cm (depending on cartridges used)	Up to 4 L/min

customizeable for your pretreatment or deionization needs

Harvey DI+ Cartridge System

- Turn-key system ships complete with a remote dispenser, Pura-Lite (50 KΩ·cm) indicator and a high capacity, two-bed ion exchange cartridge to remove calcium, magnesium, and other ions from water
- The Harvey DI+ system accepts a broad range of other cartridges to remove impurities and produces pure water at a flow rate of 4 L/min

Product Specifications					
	Overall dimensions W x H x D	**Inlet connection**	**Feed water temperature**	**Max feed water pressure**	**Max flow rate**
Single holder	7 x 24 x 7 in (17.8 x 61 x 17.8 cm)	1/2 in NPTF	4-49°C (40-120°F)	100 psig	4 L/min
Double holder	15 x 27 x 7 in (38.1 x 68.65 x 17.8 cm)	1/2 in NPTF	4-49°C (40-120°F)	100 psig	4 L/min
Half size holder	7 x 15 x 7 in (17.8 x 38.1 x 17.8 cm)	1/2 in NPTF	4-49°C (40-120°F)	100 psig	2 L/min
Harvey DI+	7 x 26 x 7 in (17.8 x 63 x 17.8 cm)	1/2 NPTF	4-49°C (40-120°F)	100 psig	4 L/min

Thermo Scientific Barnstead B-Pure (continued)

Cartridges	
Size	**Dimensions Length x Diameter**
Full Size Cartridge	17.5 x 3.4 in
Half Size Cartridge	10.95 x 3.4 in

System Options	Electrical	Model number
Single holder	–	**D4511**
Double holder with digital purity meter	120 VAC	**D4521**
	240 VAC	**D4522-33**
Double holder with Pura-Lite indicator (50 kΩ)	120 VAC	**D4524**
Double holder with Pura-Lite indicator (200 kΩ)	120 VAC	**D5831**
Double holder with Pura-Lite indicator (1 MΩ)	120 VAC	**D5833**
Half size holder	–	**D4505**
Harvey DI+	120V	**AY1273X4**

Required Accessories

Choose the cartridge(s) according to your needs.	Resin type(s)	Cartridge size	Capacity as $CaCO_3$	Model number
Anion removal Effective removal of weakly ionized impurities, raises the pH of solutions, recovers precious metal complex	Strong anion exchange	Full	1680 grains	**D0760**
Cation removal Converts ionized salts to the acid form resulting in a product water that is low in pH, ideal for precious metal or isotope recovery	Strong cation exchange	Full	3170 grains	**D0815**
High capacity Removes ionized impurities, produces a larger quantity of water than that of the Ultrapure (D0809), however at a lower resistivity	Two-bed ion exchange	Full	1760 grains	**D0803**
Pretreatment macropure Effectively removes colloids and bacteria, increases filter life	Macroreticular, activated carbon	Full	2000 gal	**D0836**
Organic removal Removes organics and chlorine.	Activated carbon	Full	5000 gal	**D0813**
		Half	5000 gal	**D50215**
Organic removal Removes organics and chlorine. Ideal for pretreating water systems with high organic levels in the feed water.	Extruded carbon	Full	5000 gal	**D63112**
Oxygen removal Maintains low oxygen content to prevent corrosion in cooling water loops, etc. The feed water should contain less than 10 ppm of ionized solids.	Porous strong anion exchange	Full	30 g	**D0811**
		Half	18 g	**D50214**
Oxygen and demineralization	Oxygen removal mixed-bed	Half	275 grains / 9 g	**D50216**
Ultrapure Removes ionized impurities to produce high resistivity water with a neutral pH	Mixed-bed	Full	875 grains	**D0809**
		Half	550 grains	**D50213**
Ultrapure and organic removal Commonly used as still pretreatment. Removes ionized impurities and has a layer of activated carbon to remove chlorine and organics.	Mixed-bed, activated carbon	Full	785 grains / 1000 gal	**D0832**
		Half	275 grains / 2000 gal	**D50217**
Ultrapure and oxygen removal	Ultrapure, oxygen removal	Full	455 grains / 30 g	**D8809**
Ultrapure, oxygen, and organic removal	Ultrapure, oxygen and organic removal	Full	365 grains / 2000 gal / 12 g	**D8811**

