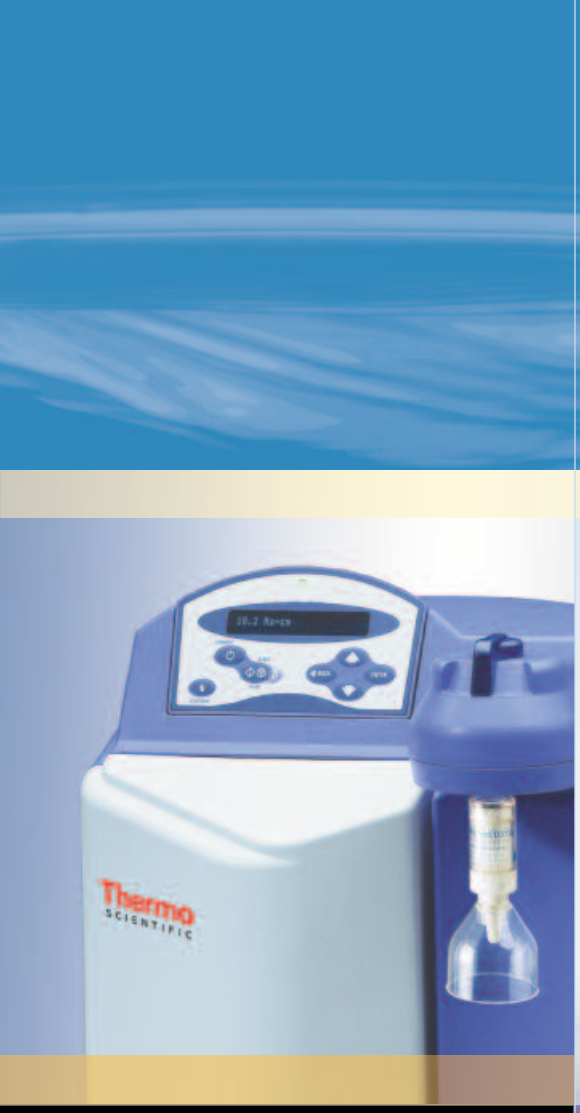


Thermo Scientific Barnstead Nanopure® Ultrapure Water Systems

Pure water. Pure research. Total confidence.

Part of Thermo Fisher Scientific

Thermo SCIENTIFIC

Thermo Scientific Barnstead Nanopure Ultrapure Water Systems

For more than 125 years, Barnstead pure water systems have been a trusted resource for science and industry. Now the most comprehensive portfolio of water systems is sold as Thermo Scientific and enhanced by our worldwide capabilities delivering:

Expertise: our unique Thermo Scientific H_2O SELECT™ testing program will analyze your feed water to match the best water system to your application

Value: key features come standard and low cost-of-ownership means reduced equipment and consumables costs

Quality: water quality validated by independent labs to meet your most stringent application requirements

Barnstead Nanopure Systems

Critical applications in today's laboratories require exceptional performance.

Our Nanopure solutions deliver the expertise, quality and value you need – offering four models with advanced purification technologies to suit your specific research needs.

Nanopure Analytical

Our analytical unit produces ultrapure water suitable for general laboratory applications – such as reagent preparation, high-purity rinsing, as well as for use in AA, ICP and ICP/MS.

- 18.2 MΩ-cm
- 5-10 ppb TOC

Nanopure Analytical UV

Dual wavelength UV oxidation is incorporated into our analytical UV system to reduce organic carbon to the absolute lowest levels. Typical applications include ion chromatography, gas chromatography, HPLC, LC/MS, GC/MS, and TOC analysis.

- 18.2 MΩ-cm
- 1-5 ppb TOC

Nanopure Biological UF

A hollow-fiber ultrafilter (UF) provides water for use in applications requiring pyrogen-free water, including cell and tissue culture, monoclonal antibody production and electrophoresis.

- 18.2 MΩ-cm
- 5-10 ppb TOC
- ‹ 0.001 Eu/ml pyrogens

Nanopure Life Science UV/UF

The hollow-fiber ultrafilter and UV oxidation technologies are combined into one system for applications requiring the lowest levels of organic carbon, pyrogens and nucleases, including PCR, 2-D electrophoresis and cell culture.

- 18.2 MΩ-cm
- 1-5 ppb TOC
- ‹ 0.001 Eu/ml pyrogens

Pure water.

