

전 세계 물 부족 문제의 “가장 혁신적인 해결책”

SEAWATER DESALINATION

해수담수화

FILTERTECH
QT ENVIRO TECH
SEAWATER DESALINATION
SYSTEM



홈페이지

 FILTERTECH

 QT ENVIRO-TECH
乾通环境科技



KCL 주관 마크 인증 취득
여성가족부 주관 가족친화인증 취득
ESG 벤처기업부 주관 클링프시스템 성능인증 취득
JSG 경영보고서 보유

대전테크노파크 주관 대전지역 우수혁신클러스터 지정
에너지절감효과실익이 클링프시스템 개발 완료
클링프시스템 온도지감, 복사열지감, 미세먼지지감
효과 입증 KCL 성적서 보유

LCC 경제성효과 10.7% 월간절감효과 입증
원가보고서 보유

해수담수화 장치란?

Seawater desalination

도시 지역의 해수 및 염지하수를 식수, 생활용수, 소방용수, 농업용수, 산업용수 등으로 담수화하여 활용하는 환경친화적 수처리 장치입니다.

‘필터테크 해수담수화 장치’는 생활용수뿐 아니라 높은 수준의 식수 생산이 가능하며, 음용수/생활용수를 필요 지역에서 생산할 수 있어 운송 편의성이 매우 높습니다. 인천광역시와 전라남도 보건환경연구원에서 먹는 물 기준 50개 항목 수질분석 결과 매우 우수한 판정을 받았습니다.

해수담수화 시스템



농업용수 Agriculture



발전소 Power plant



공업용수 Industrial water



생활용수 Tap water

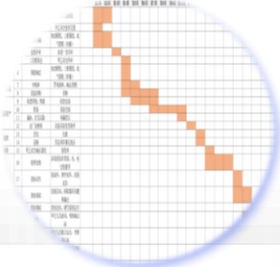
해수담수화시스템 과정 및 절차



1

개념설계

고객의 요구 사항에 따라 프로세스를 설계합니다.



2

생산도 계획

설계의 신뢰성 테스트, 장비 CEPE 및 유지관리 비용 및 서비스 절차 등을 공유하고 제공합니다.



3

기술 검토

프로젝트 실행 전 고객과 적극적으로 소통하고 고객 맞춤형 기술 검토를 진행합니다.



4

장비제조

3차원 도면으로 시공하여 생산 안정성을 높였습니다.



5

장비설치 및 시공

공장 출하 전 테스트를 거쳐 장비의 현장 설치 인력과 물적 자원 낭비를 최소화합니다.
전문 서비스 인력을 현장에 파견하여 전방위적인 기술 작업을 수행할 수 있습니다.



6

사후관리 및 유지보수

정기적으로 고객과의 연락 및 현장 방문을 실시하여 설비 시스템의 가동 상황을 파악, 시스템의 발생 가능한 문제를 사전에 예방하고 설비의 수명을 향상시킵니다.

필터테크 해수담수화 특허증

Seawater desalination
Patent certificate



1 특허 제 10-1845674호



2 특허 제 10-2005147호

인청광역시보건환경연구원 수질검사 성적서
한국에너지기술연구원 에너지소비 고효율 시험성적서

국내외 해수담수화장치 인증 및 자격

Qualification and Honor Certificate of quality

FILTERTECH **QT ENVIRO-TECH**
乾通环境科技

필터테크는 중국 해수담수화 전문기업
QT와의 기술협약을 통해 국내외
해수담수화 기술을 발전시키고 있습니다.



MANAGEMENT SYSTEM CERTIFICATE

주식회사 필터테크

대전광역시 대덕구 대입북로70번길 35, 2층 (여암동)

적용 표준
KS Q ISO 9001:2015

인증 범위
물리포그시스템, 전자식 초미세 무압포그시스템, 해수담수화장치, 필터에 대한 생산

위와 같이 **해수담수화장치**

인증번호: SM-2294Q
유효기간: 2022/11/11 ~ 2024/12/17
발행일자: 2022/11/25
최초 인증일자: 2018/12/18

한국표준경영원
서울시 관악구 가산디지털로 212, 1409호
(가산동, 조오디지털타워에스텐)
www.smi21.com Tel. 02-6677-9002 Fax. 02-6677-9003
KAB-QC-42



MANAGEMENT SYSTEM CERTIFICATE

주식회사 필터테크

대전광역시 대덕구 대입북로70번길 35, 2층 (여암동)


적용 표준
KS I ISO 14001:2015

인증 범위
물리포그시스템, 전자식 초미세 무압포그시스템, 해수담수화장치, 필터에 대한 생산

위와 같이 경영시스템 표준에 적합함을 인증합니다.

인증번호: SM-2294E
유효기간: 2022/11/11 ~ 2024/12/17
발행일자: 2022/11/25
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www.smi21.com Tel. 02-6677-9002 Fax. 02-6677-9003
KAB-EC-37




QUALITY MANAGEMENT SYSTEM CERTIFICATE

QT Enviro-Tech (Suzhou) Ltd

Registered Address: Block 5, No. 12 Changjiang Street, GIP, Suzhou, China

Audit Address: Block 5, No. 12 Changjiang Street, GIP, Suzhou, China

GB/T 19001-2016 idt ISO 9001:2015




ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE

QT Enviro-Tech (Suzhou) Ltd

Registered Address: Block 5, No. 12 Changjiang Street, GIP, Suzhou, China

Audit Address: Block 5, No. 12 Changjiang Street, GIP, Suzhou, China

GB/T 24001-2016 idt ISO 14001:2015




OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM CERTIFICATE

QT Enviro-Tech (Suzhou) Ltd

Registered Address: Block 5, No. 12 Changjiang Street, GIP, Suzhou, China

Audit Address: Block 5, No. 12 Changjiang Street, GIP, Suzhou, China

GB/T 45001-2020 idt ISO 45001:2018



CERTIFICATE

CERTIFICATE OF MACHINERY AND LOW VOLTAGE DIRECTIVES

해외 해수담수화 품질인증서



授予: 乾通环境(苏州)有限公司

大连市长海县海洋岛供水 800 吨/天海水淡化工程项目

优质服务商

(2021-2022 年度)