Optional Accessories

		Voltage	
		120	240
Digital Purity Monitor – Resistivity range of 0.1-18.2 MΩ.cm		**D2770**	**D2769**
Pura-Lite	Indicator light at 50,000 Ω.cm	**E3450**	**E3454**
	Indicator light at 200,000 Ω.cm	**E3451**	**E3455**
	Indicator light at 1,000,000 Ω.cm	**E3452**	**E3456**
Flow meters	1 to 75 L/hr using 1/8 inch NPT inlet	**D0787**	**D0787**
	0 to 190 L/hr using 1/8 inch NPT inlet	**D0788**	**D0788**
0.2 µm final filter – For use on Double Holder units		**D3750**	**D3750**

Thermo Scientific Bantam Deionizer

The Bantam Deionizer is an economical way to deionize your water. Easily view resistivity readings directly from unit. Customizable to specific applications by selecting the appropriate cartridge listed below.

simple deionization system

ROUTINE LABORATORY WORK:

- Pretreatment
- Deionization
- Organic and chlorine removal

- Ideal for applications requiring up to 38 L/hr of purified water
- Select the cartridge to best meet your application needs
- Point of use polishing of pretreated water or single stage treatment of tap water
- Direct reading purity monitor
- Designed for non-pressurized applications. Output water must be diverted to an atmospherically-vented receptacle, no back pressure can be accepted
- Minimum inlet pressure 5 psi, maximum inlet pressure 70 psi
- Includes 3 ft (0.9 m) of inlet feed tubing

Quick Look Comparison

Resistivity reading	Flow rate
25,000-18,000,000 Ω-cm	Up to 38 L/hr

System Options

	Overall dimensions W x H x D	Feed water pressure	Electrical	Model number
Bantam Deionizer	6 x 28.5 x 8.75 in (15.2 x 72.4 x 22.2 cm)	5-70 psi	120 VAC	**D0800**
			240 VAC	**D0805**

Required Accessories

Choose the cartridge based on your application needs.	Resin Type(s)	Capacity	Model Number
Anion removal Effective removal of weakly ionized impurities, raises the pH of solutions, recovers precious metal complex	Strong Anion Exchange	1680 grains	**D0760**
Cation removal Converts ionized salts to the acid form resulting in a product water that is low in pH, ideal for precious metal or isotope recovery	Strong Cation Exchange	3170 grains	**D0815**
High capacity Removes ionized impurities, produces a larger quantity of water than that of the Ultrapure (D0809), however at a lower resistivity	Two-Bed Ion Exchange	1760 grains	**D0803**
Ultrapure Removes ionized impurities to produce highest resistivity water with a neutral pH	Mixed-Bed	875 grains	**D0809**
Ultrapure and organic removal (pretreatment) Commonly used as still pretreatment. Removes ionized impurities and has a layer of activated carbon to remove chlorine and organics	Mixed-Bed, Activated Carbon	785 grains / 1000 gal	**D0832**

Thermo Scientific Barnstead Hose Nipple Cartridges

The Barnstead Hose Nipple Cartridges are an economical way to purify water volumes up to 75 L/hr Applications include softening, deionization, organic and chlorine removal.

easily customizable cartridge holder

- Economical purification option
- Ideal for small volume applications
- Same superior quality resins used in B-Pure cartridges
- Constructed of 100% virgin polypropylene cartridge
- Designed for non-pressure applications, these cartridges include 3/8 inch barb hose connections on each end. D8822, D8950, and D8951 cartridges include tapered straight nipple for 3/8 inch ID tubing
- Color change indicator identifies when resin is exhausted in specific cartridges
- Simple cartridge holder is easily wall mounted

Product Specifications	
Cartridge size	**Dimensions Length x Diameter**
1/2 Size	10.2 x 3.25 in (25.9 x 8.25 cm)
2/3 Size	13.3 x 3.25 in (33.8 x 8.25 cm)
Full Size	18.7 x 3.25 in (47.5 x 8.25 cm)

System Options	Model number
Hose nipple cartridge holder For easy wall mounting	**D8900**

ROUTINE LABORATORY WORK:

- Pretreatment
- Deionization
- Organic and chlorine removal
- Feeding laboratory equipment