Digital Display

High-visibility display provides an accurate reading of resistivity, conductivity, temperature, and TOC.

Removable Display and Controls

Removable display can be mounted up to 10 feet (3 meters) away from the unit for added flexibility.

Automatic Cleaning Cycle

Simply introduce the cleaner into the system, press a button and walk away; our Nanopure will take care of the rest.

Whisper-Quiet Pump

Provides optimum flow with virtually silent operation.

Choose Your Method of Dispensing

Intermittent, constant or volumetric dispensing of water, based on your needs.

Hollow-Fiber Final Filter

The 0.2 µm final filter requires less frequent replacements than comparable units.

Thermo Scientific Durapack™ Cartridge Pack

High-capacity for long life. Easy to install or change cartridges.

Flexibility in Mounting Location

Locate your system on the bench or wall. Wall mounting bracket included as standard equipment.

Built-in Pressure Regulating Valve

Allows feed water pressures up to 100 psig (6.9 bar) with no additional equipment.

Accudispense Volumetric Dispenser

Patented volumetric technology remotely dispenses a programmed volume of water (250 ml - 60 L) from up to eight feet (2.5 meters) away. Complete recirculation up to the tip of the dispenser eliminates contamination of your water. Easily mounts anywhere in your lab.

Remote Dispenser

Conveniently dispenses ultrapure water from up to eight feet (2.5 meters) away. Unique design virtually eliminates any dead volume, and coiled tube allows for easy use while taking up a minimal amount of space.

Pure research. Total confidence.

Complete Control

- **Continuous recirculation** maintains the highest water purity during periods of inactivity.
- **Built-in pressure regulating valve** ensures optimum system pressures and flows.
- **Automatic system notification** indicates when water quality falls below the programmable set point. Simply program the value you prefer, and the alert will appear on the display when the purity drops below the set value.
- **One-touch automatic dispensing**, volumetric or timed – your choice. Our Nanopure system allows automatic dispensing of volumes between 0.25 and 60 liters.

Intuitive Display

- **Push-button controls** for resistivity, conductivity, TOC, and temperature. Readings are compensated to 25°C. In addition, users can comply with USP specifications and display uncompensated resistivity.
- **Multilingual display** provides information in English, Spanish, German, and French. Japanese language available on select units.

Easy to Maintain

- **Diagnostic menu** evaluates important system components and alerts if a problem exists.
- **Durapack cartridge pack** simplifies cartridge installation and replacement.
- **NIST traceable calibration module** avoids costly downtime and service with on-site performance verification of resistivity meter.

Durapack Cartridge Pack

Remote Display and Controls

Unmatched Expertise and Quality.

FREE H_2O SELECT Water Analysis

Our unique H_2O SELECT testing program provides expert analysis of your feed water. Based on the results, we will identify the best water system for your application. You will receive a comprehensive report including equipment and consumables recommendations.

3 EASY STEPS:

1. Request a FREE H_2O SELECT* kit from your sales representative or visit **www.thermo.com/select**
2. Fill the H_2O SELECT bottle with your feed water sample and complete the brief form
3. Send your water sample and completed form back to our water experts for a FREE in-depth analysis

Our H_2O SELECT analysis program is free and with no obligation.

Your custom recommendation includes:

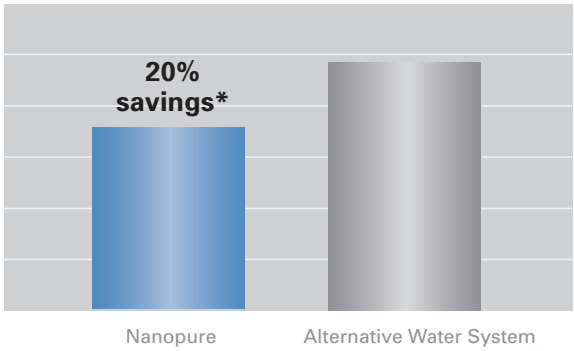
- ***Summary report*** *of your feedwater test results*
- ***System recommendation*** *based on your feedwater quality, laboratory applications, daily water demand, and budget*
- ***Estimated life expectancy*** *of consumables to help you project system operation costs*