大连安能东科技发展有限公司
二〇二二年十二月



卓越服务供应商

乾通环境(苏州)有限公司

公司于 2021 年“大连市长海县海洋岛供水 800 吨/天海水淡化工程项目”中提供优质服务并超出客户期望的供应。

“年度优质服务商”的称号。

필터테크 해수담수화 9001/14001 ISO인증서

고객사 감사장

해수담수화 납품 업체로부터 품질을 인증받은 고객사 감사장

Seawater desalination system Container type

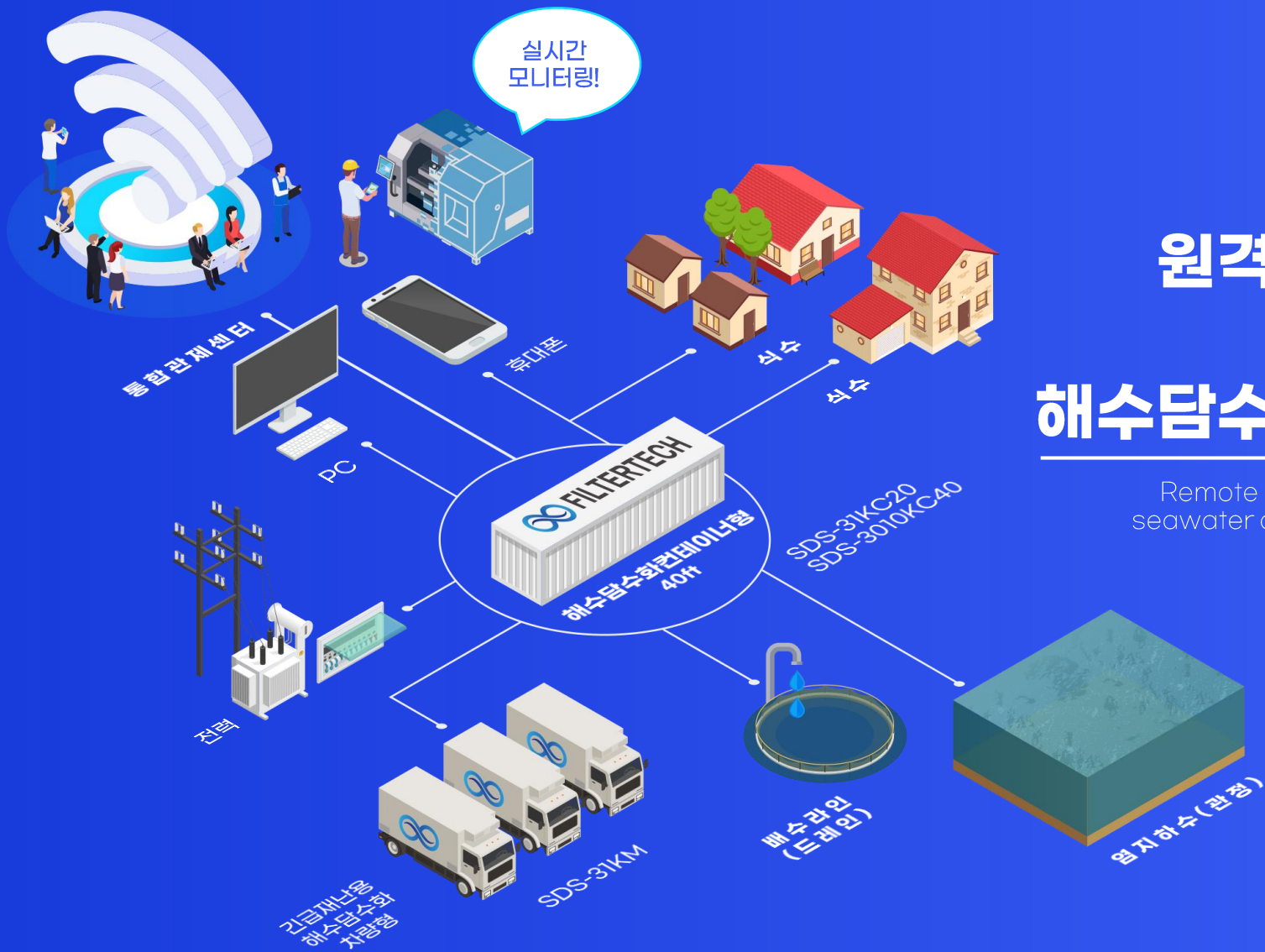
해수담수화시스템 컨테이너 타입

해수 최대 35,000ppm → 담수 최소 50ppm

 FILTERTECH

 QT ENVIRO-TECH
乾通环境科技





원격제어기반 친환경 해수담수화시스템

Remote control eco-friendly
seawater desalination system

해수담수화 시스템

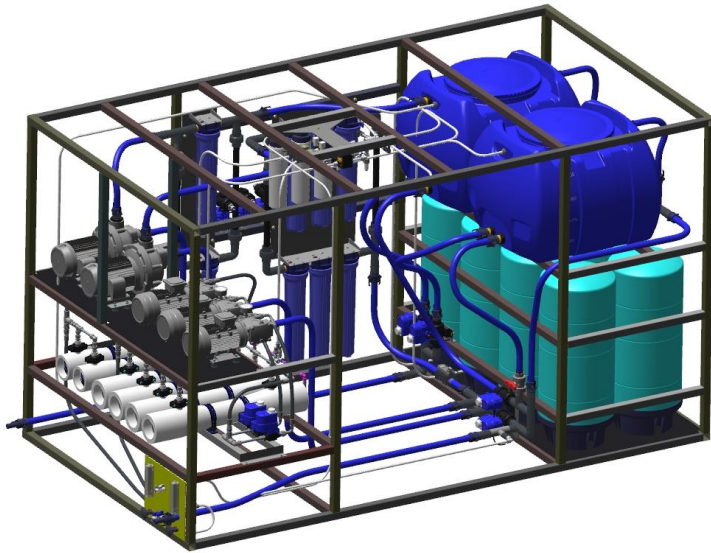
(Seawater Desalination Equipment System)

