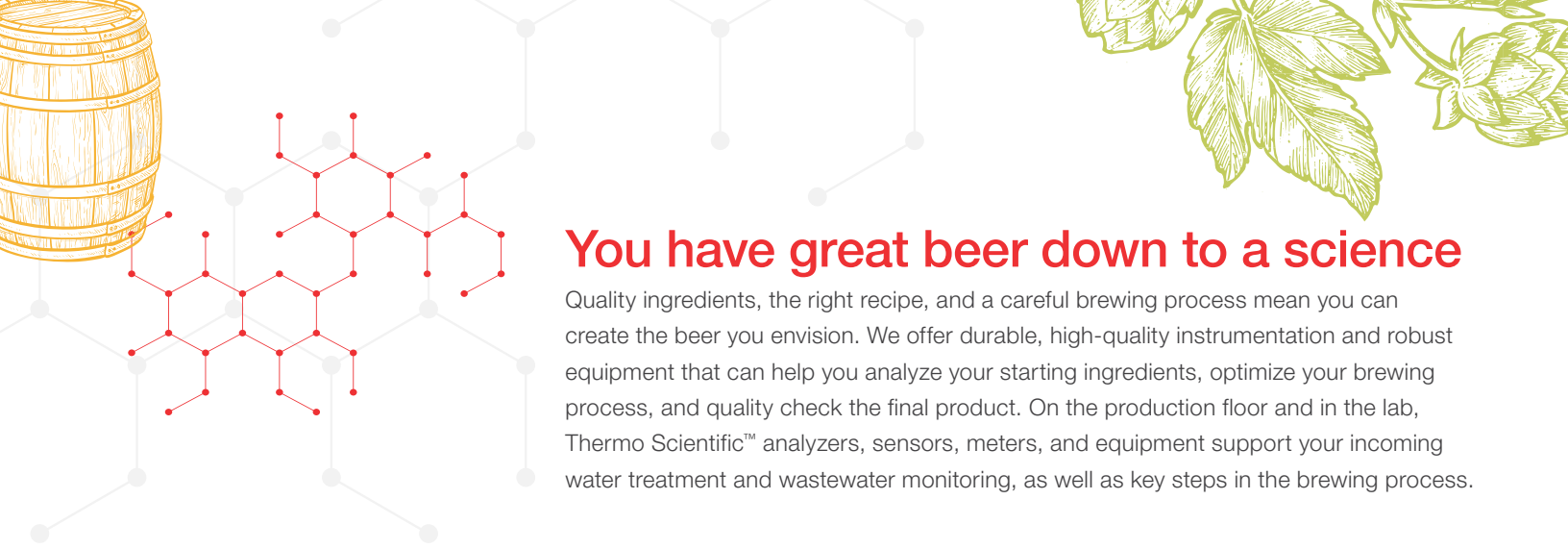




# Great beers start with great chemistry

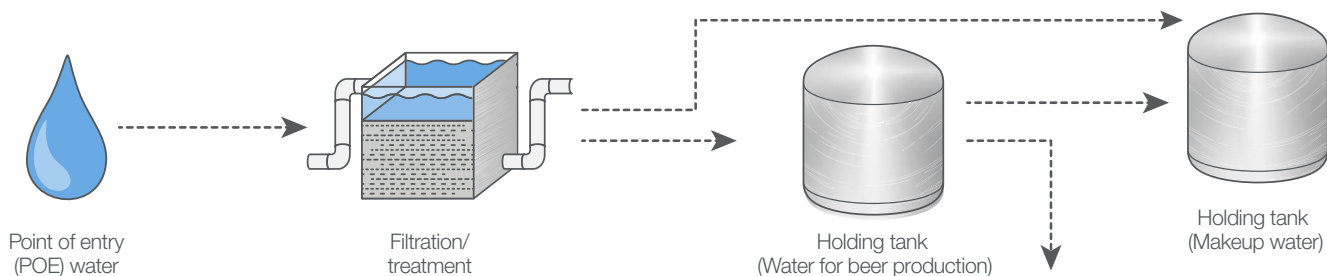
Beer analysis products



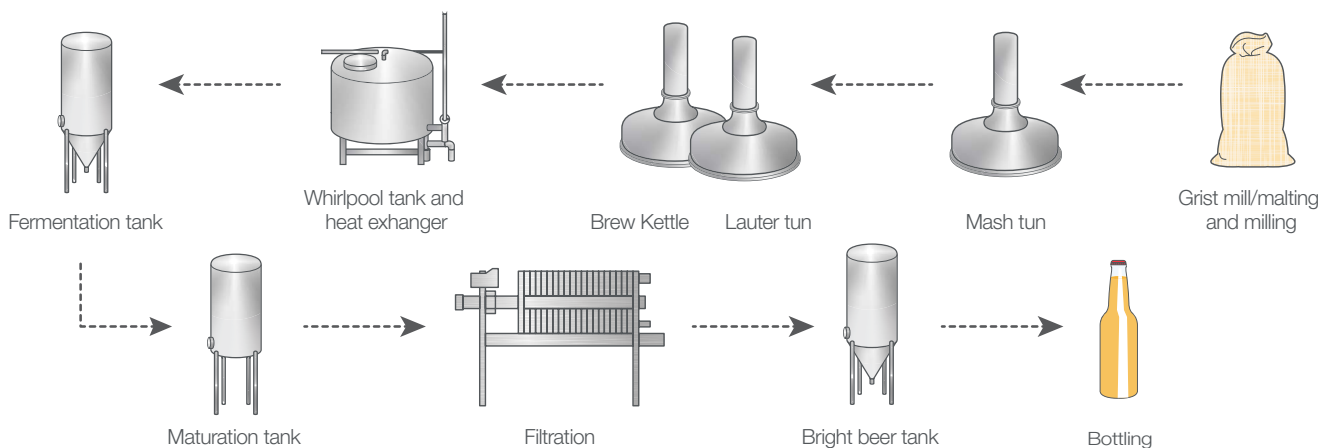
# You have great beer down to a science

Quality ingredients, the right recipe, and a careful brewing process mean you can create the beer you envision. We offer durable, high-quality instrumentation and robust equipment that