**H_2O SELECT program may not be available in all countries. Please check with your local sales representative.*

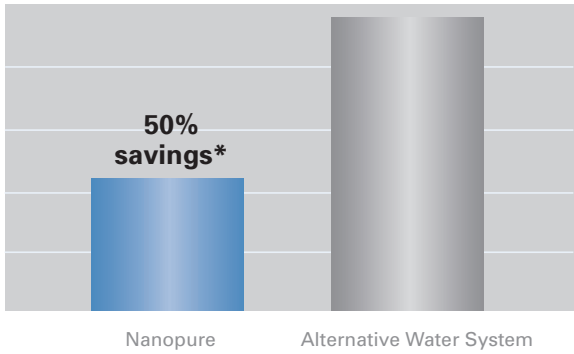
Exceptional Value.

Maximizing value is critical for today's laboratories. Our Nanopure systems deliver significant savings – both in capital investment and ongoing operating costs.

Capital Equipment Comparison



Annual Operating Cost Comparison



Up to 20% savings on initial purchase price with key accessories included as standard equipment

- **Remote display controls** provide flexibility in choosing a mounting location for the system or control panel
- **Pressure-regulating valve** allows feed-water pressures up to 100 psig with no additional equipment
- **Ready-to-mount wall bracket** enables easy bench- or wall-mounting without the purchase of additional parts

Up to 50% savings on annual operating costs

- **High-capacity cartridge pack** has 20% more capacity than alternatives, delivering fewer change-outs and lower costs
- **UV lamp and ultrafilter replacements** cost 50% less per year than alternative water systems

** Savings based on internal performance data, when compared with alternative systems*

Intelligent technology to maximize water quality and optimize system operation.

Durapack Cartridge Pack

Our high-capacity cartridge packs are easily installed with one connection. The pack uses two types of activated carbon to absorb both volatile and non-volatile organic compounds and chlorine, and the highest purity semiconductor-grade ion-exchange resins for removing the last traces of ionic contaminants.

Systems fed with deionized water (DI) have their own pack – designed to remove problematic organic and colloidal compounds associated with central DI feed.

Final Filtration

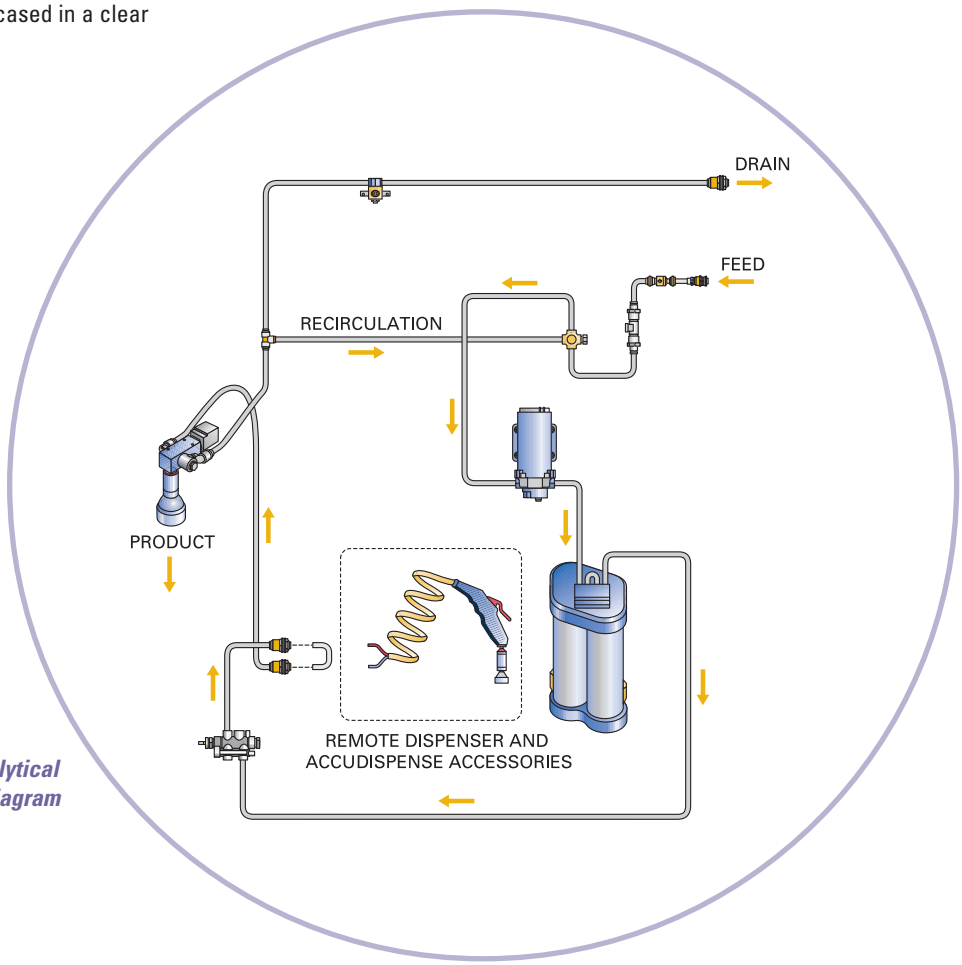
Final filtration is performed with an absolute 0.2-micron gamma irradiated filter. The naturally hydrophilic hollow fibers provide high surface area for longer filter life and fast rinse up to desired purity levels. The fibers are made of cellulose acetate and are encased in a clear polycarbonate housing.