- ① 생활용수 생산을 위한 **SWRO**(Sea Water-RO),
식수 생산을 위한 **BWRO**(Brackish Water-RO)
- ② **필터테크만의 특화된 전문필터** 적용
- ③ 비상시, 복수 펌프(2개) 구성 통한 **운전 안정성 확보 및 원격 모니터링** 통한 재가동 시스템
(2교대, 교차 운전 및 펌프 고장 시 상대 펌프 가용 통한 연속 생산 기능,
비상 원격 재가동 기능 적용)
- ④ **비상사태**(낙뢰 등 천재지변 사항)에서의 운전 상태 **원격 모니터링 기반 원격 재가동 기능** 탑재
- ⑤ **필터수명 원격 모니터링 으로 효율적 관리 및 유지보수 비용 절감**

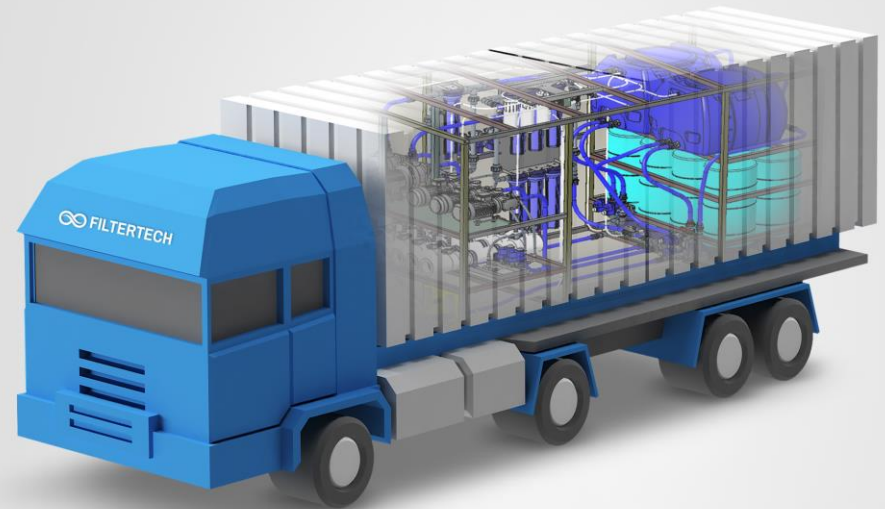
해수담수화 시스템 모델 리스트

SDS-31KM	SDS-31K	SDS-31KC20	SDS-3010KC40
 <p>이동형 해수담수화 시스템 긴급재난 차량형</p>	 <p>설치형 해수담수화 시스템 실내 설치형</p>	 <p>고정형 해수담수화 시스템 컨테이너형 20ft</p>	 <p>고정형 해수담수화 시스템 컨테이너형 40ft</p>
<p>생활용수4.8톤/일 식수2톤/일</p>	<p>생활용수4.8톤/일 식수2톤/일</p>	<p>식수10톤/일</p>	<p>식수20톤/일</p>
<p>단수 혹은 재난 상황에서 의 긴급 지원에 최적화된 차량형 해수담수화 시스템으로, 지표수(해수)를 사용하여 도서 지역의 생활용수와 식수의 현지 생산·운송이 가능합니다.</p>	<p>지상 실내에 설치하여 사용하는 해수담수화 시스템으로 도서 지역 의 염지하수를 끌어올려 생활용수와 식수를 생산합니다. 상시 담수를 생산하여 저장하고 사용할 수 있 습니다.</p>	<p>지상에 컨테이너 형태로 고정하여 사용하는 해수담수화 시스템으로 도서 지역의 염지하 수를 끌어올려 생활용수와 식수를 생산합니다. 상시 담수를 생산하여 저장하고 사용할 수 있 습니다.</p>	

시스템 구성



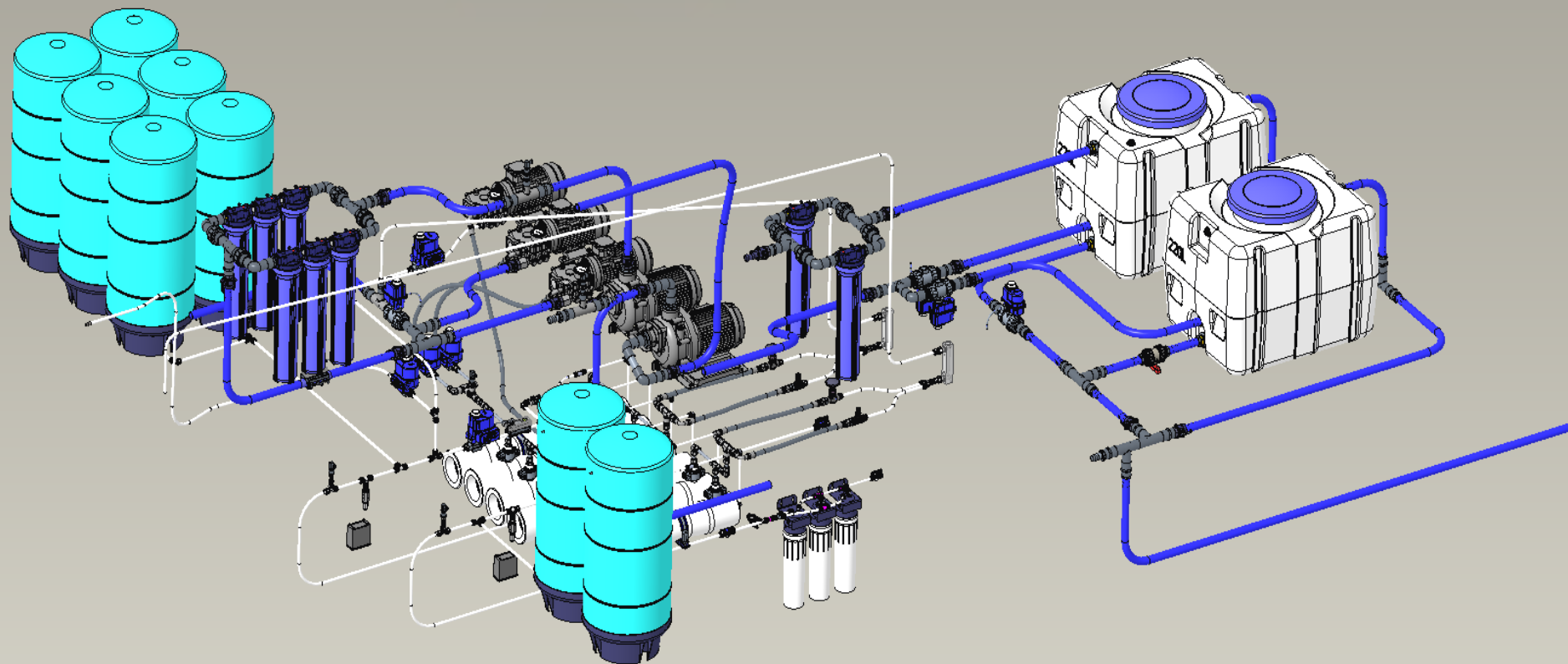
모델 : SDS-31K(설치형)