Required Accessories

Choose the cartridge based on your needs.	Resin type(s)	Capacity	Color indicator[1]	Model number
1/2 size mixed-bed	Ultrapure ion exchange	430 grains	No	**D50220**
1/2 size mixed-bed with oxygen removal	Ultrapure mixed-bed with strong anion exchange	280 grains / 4.4 g	No	**D8822**
2/3 size high capacity	Two-bed ion exchange with strong cation exchange	1100 grains	Yes	**D8950**
2/3 size mixed-bed and organic removal	Mixed-bed ion exchange with activated carbon	470 grains / 2000 gal	Yes	**D8951**
Full size cation removal	Cation exchange	3000 grains	Yes	**D8905**
Full size high capacity	Two-bed ion exchange	1650 grains	Yes	**D8901**
Full size macroreticular, cation removal	Macroreticular cation exchange	n/a	No	**D8908**
Full size organic removal	Activated carbon	5000 gal	No	**D8904**
Full size oxygen removal	Strong anion exchange	30 g	No	**D8903**
Full size pretreatment and scale eliminator	Mixed-bed and strong cation exchange, activated charcoal	1250 grains / 1000 gal	Yes	**D8921**
Full size ultrapure	Ultrapure ion exchange	915 grains	No	**D8911**
Full size ultrapure	Ultrapure mixed-bed ion exchange	915 grains	Yes	**D8902**
Full size ultrapure with organic removal	Mixed-bed ion exchange with activated carbon	730 grains / 2000 gal	Yes	**D8922**

[1] Alcohol-containing samples can not be used in cartridges containing the color indicator

Thermo Scientific Barnstead 1/2 Size B-Pure Filter

Barnstead 1/2 Size B-Pure Filters will meet all your prefiltration needs.
The filters can be used to pretreat feed water or act as a final filter to ensure consistently pure water.

ROUTINE LABORATORY WORK:

- Particulate and bacteria removal

Product features

- Large surface area ensures long life
- Flow rates of up to two L/min

Choose from two holder options:

1/2 Size B-Pure Filter Holder

- Natural polypropylene material construction maintains purity
- Filters are easily and quickly replaced with quarter turn quick release canisters
- Accepts 10 inch (25.43 cm) pre- and post-filters
- Wall mounting bracket comes standard

Economy Filter Holder

- Accepts 10 inch (25.43 cm) double open-ended filters
- Can be piped into any water line

Optional accessory

Pressure Gauge Kit

- Attaches to any B-Pure system
- 0 to 160 psi pressure gauge allows for monitoring inlet and outlet water pressure
- Monitors pressure drop across any of the 10 inch (25.43 cm) filter cartridges used in the 1/2 Size B-Pure Filter Holder
- Pressure drop of greater than 10 psi indicates need for filter change