can help you analyze your starting ingredients, optimize your brewing process, and quality check the final product. On the production floor and in the lab, Thermo Scientific™ analyzers, sensors, meters, and equipment support your incoming water treatment and wastewater monitoring, as well as key steps in the brewing process.

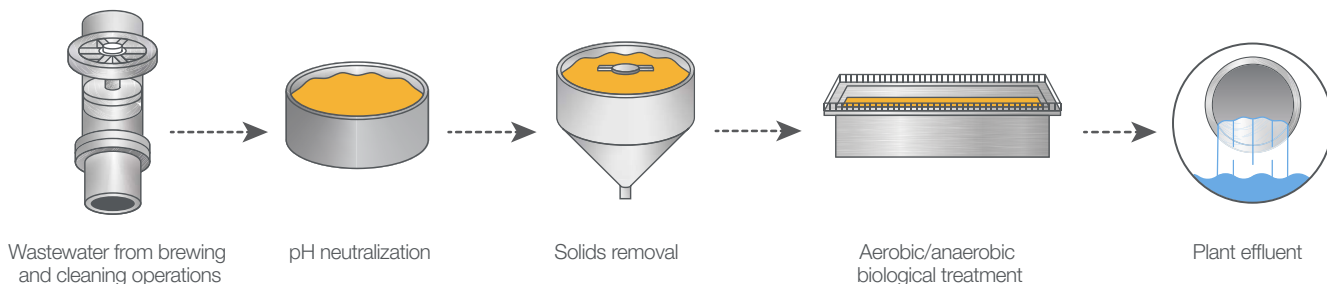
## Step 1 Point of entry (POE) water treatment