모델 : SDS-31KM(차량형)

P&ID

모델 : SDS-31KM(차량형), SDS-31K(설치형)



Fast , Reliabe, Cost-saving

***fastRO® Container series
containerized seawater desalination system***

 **FILTERTECH**

Brief

fastRO Container series (hereinafter “fastRO C”) seawater reverse osmosis system is a containerized desalination solution, with most parts installed into 1 or 2 containers, and freshwater production capacity of 55 to 2,016 m3/day (2,300 – 84,000 liters/hour). Multi-media filter (MMF) will be common set-up, -S version without MMF (turbidity < 1 NTU) for better feed water is available. The water intake recommendation, extra pre-treatment and post-treatment customizing, installation guide commissioning and training services could be provided by the FILTERTECH/QT upon request.



Application

- Construction site
- Island residents
- Agricultural exploitations
- Mobile water supply vehicle
- Military water supply
- Hotels and Resorts
- Oil drilling platform
- Other customized applications

Benefits

- Stability and reliability: 30 years of experience in desalination.
- Better filtration: 3 steps filtering process including multi-media filter, pre-filter and main-filter to ensure better protection for high pressure pump, energy recovery device and RO membrane.
- Quick installation and commissioning: most of the installation is completed before delivery, fast deployment.
- Long service life: well-known international brands, non-corrosive duplex for pump and high pressure piping, cpvc or other plastics for piping, and the heavy-duty marine paint is used for frame and container.
- Low energy consumption: using high-efficiency high pressure pump (based on axial piston principle), high-efficiency energy recovery device (based on isobaric pressure exchanger principle, if equipped) and low energy-consumption RO membrane.
- Easy operation: user friendly control by touch screen with remote control.
- Fast restoring feature: in case of malfunction, the whole system can be restored quickly by using standard parts.
- Customization: sensors adding/upgrading according to customer needs, collect data remotely and provide operational consulting service

Containerized vs traditional

Feature comparison table		Traditional desalination system	fastRO C
Cost	Civil Works	100%	44%
	Installation	100%	14%
	Commissioning	100%	15%
	Equipment	100%	91%
	Total	100%	77%
Time	Civil Works	100%	63%
	Installation	100%	30%
	Commissioning	100%	33%
	Total	100%	52%

Water standards

Feed water standards	
Salinity (TDS)	20,000-42,000mg/L
Temperature	5-35°C
Turbidity ¹⁾	< 20NTU
Chemical Oxygen Demand (COD)	< 10mg/L
Ferrous (Fe ²⁺)	< 0.1mg/L
Manganese (Mn ²⁺)	< 0.1mg/L
Oil and grease	< 0mg/L
Product water standards ²⁾	
Salinity (TDS)	< 500mg/L
pH	6-8
Turbidity	< 0.2NTU

Notes:

1) If feed water turbidity is higher than the above specifications, extra pretreatment might be needed.

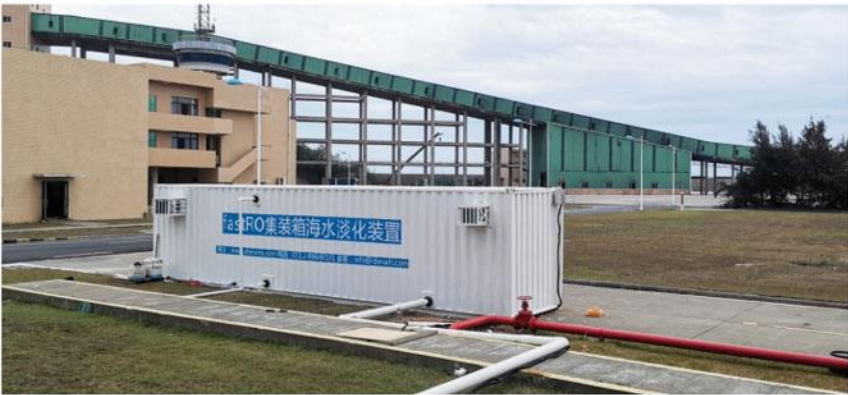
2) If the source water is natural seawater, the produced drinking water shall meet the WHO Guidelines for Drinking Water quality, 4th edition, 2012.





fastRO C50-300E

[illegible]