Simple Sanitization

All Nanopure systems are easily sanitized. A liquid cleaning solution is injected by syringe and the software manages the rest of the sanitization process.

Other Materials of Construction

All wetted parts beyond the purification cartridge pack are constructed of low-extractable, corrosion-resistant materials, including the tubing and fittings, which are made of fluoropolymers. The cell well and cartridge pack are constructed of virgin polypropylene, and the cell is constructed of corrosion-resistant titanium.



Nanopure Analytical system flow diagram

UltraFiltration

For applications requiring undetectable levels of pyrogens, such as cell and tissue culture, where ultrafiltration is essential.

Ultrafiltration removes the last traces of pyrogens (bacterial endotoxins) and nucleases. The encapsulated ultrafilter uses unique, polysulfone hollow fibers to remove particulates, nucleases and pyrogens. The filter is located downstream of the purification media and UV chamber for maximum benefit.

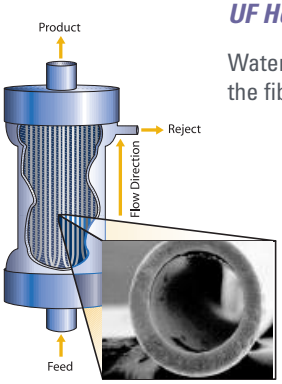
Fine hollow UF fibers are folded and secured on the product side of the capsule. Water entering the capsule flows from the outside of the fibers into their hollow cores. The channels merge to become the purified product stream. The system periodically sends water from the outside of the fibers to the drain – thereby removing filtered contaminants and extending filter life.

Fast Rinse-up

The filters are shipped dry without chemical preservatives. This allows fast rinse-up to high-purity water.

Low Extractables

There is almost no organic or inorganic addition to the water as demonstrated by low-TOC and high-resistivity measurements.



UF Hollow Fiber

Water flows from the outside of the fiber into the fiber lumen.

UV Oxidation

For ultra-low TOC (Total Organic Carbon) concentrations and germicidal action. The addition of UV oxidation is ideal for analytical applications, which require the absolute lowest levels of organic carbon.

UV Chamber

A UV oxidation chamber is placed between the third and fourth (final) cartridges. The chamber is constructed of highly polished 316 stainless steel and a UV-transparent quartz sleeve. Within the sleeve resides the mercury vapor lamp.

Germicidal Action

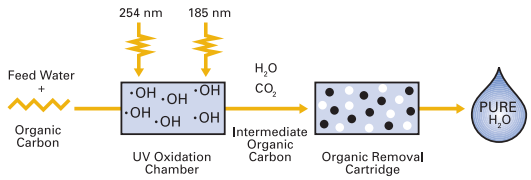
The mercury vapor lamp creates a high fraction of light at 254 nm, which keeps bacterial levels in the system extremely low.

Organic Carbon Oxidation

The lamp also creates a high fraction of 185 nm light which, in conjunction with the 254 nm radiation, produces hydroxyl free radicals (•OH). The radicals quickly oxidize residual organic carbon to CO_2 and water.

Organic Removal Cartridge

A specially formulated media removes oxidation by-products (carbon dioxide and organic intermediates) to produce water virtually free of TOC. A final fraction of semiconductor-grade mixed-bed resin is the last step in producing the highest purity water.