## Step 2 Beer production, quality control, and packaging



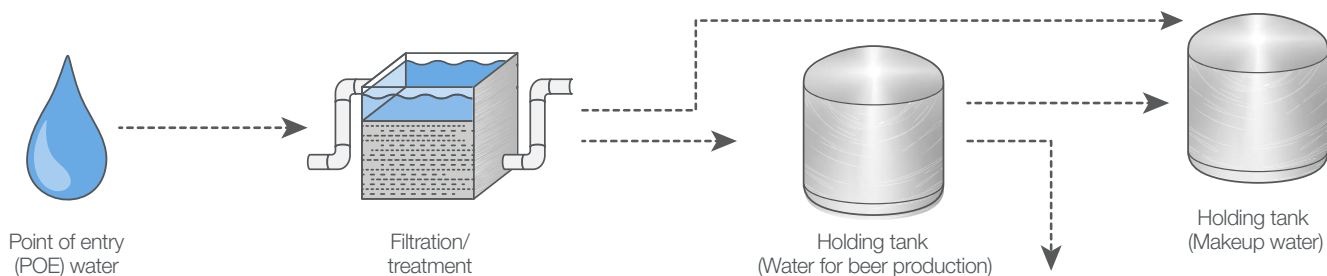
## Step 3 Treatment of wastewater from brewing operation





# Incoming water treatment and monitoring

## Step 1 Point of entry (POE) water treatment



A beer's flavor profile depends on the chemical profile of the water used for brewing. Thermo Scientific™ water analysis products are designed to be durable, low-maintenance, and easy

to use. Test your water and get your results quickly and easily so you can create the water profile you need to get on with your brewing.

Measurement	Thermo Scientific products for grab sample analysis	Thermo Scientific online process products
<b>pH with temperature</b>	Thermo Scientific™ Orion Star™ A211 pH Benchtop Meter kit or Orion Star A221 Portable pH Meter kit (also measures total alkalinity)	Thermo Scientific™ AquaSensors™ DataStick™ pH Measurement System
<b>Turbidity</b>	Thermo Scientific™ Orion™ AQUAfast™ AQ3010 Turbidity Meter or AQ4500 Portable Turbidity Meter	Thermo Scientific™ AquaSensors™ DataStick™ Wide-Range Turbidity Measurement System
<b>Chlorine*</b>	Thermo Scientific™ Orion™ AquaMate™ 8100 UV-Vis Spectrophotometer or Orion™ AQUAfast™ AQ3700 Portable Colorimeter or Orion AQUAfast AQ3170 Chlorine Colorimeter	
<b>Conductivity and TDS with temperature</b>	Thermo Scientific™ Orion Star™ A212 Conductivity Benchtop Meter kit or Thermo Scientific™ Orion Star™ A222 Conductivity Portable Meter kit	Thermo Scientific™ AquaSensors™ DataStick Conductivity system
<b>Sodium ion concentration</b>	Thermo Scientific™ Orion Star™ A214 pH/ISE Benchtop Meter kit and Thermo Scientific™ Orion™ Sodium ISE Electrode	
<b>Calcium ion concentration</b>	Thermo Scientific™ Orion Star™ A214 pH/ISE Benchtop Meter kit and Thermo Scientific™ Orion™ 9720BNWP Calcium ISE Electrode	Thermo Scientific™ Orion™ 2120XP Calcium Hardness Analyzer
<b>Ozone*</b>	Orion AquaMate 8100 UV-Vis Spectrophotometer or Orion AQUAfast AQ3700 Portable Colorimeter	Thermo Scientific™ AquaSensors™ DataStick Dissolved Ozone Measurement System

\* Additional AquaMate and AQUAfast meter test parameters include alkalinity, chloride, chlorine dioxide, color, copper, fluoride, hardness, iron, manganese, nitrate, nitrite, pH, phosphate, silica, sulfate, and zinc



### Orion AquaMate 8100 UV-Vis Spectrophotometer.

With over 260 preprogrammed water analysis methods, user-customizable methods, an intuitive graphic interface, long-life lamp, and one-point calibration, the AquaMate 8100 spectrophotometer is designed to save analysis time, maintenance time and cost.