Technical specifications

fastRO C400E-2000E

Technical Data	Unit	C400E	C500E	C800E	C1000E	C1200E	C1500E	C2000E
Rated Product Flow 1)	m ³ /h	16.7	21.5	33.5	42	52	65	84
	L/S	4.64	5.97	9.31	11.67	14.44	18.06	23.33
Rated Recovery Rate 1)	%	45	45	45	45	45	45	45
Rated Feed Flow	m ³ /h	37.1	47.8	71.1	93.3	115.6	144.4	186.7
Min System Pressure 2)	barg	20	20	20	20	20	20	20
Max System Pressure 2)	barg	70	70	70	70	70	70	70
RO Membrane Spec.		8040	8040	8040	8040	8040	8040	8040
RO Membrane Qty.	pcs	28	35	56	70	84	105	144
Weight (dry)	ton	13	13	16+8	20+8	26+9	30+10	36+10
Container size	ft	40	40	40+40	40+40	40+40	40+40	40+40
Type-S container size	ft	40	40	40	40	40	40	40
Rated Power	kW	48.0	60.3	87.3	113.6	141.8	183.1	221.8
Energy Consumption 3)	kWh/m ³	2.88	2.80	2.74	2.71	2.73	2.82	2.64
Installed Power 4)	kW	61.3	86.8	134.9	161.9	213.9	265.9	320.9
Input	3PH 380V AC±10%, 50Hz							

- Notes:
- 1) The rated product flow and rated recovery rate are based on the design feed of 35,000 ppm and 20°C standard seawater. Higher product flow and higher recovery rate could be reached upon demand.
 - 2) The normal operating system pressure shall be above the minimum pressure. The system could be adapted to higher pressure above 70 bar when needed.
 - 3) The power consumption is based on the design feed of 35,000 ppm and 20°C standard seawater, but does not include the consumption by the intake pump, product supply pump, Heating, ventilation, and air conditioning (HAVC).
 - 4) Installed power includes feed pump, high pressure pump (HPP), energy recovering device (ERD), cleaning in place (CIP) pump, dosing pump and lights.

TECHNICAL DATA SHEET

fastRO® M series marine type sea water desalination system FILTERTECH

Description

fastRO M series is a small-size modular Sea Water Reverse Osmosis (SWRO) machine.

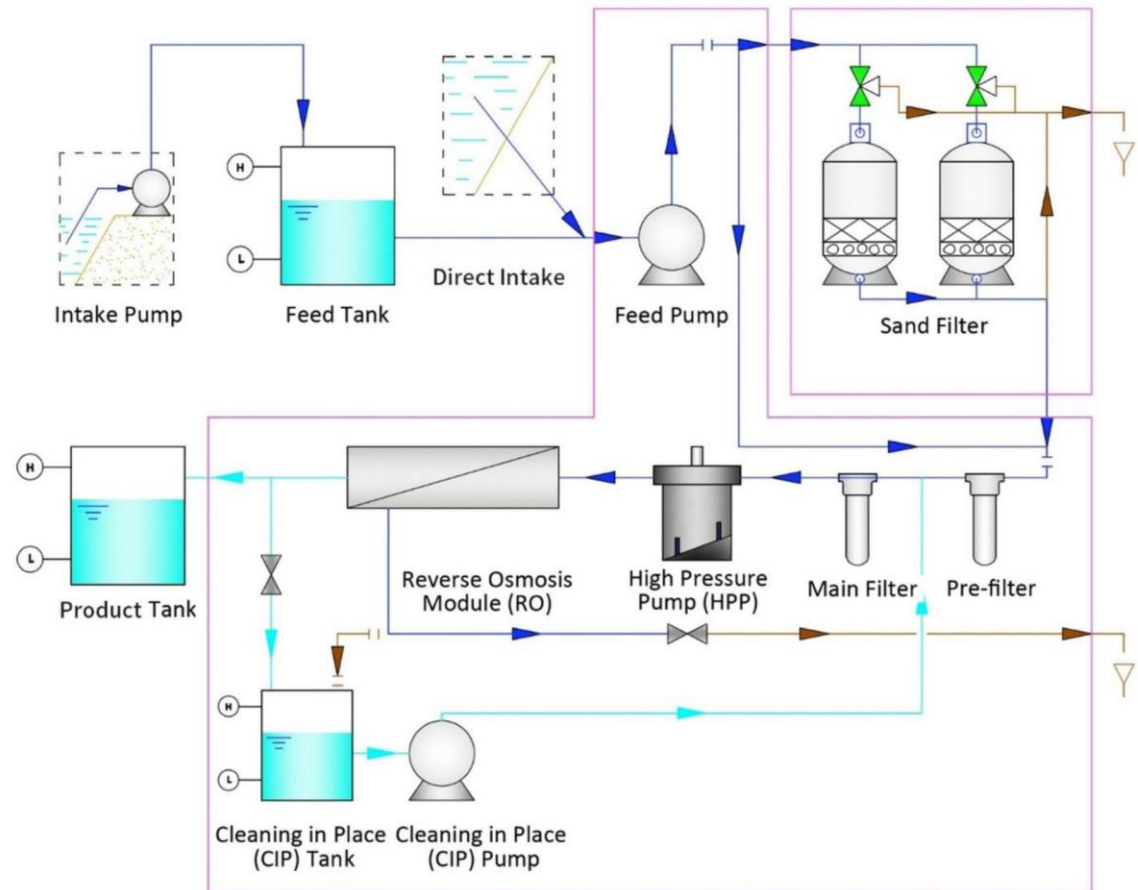
The feed pump, sand filter, pre-filter and main filter, high pressure pump and control, membrane unit are all within modular design, and the fresh water capacity is 120 to 1,100 liters (32-290 USgallon) per hour.