Economy Filter Holder

flexible filtration system

System Options Product Specifications

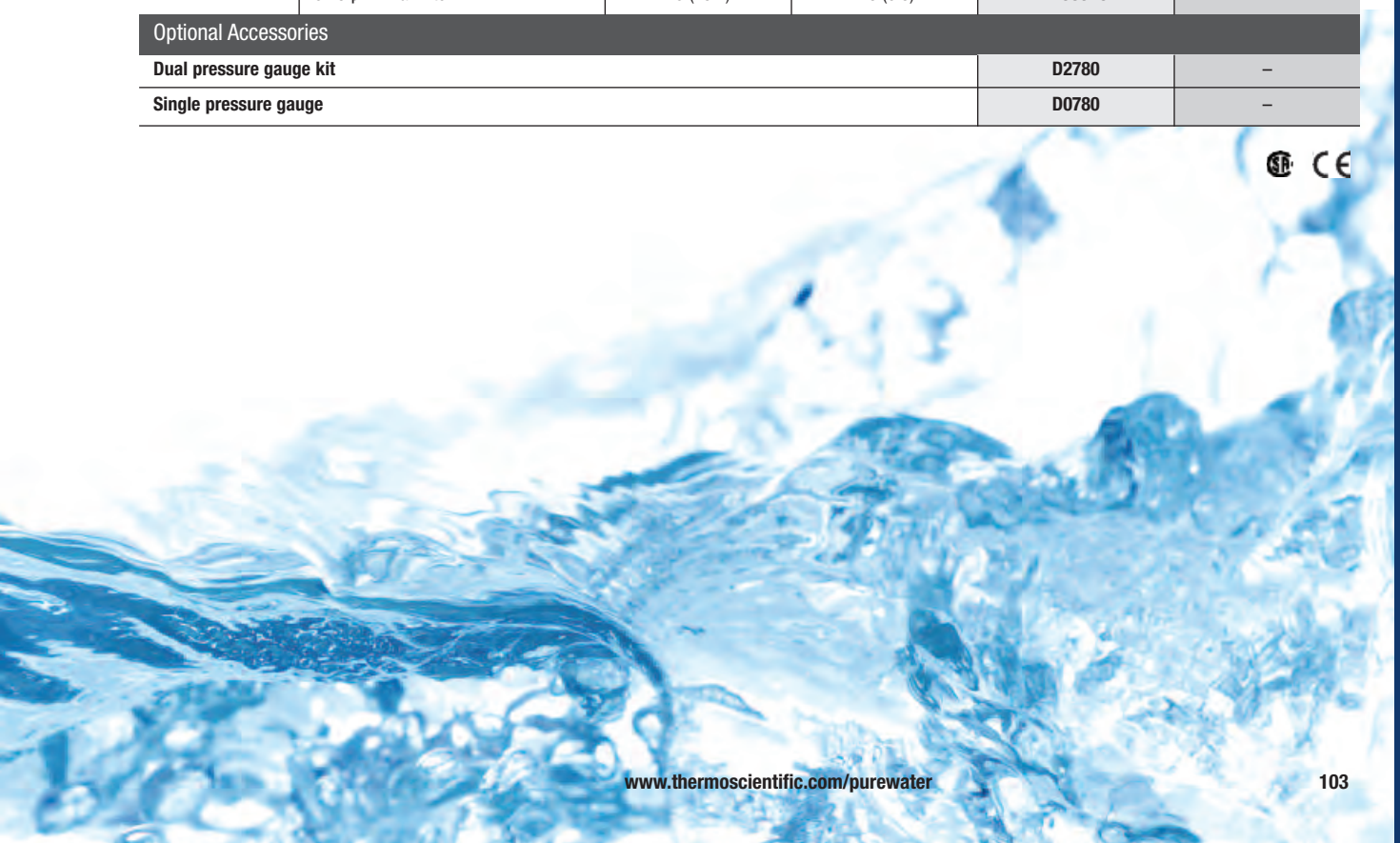
	Overall dimensions W x H x D	Inlet connection	Feed water temperature	Max feed water pressure	Max flow rate	Model number
1/2 Size B-Pure holder Wall mount included	7 x 15 x 7 in (17.8 x 38.1 x 17.8 cm)	1/2 in NPTF	4-49°C (40-120°F)	100 psig	2 L/min	**D5839**
Economy filter holder	5.25 x 12 x 5.25 in (13.3 x 30.5 x 13.3 cm)	3/4 in NPTF	4-49°C (40-120°F)	100 psig	2 L/min	**15840**

Required Accessory

	Pore Size	Length in (cm)	Diameter in (cm)	1/2 size B-Pure Filter Holder	Economy Holder
Filters Choose the filter(s) according to your needs	1 µm Pre-filter	10 (25.4)	2.5 (6.5)	**FL583X4**	**18024**
	5 µm Pre-filter	10 (25.4)	2.5 (6.5)	**FL583X1**	**D2729**
	10 µm Pre-filter	10 (25.4)	2.5 (6.5)	**FL583X2**	**18011**
	15 µm Pre-filter	10 (25.4)	2.5 (6.5)	**FL583X3**	**18018**
	0.2 µm Final Filter	10 (25.4)	2.5 (6.5)	**FL583X6**	–
	0.45 µm Final Filter	10 (25.4)	2.5 (6.5)	**FL583X5**	–

Optional Accessories

Dual pressure gauge kit	**D2780**	–
Single pressure gauge	**D0780**	–



Already have a Thermo Scientific water purification system?

This is where you can find the replacement consumables for your previously purchased Thermo Scientific water purification system.

Cleaning your purification system allows bacterial contaminants to be flushed away.