The UV Oxidation Process

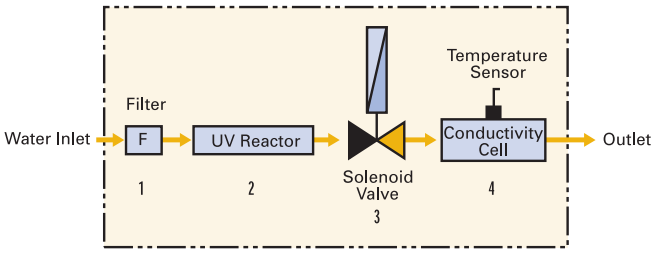
Total Organic Carbon (TOC) Analyzer

By monitoring TOC and resistivity, you can be sure that the product water exceeds the most stringent requirements of analytical or biological applications.

To ensure accurate measurement of product-water quality before it is dispensed from the system, the TOC analyzer is positioned after all purification technologies, next to the resistivity cell.

Specifications

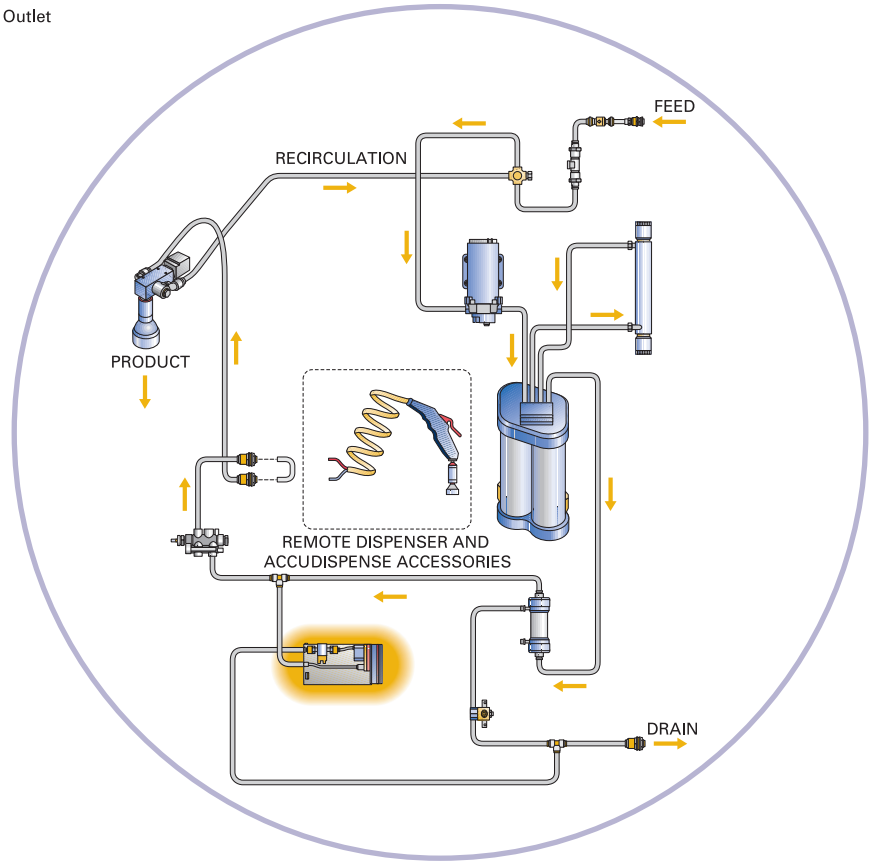
Volume per measurement: 10–15 ml per reading dispensed to drain
Cycle interval: approximately 3.5-minute cycle between readings
Control: TOC monitoring can be turned on or off via system keypad
Range: 1–250 ppb (@ ≥ 10 MΩ-cm resistivity)
Resolution: 1 ppb
Accuracy: ±1 ppb or 15% of reading, whichever is greater
Water temperature range: 4–40°C system (40–104˚F)
Ambient temperature range: 10–40°C



TOC Analyzer

Analyzer Principles of Operation

Water from our Nanopure passes through a filter **(1)** and enters the UV reactor **(2)**. The resistivity of the water is measured initially. The high-intensity (185 and 254 nm) UV lamp oxidizes organic compounds present in the water, producing CO_2. The solenoid valve **(3)** opens and moves the water across the conductivity cell **(4)**, where resistivity is measured again. The difference in resistivity resulting from the increased CO_2 concentration is used to calculate the TOC value, which is then displayed.