Desalination Process

The desalination process aims to take away salt from seawater. The Reverse Osmosis membrane process starts by filtering feed water particles through applying pressure from the feed pump to the sand filter (No need to use sand filter if the feed water turbidity is lower than 0.3 NTU), then entering the high-pressure pump, to pressurize fresh water out through the membrane, while concentrated water is discharged after pressure relief.

fastRO M 시스템 공정



Water quality standards

Feed water standards	
Salinity (TDS) ¹⁾	20,000-40,000 mg/L
Temperature	5-35 ° C
Turbidity ²⁾	< 5 NTU
Chemical Oxygen Demand (COD)	< 10 mg/L
Ferrous (Fe ²⁺)	< 0.1 mg/L
Manganese (Mn ²⁺)	< 0.1 mg/L
Oil and grease	0 mg/L
Product water standards	
Salinity (TDS) ³⁾	< 500 mg/L
pH	6-8
Turbidity	< 0.2 NTU
<p>Notes:</p> <p>1) If feed water salinity is out of the range, please contact us for solution.</p> <p>2) If feed water turbidity is higher than the above specifications, extra pretreatment might be needed.</p> <p>3) If the seawater is free of harmful contaminants such as nitrate or fluoride ion, the produced drinking water meets the WHO Guidelines for Drinking Water quality, 4th edition, 2012.</p>	





System characteristics

- Stability and reliability: We have nearly 30 years of experience in the design of desalination systems.
- Long life: Non-corrosive, non-welding duplex pipe and fittings, SS304 frame with powder coating.
- Better flexibility: The modular design that includes the feed pump, sand filter, pre-filter, main filter unit and membrane unit, there can be many placement combinations to fit the limited space inside a cabin. In addition, the sand filter unit can be omitted, which further increases the flexibility.
- Low noise & vibration level: Using high pressure hose and vibration damper.
- Simple control: One button ON/OFF design.
- Advanced cleaning options: Automatic fresh water flushing after shut down and integrated chemical cleaning system.

Extensive applications

- Yachts and Fishing boats
- Public service vessels
- Cargo ship and Freighter
- Lighthouse

Technical specifications

Technical Data	Unit	M100P	M200P	M500P	M800P	M1000P
Rated Product Flow ¹⁾	LPH	120	240	550	820	1,100
	USGPH	31.7	63.4	145.3	216.6	290.6
Rated Recovery Rate ¹⁾	%	25	31	33	33	33
Rated Feed Flow	M ³ /H	0.48	0.77	1.67	2.48	3.33
Min System Pressure ²⁾	barg	10	10	10	10	10
Max System Pressure ²⁾	barg	64	64	64	64	64
RO Membrane Spec.	inch	2,540	2,540	4,040	4,040	4,040
RO Membrane Qty.	pcs	2	4	4	6	8
Weight (dry) ³⁾	kg	95	115	200	240	280
Rated Power ⁴⁾	kW	1.5	2.1	4.0	5.7	7.6
Energy Consumption ⁴⁾	kWh/M ³	12.10	8.84	7.33	7.01	6.93
Installed Power ⁵⁾	kW	2.02	3.12	5.1	7.15	9.15
Length	m	1.3	1.3	1.6	2.6	2.6
Width	m	0.6	0.6	0.8	0.8	0.8
Height	m	0.7	0.7	1	1	1
Power Input		1phase, 220V, 50Hz		3phase, 380V, 50Hz		

Notes:

- 1) The rated product flow and rated recovery rate are based on the design feed (35,000 ppm, 20°C standard seawater), other recovery rate could be reachable, contact us for details.
- 2) The normal operating system pressure shall be higher than the minimum system pressure above. Higher maximum system pressure could be applicable upon request.
- 3) The dry weight excludes water (operating or other).
- 4) The rated power and energy consumption calculation are based on a design feed (35,000 ppm, 20°C standard seawater), the rated flow and rated recovery rate. The calculation include the power of feed pump, HPP, CIP pump, but exclude the power of intake pump and product supply pump.

Warranty

- Provided that the equipment has been running according to the FILTERTECH/QT specifications in the operational manual, FILTERTECH/QT provides 12 months guarantee from date of commissioning, and maximum of 18 months from date of production.

 FILTERTECH  QT ENVIRO-TECH
乾通环境科技

SEAWATER DESALINATION


Installation case

해외 해수담수화시스템 설치 사례

해수담수화 설치사례 1

설치현장사진

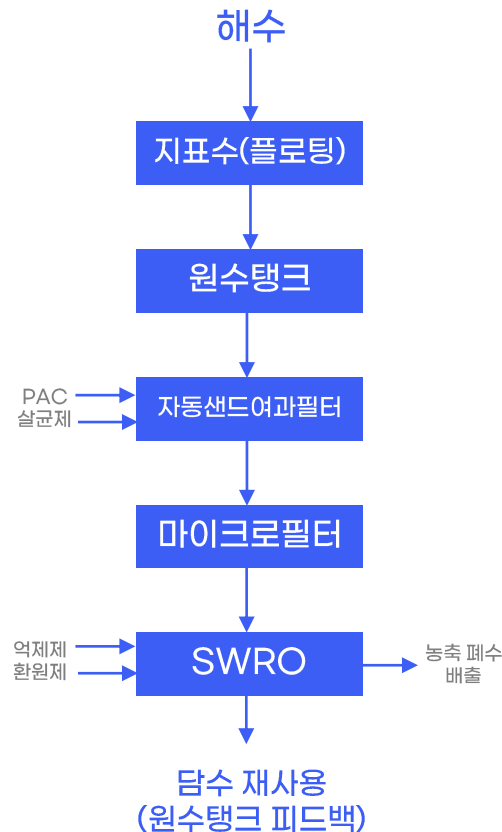


 On-site photo of Container Seawater Desalination System



 On-site photo of Container Seawater Desalination System

Process



fastRO®


- Project : Nuclear power plant 500T/D container seawater desalination
- Scale : Inlet: 1250T/D Product: 500T/D
- Location : Ningde, Fujian
- Time : 2020
- Key Tech : Standard container seawater desalination
- Parameter : In-TDS : $\approx 33\text{g/L}$, In-SS : $< 30\text{mg/L}$
SWRO-R : $> 40\%$, SWRO-P : 55bar
- **Goals : Out-TDS : $< 300\text{mg/L}$**