Regularly changing filters and cartridges protects your water quality

Water purification systems can only produce pure water when the cartridges and filters are changed according to the operational manuals. Regular maintenance of your water system will ensure the product water is consistently the highest purity.

Changing the UV lamp protects the system against microorganisms and oxidizes organic compounds in the feed water, allowing for TOC levels of less than 5ppb.

Thermo Scientific Barnstead Nanopure System Consumables					
		**Nanopure Analytical**	**Nanopure Analytical UV**	**Nanopure Biological UF**	**Nanopure Life Science UV/UF**
	Standard unit	D11901	D11911	D11921	D11931
	+ TOC moniter	D11941	D11951	D11961	D11971
Replacement Consumables					
Diamond cartridge pack Choose the cartridge pack according to your feed water and system. Ships with 0.2 µm final filter (D3750)	**Deionized feed**	D50283	D50281	D50283	D50281
	RO or distilled feed	D50282	D50280	D50282	D50280
0.2 µm final filter		D3750	D3750	D3750	D3750
Ultraviolet lamp (system)		n/a	LMX13	n/a	LMX13
Ultrafilter		n/a	n/a	FL1192X1	FL1192X1
Cleaning syringe		CMX25	CMX25	CMX25	CMX25
Ultraviolet lamp (TOC)		LMX26	LMX26	LMX26	LMX26

Thermo Scientific Barnstead Easypure II System Consumables

		Easypure II	Easypure II UV	Easypure UF	Easypure II UV/UF
		D7381	D7401	D7411	D8611
Replacement Consumables					
Cartridge pack Choose the cartridge pack according to your feed water and system	**Deionized feed**	D502126	D502124	D502126	D502124
	RO or distilled feed	D502127	D502125	D502127	D502125
0.2 µm final filter		D3750	D3750	D3750	D3750
Ultraviolet lamp		n/a	LMX13	n/a	LMX13
Ultrafilter		n/a	n/a	FL1192X1	FL1192X1
Cleaning syringe		CMX25	CMX25	CMX25	CMX25

Thermo Scientific Barnstead Easypure RF System Consumables

		Easypure RF	Easypure RF UV
		D7031	D7035
Replacement Consumables			
Cartridge pack Choose the cartridge pack according to your feed water and system	**Deionized feed**	D502126	D502124
	RO or distilled feed	D502127	D502125
0.2 µm final filter		D3750	D3750
Ultraviolet lamp		n/a	LMX13
Ventgard™ reservoir cap		CV703X4A	CV703X4A
Set of three empty cartridges for cleaning		D7034	D7034

Thermo Scientific Barnstead Easypure RoDi System Consumables

	Easypure RoDi
	D13321
Replacement Consumables	
Cartridge kit Includes pre-filter, ultrapure mixed bed cartridge, and Easypure high purity/low TOC cartridge	D502133
0.2 µm final filter	D3750
Ultraviolet lamp	LMX13
Ventgard™ reservoir cap	CV703X4A
Reverse osmosis membrane	FL1332X2
Set of three empty cartridges for cleaning	D7034

Thermo Scientific Barnstead TII System Consumables

		Barnstead TII
	TII 12 L/h	D14031
	TII 24 L/h	D14041
Replacement Consumables		
TII DI cartridge pack Ships with 0.2 µm final filter (D3750)		D502137
1 µm pre-filter		D502113
MPS cartridge		D502114
Extruded carbon cartridge		D502115
0.2 µm final filter		D3750
Reverse osmosis membrane		FL1265X1
Ultraviolet lamp (system)		LMX13
Ultraviolet lamp (reservoir)		LMX31
Ventgard reservoir cap		CV703X4A

Thermo Scientific Barnstead RO System Consumables

		Barnstead RO
	RO 6 L/h	D12671
	RO 12 L/h	D12651
	RO 24 L/h	D12661
Replacement Consumables		
Reverse osmosis membrane	**6 and 12 L/h**	FL1265X1
	24 L/h Requires 2 RO membranes	FL1265X1 (please order 2)
1 µm pre-filter		D502113
MPS cartridge		D502114
Extruded carbon cartridge		D502115
Ventgard reservoir cap		CV703X4A

support and maintenance

Contact the Pure Water Experts

Have a question or concern, contact our PURE Water Experts!

Technical Questions

Our technical service team is ready to answer any of your questions on your existing systems.