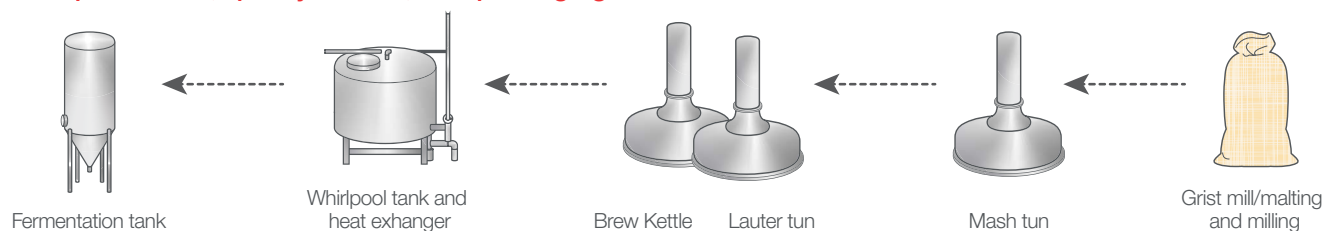


### Orion Star A222 Portable Conductivity Meter.

Dependable and easy to use, the Orion Star A222 Portable Conductivity Meter offers advanced features and functions to help you get the measurements you need quickly and easily. Waterproof IP67-rated housing design offers durability and rugged performance.

# Incoming water treatment and monitoring

## Step 2 Beer production, quality control, and packaging



Getting the right flavor profile and maintaining consistent quality takes diligence. Incoming material monitoring, control of the brewing process, and quality control on the finished product all contribute to beer profile consistency.

To get the job done, you need high quality, reliable tools that are easy to use and maintain. Thermo Scientific™ laboratory instruments give you the feedback you

need to help you get the consistent beer you want. Our laboratory equipment includes automated procedures and step-by-step instructions to enable testing at any step of the process.

Thermo Scientific instruments and equipment are designed to be easy to use and maintain, to enable reliable results, even in challenging environments throughout the brewing process.

Process/application	ASBC or EBC method	Measurement	Thermo Scientific product
Incoming material monitoring	BEER-9; Sugar and syrups-10	pH determination	Orion Star A221 Portable pH Meter kit
Incoming material monitoring	Sugars and syrups-9	Total acidity (titration)	Thermo Scientific Orion Star T910 pH Titrator
Malting	BARLEY-5, MALT-3, GRAINS-2 and 3, FILLS-1	Moisture, preparation of sample, total contents of bottles and cans	Thermo Scientific™ Heratherm™ heating and drying ovens
Mash tun/mashing	WORT-8 / BEER-9	pH determination	Orion Star A221 Portable pH Meter kit
Lauter tun/lautering	WORT-12	FAN in wort	Thermo Scientific UV/Vis spectrophotometer
Aeration of wort and fermentation monitoring		Dissolved oxygen using optical method	Thermo Scientific™ Orion Star™ A323 RDO/DO Portable Meter kit



### Orion Star A221 Portable pH Meter kit for brewers

Orion Star A221 Portable pH Meter together with a Thermo Scientific™ Orion™ ROSS Ultra™ Glass Triode™ pH/

ATC Combination Electrode provides simultaneous temperature and pH readings using simple, step-by-step menus, which walk you through how to calibrate and measure pH. The pH sensor has an 18 month warranty supporting long electrode lifetime.



### Thermo Scientific™ Orion™ ROSS™ Sure-Flow™ pH Electrode.

Messy, viscous, or solid containing samples are no match for the Orion Sure-Flow electrode. This unique electrode can be flushed out after every use by pressing on the cap.