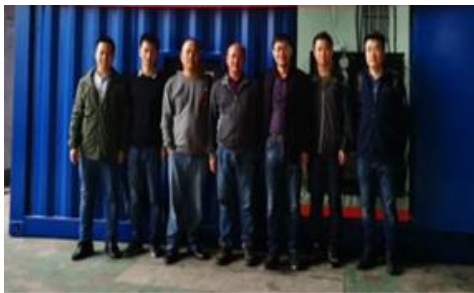
33,000ppm < 300ppm


해수담수화 설치사례 2

설치현장사진

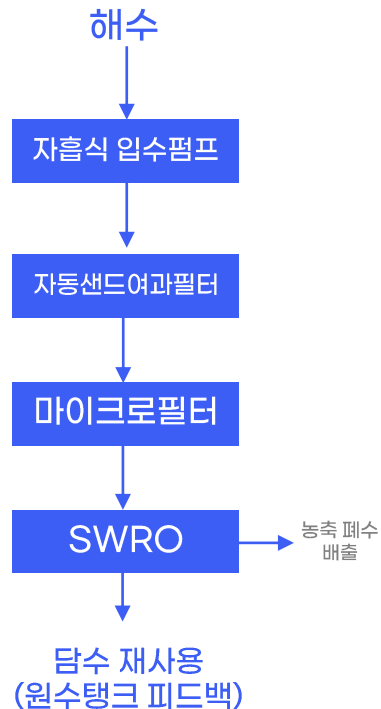


 Photo of small standard intergration seawater desalination system



 중국남극탐사대 해수담수화
Photo of small standard intergration seawater desalination system

Process



iDesalt

- Project : Antarctic expedition team seawater desalination for potable use
- Scale : Intake: 300T/D Product: 6T/D
- Location : Antarctica
- Time : 2017
- Key Tech : Small standard intergration seawater desalination RA-6
- Parameter : In-TDS : $\approx 30\text{g/L}$, In-SS : $< 5\text{mg/L}$
SWRO-R : $> 20\%$, SWRO-P : 45bar
- **Goals : Out-TDS : $< 250\text{mg/L}$**

30,000ppm < 250ppm

해수담수화 설치사례 3

설치현장사진

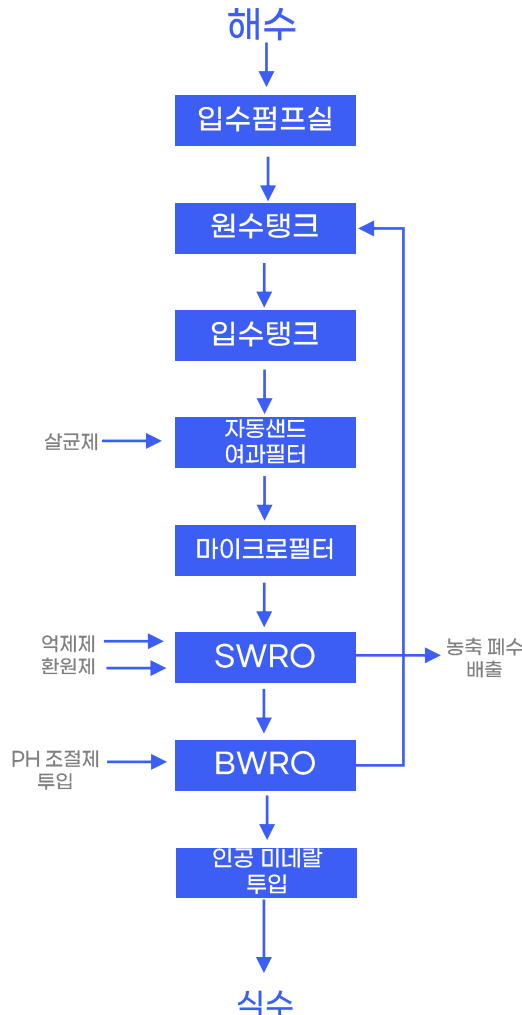


 On-site photo of Container Seawater Desalination System



 On-site photo of Container Seawater Desalination System

Process



VIEW



- Project : In island constructing 1200T/potable water container seawater desalination
- Scale : Inlet: 2800T/D
Product:1200T/D
- Location : Zhangzi island,Dalian,Liaoning
- Time : 2022
- Key Tech : UF、SWRO、Mineralization
- Parameter : In-TDS : $\approx 32\text{g/L}$, In-SS : $< 20\text{mg/L}$
SWRO-R : $> 45\%$, SWRP-P : 50bar
BWRO-R : $> 85\%$, BWRO-P : 11bar
- **Goals : Out-TDSBWRO : $< 20\text{mg/L}$
Out-TDS mineralization : $\approx 50\text{mg/L}$**