Customer Service

Let our professional and experienced customer service representatives guide you when choosing your water system. They will evaluate your needs, develop a system recommendation and coordinate the installation of your water system.

New Lab Construction

We offer the most comprehensive line of water purification systems in the world. We can design a water system to meet your new lab's needs.

Services

Maintaining your water purification system is crucial to the overall productivity of your laboratory, the long-term performance of the system and the total cost of ownership. We offer a variety of services to suit your individual needs. Professional service delivers improved productivity, convenience, peace-of-mind and budget control.

Preventative maintenance

To ensure your system is working within specifications, regular maintenance is essential. We offer various service options and preventative maintenance, which will extend the working life, protect your system and prevent costly breakdown.

Installation

Our factory-trained technicians can install your system to ensure it operates with precision. With our services, you will receive:

- **Installation scheduled at your convenience**
- **Assurance that all technical specifications are met**
- **Practical hands-on instructions**

Validation

We offer validation services according to cGMP/GLP regulations, certifying that your system is performing to pre-determined technical specifications. Our validation services provide you with:

- **Factory-trained experts** – experienced in cGMP/GLP environments and Good Document Practice
- **IQ/OQ factory-developed validation protocols**

Please ask your local sales representative for additional information about service offerings in your area.

Go Green

Smart Green designs mean a great water system for you and a smaller impact on the environment!

Our engineers created water systems with the environment in mind:

Reduce

Our cartridges use high quality resin to extend the useful life of the cartridge. Extended life reduces the need to replace your cartridges which, in turn, reduces the waste stream and improves your laboratory's sustainability. You'll use your cartridges longer, reducing the need to reorder, ship, handle and dispose of your cartridges.

Our units are designed to minimize the amount of water that is used during the analysis.

To provide the customer with pure water and low power consumption, our units go into a low energy mode after dispensing without sacrificing water quality for your applications.

Reuse

Our cartridges were engineered with the environment in mind. The plastic cartridge casings and endcaps are constructed using virgin polypropylene to allow for easy recycling after end of life. The cartridge is assembled in a clean environment using environmentally friendly ultrasonic welding that minimizes energy usage compared to other joining as well as avoids the use of any environmentally unfriendly solvents. Our conscious effort to avoid chemical solvents and adhesives makes the plastic and resin suitable to be recovered, reground and reused for a variety of alternate uses.

Common Conversions

Common Conversions for Pure Water	
Volume	1 U.S. Gallon (gal) = 231 Cubic in (in^3) = 3.785 Liters (L)
	1 Cubic Meter (m^3) = 35.3 Cubic Feet ($ft.^3$)
	1 U.S. Ounce (oz) = 29.57 Milliliters (mL)
Density	1 U.S. Gallon (gal) = 8.33 lb. Water
	1 Cubic Foot ($ft.^3$) = 62.3 lb. Water
Temperature	°F = (°C x 9/5) + 32
	K =°C + 273
	°F = (K - 273.15) * 9/5 + 32
Mass	1 lb = 453.6 grams (g) = 7000 grains (gr.)
	1 kg = 2.205 lb.
Pressure	1 Atmosphere = 14.7 Pounds Per Square Inch (psi) = 101.325 Kilo Pascal (KPa)
	psia (absolute) = psig (gauge) + 14.7
	9.92 in Hg = 33.83 ft. H_2O
	1 kg/cm^2 = 14.233 psi
	1 KPa = 0.145 psi
Total ionized solids concentration	1 Grain Per Gallon (gr/gal) = 17.1 Parts Per Million (ppm)
	1 Grain Per Gallon as NaCl = 0.85 Grains Per Gallon as $CaCO_3$
	1 Part Per Million (ppm) = 1 Milligram Per Liter (mg/L)
	1 ppm as NaCl = 0.85 ppm as $CaCO_3$
	1ppm = 1,000 Parts Per Billion (ppb) = 1,000,000 Parts Per Trillion (ppt)
	1 ppb = 1 Microgram Per Liter (µg/L)
	1 ppm = 1.5 µS/cm
Resistivity/Conductivity	1 megohm-cm = 1/(µS/cm) = 1/(µmho/cm)

Calculating Ion Exchange Capacity

Cartridge Grain Capacity / Total Dissolved Solids (Grains/Gal) = Gallons Processed

Cartridge Grain Capacity x 17.1 / Total Dissolved Solids (ppm) = Gallons Processed

Cartridge Grain Capacity x 64.7 / Total Dissolved Solids (ppm) = Liters Processed

glossary

Absorption – Process by which one substance is taken up by another, either chemically or physically, as when a sponge "soaks up" a liquid.