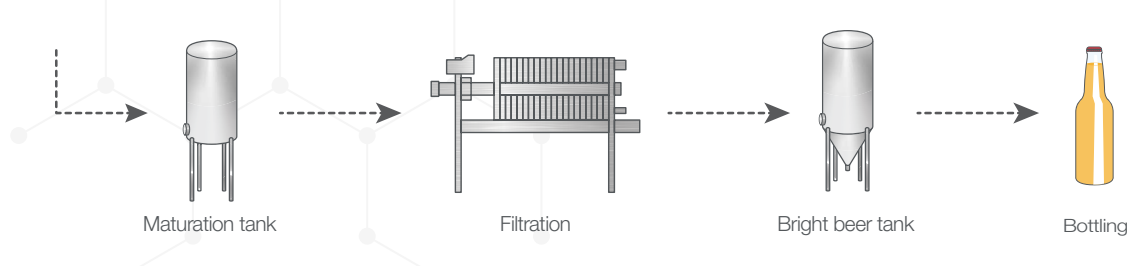


### Heratherm heating and drying oven.

Test barley and determine moisture content in samples with Heratherm heating and drying

ovens, designed with sample preservation as a top priority. Easy to use and easy to clean, Heratherm ovens offer high temperature accuracy with low energy consumption.





Process/application	ASBC or EBC method	Measurement	Thermo Scientific product
Beer filtration	FILTER AIDS-2	pH of water suspension	Orion Star A211 Benchtop pH Meter kit with a Thermo Scientific™ Orion™ 9165BNWP Combination Sure-Flow™ pH Electrode
Filtration, resting tank	BEER-27	Haze	Orion AQUAfast AQ3010 Turbidity Meter
Quality control testing	BEER-23, BEER-10	Bitterness determination, color (beer or wort)	Thermo Scientific UV/Vis spectrophotometer
Microbiological testing		Sample preparation	Thermo Scientific™ Digital Mini Rotator, with digital speed control of 50 to 300 rpm
		Sample incubation	Thermo Scientific™ Heratherm™ Microbiological Incubators
Sample preparation, glassware rinse glassware, provide water for lab equipment			Thermo Scientific™ Barnstead™ Water Purification Systems
Quality control	BEER-8	Total acidity	Orion Star T910 pH Titrator



**Orion Star A214 Benchtop pH/ISE Meter.**

Designed for dependability and ease-of-use, the Orion Star A214 pH/ISE Benchtop Meter offers the pH testing capabilities of the Orion Star A211 Benchtop pH Meter plus the ability to measure ion concentration when paired with an ion selective electrode for common water parameters such as sodium and calcium levels. The meter's advanced features and functions can help you get the measurements you need quickly and easily.



**Orion Star T910 pH Titrator.**

Manual titrations are time consuming and can be inaccurate due to human error. The Thermo Scientific Orion Star T910 automated titrator is designed to make performing titrations easier, more reliable and more reproducible than manual titrations. These automated titrators expand the number of ions and compounds that can be measured beyond direct electrode analysis and offer dynamic process controls that adjust the titration to optimize analysis results, while capturing and saving your data.



**Digital Mini Rotator.**

Space-saving and versatile, the Digital Mini Rotator offers digital speed control of 50 to 300 rpms and can be used for beer degassing and microbiology testing sample preparation. Nice also for final degree of fermentation to know when the beer has to pump into resting tank