32,000ppm about 50ppm

해수담수화 설치사례 4

설치현장사진

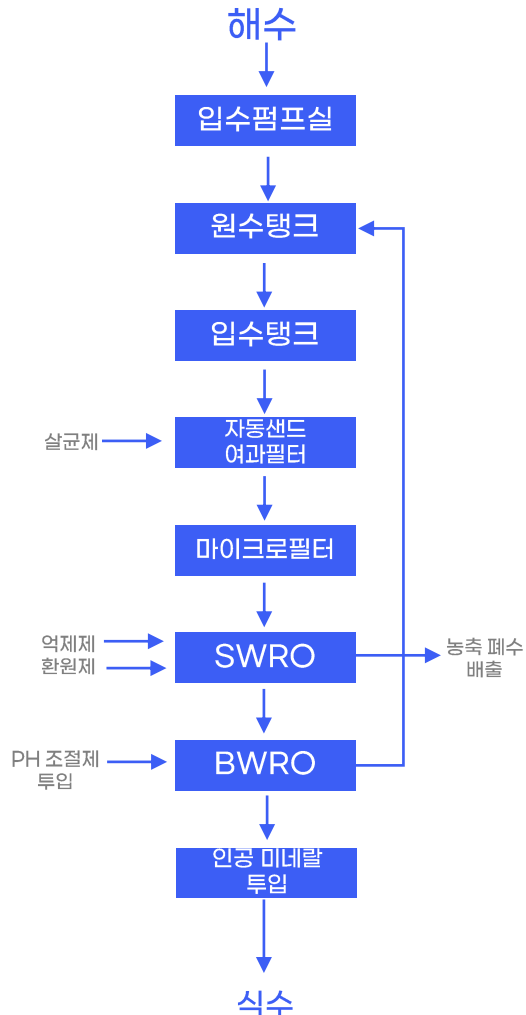


 On-site photo of Container Seawater Desalination System



 On-site photo of Container Seawater Desalination System

Process



VIEW




- Project : Daojian 1000T/D domestic water container desalination
- Scale : Inlet: 2000T/D
Product:1000T/D
- Location : Ocean Island, Dalian City, Liaoning Province
- Time : 2022
- Key Tech : UF、SWRO、Mineralization
- Parameter : In-TDS : $\approx 32\text{g/L}$, In-SS : $< 20\text{mg/L}$
SWRO-R : $> 45\%$, SWRP-P : 50bar
BWRO-R : $> 85\%$, BWRO-P : 11bar
- **Goals : Out-TDSBWRO : $< 20\text{mg/L}$
Out-TDS mineralization : $\approx 50\text{mg/L}$**

32,000ppm about 50ppm


해수담수화 설치사례 5

설치현장사진

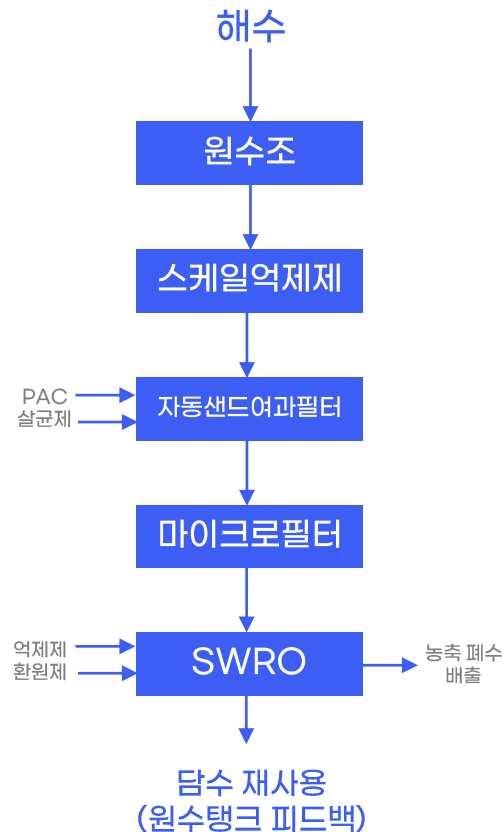


 On-site photo of Seawater Desalination System



 On-site photo of Seawater Desalination System

Process




- Project : Seawater desalination for power plant
- Scale : Inlet: 7000T/D
Product: 2*1400T/D
- Location : Kendari, Indonesia
- Time : 2018
- Key Tech : RO
- Parameter : In-TDS : $\approx 38\text{g/L}$, In-SS : $< 5\text{mg/L}$
SWRO-R : $> 45\%$, SWRP-P : 60bar
- Goals : Out-TDS SWRO : $< 400\text{mg/L}$

38,000ppm < 400ppm


해수담수화 설치사례 6

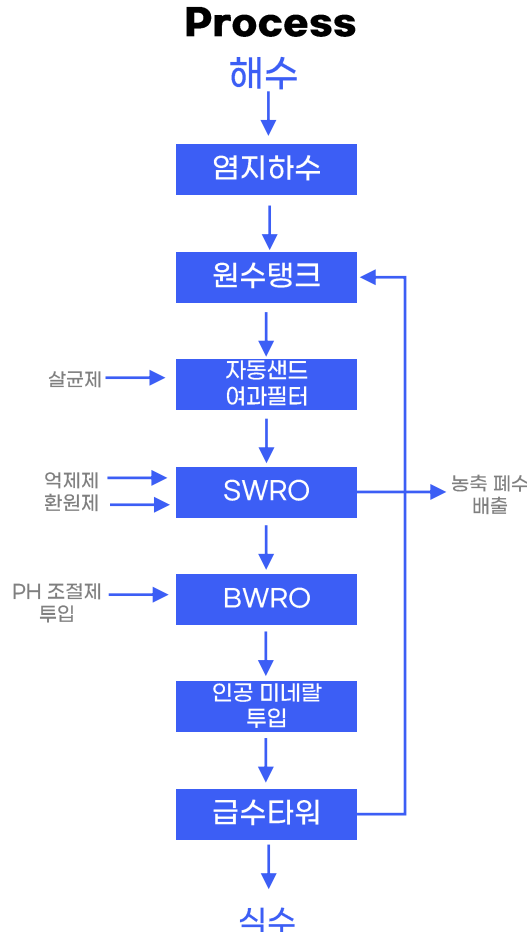
설치현장사진



 On-site photo of Seawater Desalination System



 On-site photo of Seawater Desalination System



- Project : Seawater desalination for tap water
- Scale : Inlet: 2000T/D
Product: 2*500T/D
- Location : Mauritania
- Time : 2018
- Key Tech : SWRO、Mineralization
- Parameter : In-TDS : $\approx 40\text{g/L}$, In-SS : $< 30\text{mg/L}$
SWRO-R : $> 38\%$, SWRP-P : 55bar
BWRO-R : $> 85\%$, BWRO-P : 12bar
- **Goals : Out-TDSBWRO : $< 20\text{mg/L}$
Out-TDS mineralization : $\approx 50\text{mg/L}$**

32,000ppm about 50ppm

FILTERTECH SEAWATER DESALINATION

필터테크 해수담수화장치

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필터테크 해수담수화장치는 물 부족의 가장 친환경적 해결책입니다.

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**FILTERTECH & QT ENVIRO TECH
SEAWATER DESALINATION
SYSTEM**