Activated Carbon – Material used to adsorb organic impurities from water.

Anion Exchange Resin – An ion exchange material that removes anions from solution by exchanging them with hydroxyl ions.

Bed – Column of carbon, sand or ion exchange resins through which the water passes during treatment.

Cation Exchange Resin – Ion exchange resins capable of removing cations by exchanging them for hydrogen ions.

Conductivity – The reciprocal of resistivity, it is a measure of the ability to conduct an electric current. Since ionized impurities increase the conductivity of water, it is also an accurate measure of ionic purity. To measure it, current is passed between two electrodes a fixed distance apart. Conductivity is normally expressed as microsiemens/cm, identical to micromhos/cm.

Deionization – Removing dissolved ions from solution by passing it through a bed of ion exchange resins, consisting of polymer beads that exchange hydrogen ions for cations and hydroxyl ions for anions in solution. The ionic impurities remain bound to the resins, and the hydrogen and hydroxyl ions combine with each other to form water.

Dissolved Solids – Also referred to as Total Dissolved Solids (TDS), it is the amount of nonvolatile matter dissolved in a water sample and is usually expressed in parts-per-million by weight.

Distillation – The process of separating water from impurities by heating until it changes into vapor and then cooling the vapor to condense it into purified water.

Electrodeionization (EDI)– Removes dissolved ions from solution using electricity to ionize water and separate ions.

Effluent – The output or discharge from a water treatment process.

Endotoxin – A poisonous substance present in bacteria that is released when the cell disintegrates. In water treatment, it most often refers to pyrogens.

Exhaustion – When absorbents, such as activated carbon or ion exchange resins, have depleted their capacity by using up all active sites. Ion exchange resins may be regenerated to reverse the process.

Feed Water – Water entering a treatment process.

Filtration – Removal of suspended matter by passing it through a porous matrix that prevents particles from getting through, usually by entrapment on or in the filter matrix.

Fouling – When gelatinous coatings, colloidal masses or dense bacterial growth form a compacted crust on membrane or filter surfaces which blocks further flow.

Grains per Gallon – Concentration of dissolved ions in water, generally as calcium carbonate. 7,000 grains is equal to a pound. One grain per gallon is equivalent to 17.1 ppm of Dissolved Solids.

Hardness – Concentration of calcium and magnesium salts in water and is sometimes also taken to include iron and manganese. High hardness can cause boiler or pipe scale and failure of reverse osmosis membranes.

Ion Exchange – Also called deionization. A process in which harmless ions attached to the resin beads are exchanged for undesirable ions in solution. Typically, hydrogen ions are exchanged for any cations and hydroxyl ions for any anions. The hydrogen and hydroxyl ions combine to form pure water.

Macroreticular Resin – An ion exchange resin with a reticular porous matrix that makes it effective for removing colloids and bacteria, as well as dissolved anions. It is especially useful for preventing colloidal and organic fouling of mixed-bed resins and premature clogging of final filters.

Megohm-cm – Ω A measure of ionic purity in water.

Resistivity (the reciprocal of conductivity) is a measure of specific resistance to electrical flow. The fewer dissolved ions in water the higher its resistivity. One megohm-cm is equivalent to one million ohms of resistance measured between two electrodes one centimeter apart. The theoretical maximum ionic purity for water is 18.2 megohm-cm at 25°C .

Membrane – Filtration membranes are thin polymer films that are permeable to water and other fluids. Microporous membrane filters have measurable pore structures which physically remove particles or microorganisms larger than pore size. Ultrafiltration membranes (sometimes called molecular sieves), also remove molecules larger than a specified molecular weight. Reverse osmosis membranes are permeable to water molecules and very little else, rejecting even dissolved ions in water.

Mho – Unit of measurement for conductance; the reciprocal of ohm (resistance). *See Megohm-cm.*

Mixed-Bed Ion Exchange – Mixing both anion and cation resins in the same deionizer results in higher efficiency, but lower capacity than separate-bed deionizers.