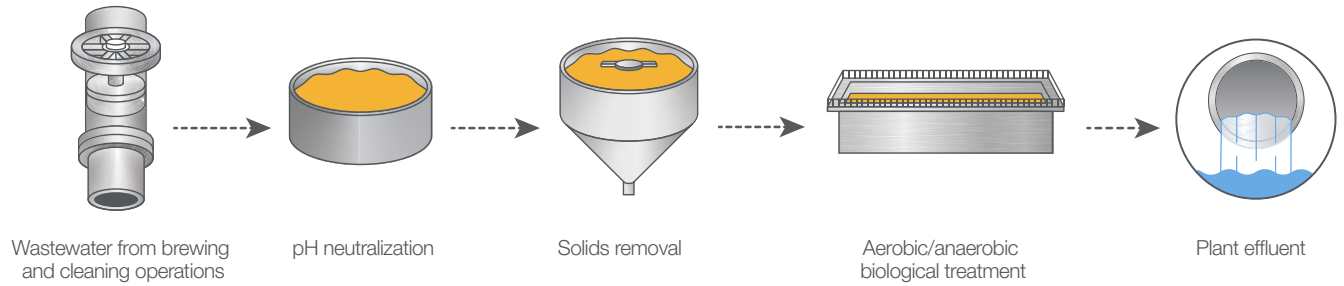


**Thermo Scientific™ Barnstead™ Smart2Pure™ Water Purification System.**

Enjoy options, convenience, and consistency in a lab water system. Choose the system best suited for your application needs, such as making buffers, diluting samples, providing purified water for use as the solvent in sensitive applications, B.O.D. blanks, or for other lab equipment (glassware washers, autoclaves, and more).

# Outgoing water treatment

## Step 3 Treatment of wastewater from brewing operation



Brew responsibly and save money by treating your brewery wastewater. Rely on Thermo Scientific™ water analysis instruments for fast, reliable information to help you ensure your outgoing water supply meets your required limits.

Process	Thermo Scientific wastewater laboratory products	Thermo Scientific product
pH neutralization	Orion Star A211 Benchtop pH Meter kit or Orion Star A221 Portable pH Meter kit	Thermo Scientific™ AquaPro™ Multi-Input Intelligent Process Analyzer with an Orion™ pHR Process ROSS™ Electrode
Turbidity measurement	Orion AQUAfast AQ3010 Turbidity Meter or Orion AQUAfast AQ4500 Portable Turbidity Meter (EPA-approved method)	AquaSensors DataStick Wide-Range Turbidity Measurement System or Thermo Scientific™ AquaSensors™ DataStick™ Suspended Solids Measurement System
Biochemical oxygen demand incubation	Thermo Scientific™ Precision™ Refrigerated Incubator and the Thermo Scientific™ Orion Star™ A213 Benchtop RDO/DO Meter BOD kit	Thermo Scientific™ AquaSensors™ DataStick™ RDO/DO Measurement System
Chemical oxygen demand measurement	AQUAfast AQ3700 Colorimeter or AquaMate 8100 UV/Vis Spectrophotometer or Orion AQUAfast AQ3140 COD Colorimeter Thermo Scientific™ Orion™ AQUAfast™ COD digestion tubes Thermo Scientific™ Orion™ AQUAfast™ COD165 Thermoreactor	



### AquaPro Multi-Input analyzer with Orion pHR Process ROSS Electrode.

AquaPro analyzer provides an attractive cost of ownership and versatility with up to four digital or analog sensor inputs combined with flexibility to interface with most communication protocols. The Orion Process ROSS electrode offers high stability and negligible drift combined with 90 days of operation between maintenance intervals, even in harsh applications.



### Orion AQUAfast AQ3010 Portable Turbidity Meter.

Shipped pre-calibrated, the turbidity meter's performance offers great stability and 0 to 2000 NTU auto-ranging. Portable and IP67 waterproof housing. Compliant to ISO 7027 infrared (IR) method for turbidity testing.