Nanopure Life Science (UV/UF) with TOC analyzer

Specifications & Ordering Information

	Nanopure Analytical	Nanopure UV	Nanopure UF	Nanopure Life Science (UV/UF)
Model #				
Standard Unit	**D11901**	**D11911**	**D11921**	**D11931**
TOC Unit	**D11941**	**D11951**	**D11961**	**D11971**
Cartridge Pack:				
Distilled/Reverse Osmosis Feed	**D50282**	**D50280**	**D50282**	**D50280**
Deionized Feed	**D50283**	**D50281**	**D50283**	**D50281**
0.2µm Final Filter:	**included**	**included**	**included**	**included**
UV Lamp:	**n/a**	**included**	**n/a**	**included**
Ultrafilter:	**n/a**	**n/a**	**included**	**included**
Specifications:				
Resistivity @25˚C	18.2 MΩ-cm	18.2 MΩ-cm	18.2 MΩ-cm	18.2 MΩ-cm
TOC (typical)	5-10 ppb	1-5 ppb	5-10 ppb	1-5 ppb
Pyrogen	NA	NA	<0.001 EU/ml	<0.001 EU/ml
Bacteria	<1 cfu/ml	<1 cfu/ml	<1 cfu/ml	<1 cfu/ml
Particles (0.2 micron)	< 1/ml	< 1/ml	< 1/ml	< 1/ml
Silica	<1 ppb	<1 ppb	<1 ppb	<1 ppb
UV Absorbance @254 nm	<0.001 AU	<0.001 AU	<0.001 AU	<0.001 AU
Flow Rate	1.8 lpm	1.8 lpm	1.8 lpm	1.8 lpm

Feed-Water Requirements:	
Required Pretreatment	Reverse Osmosis, Deionization, Distillation
Total Organic Carbon	< 1 ppm
Turbidity	< 1.0 NTU
Pressure	100 psig (Gravity feed to 6.9 bar)
Temperature	40–104°F (4–40°C)
Total Dissolved Solids	< 70 ppm as CaCO3
Silica	< 1 ppm
Silt Density Index	< 5%
Automatic Volumetric Dispense:	
Range	0.25–60 L
Accuracy	± 5% (1 L or greater)
Repeatability	± 3%
Automatic Timed Dispense:	1–40 minutes
Dimensions:	13.5" W x 19.5" H x 17.0" D (34.3 cm x 49.5 cm x 43.2 cm)
Mounting:	Bench or wall (brackets included)
Clearances:	
Sides	> 9" (22.9 cm) for servicing
Above	> 3" (7.6 cm) for removal of the top cover
Front	> 4.75" (12.1 cm) for opening front door
Electrical:	90–240 VAC, 100 VA, 47–63 Hz, 1 phase
Tubing Connections:	
Inlet	0.375" (11.43 cm) O.D. tubing (supplied)
Atmospheric Drain	0.25" (7.62 cm) O.D. tubing (supplied)

ACCESSORIES

Accudispense

Remote Dispenser

Printer

Model No.	Description
D13661	**Accudispense** – Remotely dispenses programmed volumes of water (0.25 and 60 liters) from up to eight feet (2.5 meters) away
D11981	**Remote Dispenser** – Easily attaches to any Nanopure, allowing you to deliver water up to eight feet (2.5 meters) away from the unit
AY1137X1	**Printer, 120 or 240V** – Date/Time/Resistivity and Temperature (TOC on TOC models) printed every 12 minutes
CMX25	**Cleaning Syringe**
E896X5	**NIST Calibration module** - Automatic calibration verification of the purity meter

Our complete line of water purification technologies includes solutions for your most critical and everyday application needs, from tap water pretreatment, deionization, distillation, filtration, and reverse osmosis, as well as storage reservoirs and other accessories.

Exceptional Pretreatment with Thermo Scientific Barnstead TII

Ideal for any daily application needs for primary grade water, our Barnstead TII is fed directly with tap water. It is the most intelligent and flexible system for producing ASTM Type II water. It combines pretreatment, reverse osmosis, deionization, and UV oxidation in a single system that is simple to operate and easy to maintain.

www.thermo.com/purewater

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