NPT – Abbreviation for National Pipe Thread.

Ohm – The practical unit of electrical resistance in a circuit, where a potential difference of one volt produces a current of one ampere.

Ohm-cm – Unit of specific resistance of water.

Osmosis – The diffusion of a solvent through a semipermeable membrane from a less concentrated solution to a more concentrated solution.

Percent Recovery – In reverse osmosis or ultrafiltration, the ratio of pure water output to feedwater input.

Percent Rejection – In reverse osmosis or ultrafiltration, the ratio of impurities removed to total impurities in the incoming feedwater. For example, RO membranes typically remove (reject) 90% of the dissolved inorganic contaminants in water.

Permeate – In reverse osmosis, the water that diffuses through the membrane, thereby becoming purified water.

Pretreatment – Initial water treatment steps performed prior to final processing to prolong the life of cartridges and filters and to protect downstream elements from premature failure.

Product Water – The purified water produced as a result of treatment.

Pyrogens – Lipopolysaccarides found in the outer cell walls of certain bacteria which can trigger an immune response.

Recirculation – Continuous recirculation may be necessary to maintain uniformly high purity in larger water systems. Water is continuously recirculated and reprocessed to prevent stagnation and to rinse out residual impurities in the system. Bacteria flourish in stagnant water.

Reject – In reverse osmosis and ultrafiltration, those impurities not able to permeate the membrane are said to be rejected (removed). They are flushed away in the reject (waste) stream.

Resin – Ion exchange resins are usually bead-like spherical materials with an affinity for particular ions. Cation exchange resins, made of styrene and divinylbenzene containing sulfonic acid groups, will exchange hydrogen ions for any cations they encounter. Similarly, anion exchange resins, made of styrene and divinylbenzene containing quaternary ammonium groups, will exchange a hydroxyl ion for any anions.

Resistivity – A measure of specific resistance to the flow of electricity. In water, it is an accurate measure of ionic purity. *See Megohm-cm.*

Reverse Osmosis – The reversal of osmosis to purify water. In osmosis, water diffuses through a semipermeable membrane from a less concentrated solution to a more concentrated solution. The flow of water can be reversed with an opposing pressure that exceeds osmotic pressure. With Reverse Osmosis, water is forced out of a concentrated solution, leaving the solute (impurities) behind.

glossary

Salt Rejection – In reverse osmosis, the ratio of salts removed (rejected) to the original salt concentration. *See Percent Rejection.*

Scale – The mineral deposits that can coat the insides of boilers or the surfaces of RO membranes. It consists mainly of calcium carbonate, which precipitates out of solution under certain conditions of pH, alkalinity and hardness.

Semipermeable – Membranes that do not have measurable pores, but through which smaller molecules can pass.

Suspended Solids – Undissolved solids that can be removed by filtration.

TDS – Abbreviation for total dissolved solids.

Total Ionized Solids – Concentration of dissolved ions in solution, expressed in concentration units of NaCl (sodium chloride).

Total Organic Carbon (TOC) – A measure of the level of organic impurities in water, which determines the operating life of activated carbon beds.

Total Solids – Total solids in water include both dissolved and suspended solids.

Turbidity – A suspension of fine particles that obscures light rays but requires many days for sedimentation because of small particle size.

Two-Bed – Separate beds or layers of cation and anion exchange resins. Results in lower purity than mixed-bed deionization, but provides higher capacity in terms of throughput.

Ultrafiltration – Molecular sieves; membranes with pores small enough to remove large molecules. Rated in terms of nominal molecular weight cutoff. A 10,000 Dalton (molecular weight) UF membrane, for example, will remove bacterial pyrogens, which are typically in the range of 20,000 Daltons.

Ultrapure Water – Water with a specific resistance higher than 1 megohm-cm. In the laboratory, it usually refers to ASTM D1193 Type 1 reagent grade water. Anything in laboratory water that is not H_2O is an impurity. Although chemically pure water is not attainable, ultrapure water systems are now capable of reducing impurities down to the limits of detection.

UV Oxidation – Ultraviolet radiation is employed in water purification for the photochemical oxidation of organic impurities, resulting in HPLC grade water with organic impurity levels below 5 ppb.

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