### Precision Refrigerated Incubator for BOD testing.

Ideal for applications requiring temperatures ranging from -10°C to 60°C, such as BOD studies. Easy to clean and corrosion resistant, the Precision refrigerated incubator is available in compact under-counter or full-size units, which hold over 300 BOD bottles. Features an efficient, dependable design with microprocessor controls and forced air circulation. **Available in North America only.**



## Ordering information

Description	Cat. No.
<b>Incoming water</b>	
Thermo Scientific Orion Star A211 pH benchtop meter food and beverage kit	STARA2119
Thermo Scientific Orion Star A212 conductivity benchtop meter kit	STARA2125
Thermo Scientific Orion Star A214 pH/ISE benchtop meter pH kit	STARA2145
Thermo Scientific Orion Star A221 pH portable meter kit	STARA2215
Thermo Scientific Orion Star A222 conductivity portable meter kit	STARA2225
Thermo Scientific Orion calcium ISE electrode	9720BNWP
Thermo Scientific Orion ROSS Sure-Flow sodium ISE electrode	8611BNWP
Thermo Scientific Orion Sure-Flow Chloride ISE electrode	9617BNWP
Thermo Scientific Orion AQUAfast AQ3700 portable colorimetry meter	AQ3700
Thermo Scientific Orion AQUAfast AQ3170 Chlorine Colorimeter	AQ3170
Thermo Scientific Orion AquaMate 8100 UV-Vis spectrophotometer	AQ8100
Thermo Scientific Orion 2120XP calcium hardness analyzer	2120XP
Thermo Scientific AquaSensors DataStick pH Measurement System	ASDSPH
Thermo Scientific AquaSensors DataStick wide-range turbidity system	RT1SS
Thermo Scientific AquaSensors DataStick conductivity resistivity system	CCPEEK
Thermo Scientific AquaSensors DataStick dissolved ozone measurement system	OZPEEK1B
<b>Beer production and quality control testing</b>	
Thermo Scientific Orion Star A211 pH benchtop meter food and beverage kit	STARA2119
Thermo Scientific Orion Star A214 pH/ISE benchtop meter pH kit	STARA2145
Thermo Scientific Orion Star A221 portable meter kit	STARA2215
Thermo Scientific Orion Star A323 RDO/DO portable meter kit	STARA3235
Thermo Scientific Orion Sure-Flow pH electrode	9165BNWP
Thermo Scientific Orion ATC Probe	927007MD
Thermo Scientific Orion AQUAfast AQ3010 turbidity meter	AQ3010
Thermo Scientific Heratherm heating and drying oven, 100 L (other sizes / models available)	51028873
Thermo Scientific Heratherm microbiological incubator, 100 L (other sizes / models available)	51028064
Thermo Scientific Barnstead Smart2Pure water purification system	50129885
Thermo Scientific Compact Digital Mini Rotator	88880025 (US Plug); 88880026 (EU, UK, CN Plugs)
Thermo Scientific Orion Star T910 pH Titrator Kit	START9102
<b>Outgoing water</b>	
Thermo Scientific Orion Star A211 pH benchtop meter food and beverage kit	STARA2119
Thermo Scientific Orion Star A213 RDO/dissolved oxygen benchtop meter BOD kit	STARA2136
Thermo Scientific Orion Star A221 pH portable meter kit	STARA2215
Thermo Scientific Orion AquaMate 8100 UV-Vis Spectrophotometer	AQ8100
Thermo Scientific Orion AQUAfast portable turbidity meter	AQ3010
Thermo Scientific Orion AQ4500 Turbidimeter	AQ4500
Thermo Scientific Precision refrigerated incubator, 566 L	PR505755R
Thermo Scientific Barnstead Smart2Pure water purification system	50129885
Thermo Scientific AquaSensors DataStick suspended solids turbidity measurement system	ASDSSLDS
Thermo Scientific AquaPro multi-input analyzer	AQUAPRO
Thermo Scientific Orion pHR Process ROSS electrode	SH36A9E210
Thermo Scientific AquaSensors RDO Pro-X Optical Dissolved Oxygen Sensor	RD6A43
Thermo Scientific Orion AQUAfast COD Digest tubes, 0–1500 ppm	CODH00
Thermo Scientific Orion AQUAfast COD165 Thermoreactor	COD165
Thermo Scientific Orion AQUAfast AQ3140 COD Colorimeter	AQ3140





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