Torishima Pump Global Network

East Asia

❶ Torishima Pump Mfg. Co., Ltd. ■■
1-1-8 Miyata-cho, Takatsuki-city, Osaka 569-8660 Japan
Tel : +81-72-690-2308 / Fax : +81-72-690-2329

❷ Kyushu Torishima Co., Ltd. ■
9857-13, Ohaza Kawako, Wakagi-cho, Takeo-city,
Saga 840-0813 Japan
Tel : +81-954-26-3081 / Fax : +81-954-26-3080

❸ Torishima Pump Mfg. Co., Ltd. Beijing Office
Rm707, Building 1, KUNSHA CENTER,
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❹ Torishima Pump (Tianjin) Co., Ltd. ■
No.9 Gaoxin Road, Wuqing Development Zone,
Tianjin, P.R.China PC:301700
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❺ Torishima (Hong Kong) Ltd.
Unit A, 21/F., Tower A, Billion Centre,
1 Wang Kwong Road, Kowloon Bay, Kowloon,
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South East Asia

❻ Torishima (Hong Kong) Ltd. Vietnam Office
No.76 Bui Thi Xuan Street, Hai Ba Trung District,
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❼ Torishima Pump Mfg. Co., Ltd. Singapore Office
82 Toh Guan Road East, #C2-14-4 WaterHub,
Singapore 608576
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❽ Torishima Service Solutions Asia Pte. Ltd. ■
48, Toh Guan Road East, #02-142,
Enterprise Hub, Singapore 608586
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❾ P.T. Torishima Guna Engineering ■
❿ P.T. Torishima Guna Indonesia ■
Jalan Rawa Sumur Timur No.1 Pulogadung
Industrial Estate, P.O.Box 1160, Jakarta, Indonesia
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⓫ P.T. Geteka Founindo ■
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South Asia

⓬ Torishima Pumps India Pvt. Ltd.
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⓭ Torishima Pumps India Pvt. Ltd. Service Division ■
Plot No. 27 B, C, D, Hoskote KIADB Industrial Area,
Chokkahalli Village, Kasaba Hobli, Hoskote Taluk,
Bangalore-562114, Karnataka, India
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Oceania

⓮ Torishima Australia Pty. Ltd.
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Caulfield South VIC 3162 Australia
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⓯ Torishima Service Solutions FZCO ■
Plot of Land TP010501 Techno Park-Jebel Ali,
PO Box. 37603 Dubai, U.A.E.
Tel : +971-4-880-7344 / Fax : +971-4-880-7354

⓰ Torishima Pump Mfg. Co., Ltd. Middle East Office
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Al Nahyan Camp Area, P.O.Box 53567,
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Tel : +971-2-674-3880 / Fax : +971-2-674-3881

⓱ Torishima Pump Mfg. Co., Ltd. Qatar Project Office
Office No.11,1st Floor, West Corner Centre,
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⓲ Torishima Pump Mfg.Co.,Ltd. Saudi Arabia Office
Al Riyadh, Al Khair Plaza, Office No.2
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Tel : +966-11-2931366

Europe

⓳ Torishima Europe Ltd.
2 Colliery Gate, Clyde Gateway East, Glasgow
G32 8RH Scotland, UK
Tel : +44-1236-443951 / Fax : +44-1236-702875

⓴ Torishima Service Solutions Europe Ltd. ■
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G32 8RH Scotland, UK
Tel : +44-1236-442390 / Fax : +44-1236-702875

㉑ Torishima Europe Projects Ltd.
Torishima House, Brook Lane, Westbury,
Wiltshire BA13 4ES England, UK
Tel : +44-1373-858143

㉒ Torishima Europe Ltd. Madrid Office
Avda, Fuente Nueva 12, 28703
San Sebastian de los Reyes, Madrid, Spain
Tel : +34-91-002-7541 / Fax : +34-91-284-6901

㉓ Torishima Europe Ltd. Poland Office
ul. Pomianowska 7, 03-136 Warszawa, Poland
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North America

㉔ Torishima Pump Mfg. Co., Ltd. North America East Office
100 Grove Street, Suite 217, Worcester
MA 01605-2654 U.S.A.
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㉕ Torishima Europe Ltd. Mexico Office
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Juárez,Cuauhtémoc, 06600
Ciudad de México,D.F., México
Tel : +52-55-9171-1426 / Fax : +52-55-9171-1499

■ Manufacturing ■ Service Center

ZSC02・18/7E
'16.2.2000Ⓟ

TORISHIMA

Pumps for Seawater Desalination

A World-leading Pump Manufacturer since 1919

Founded in 1919 in Osaka, Japan, Torishima has been contributing to society by providing engineered pump solutions across all industries for over 90 years, and established a solid reputation for high technology in pumps. The Torishima brand is built on reliability, flexibility, and customer satisfaction.

A Pioneer in Pumps for Seawater Desalination

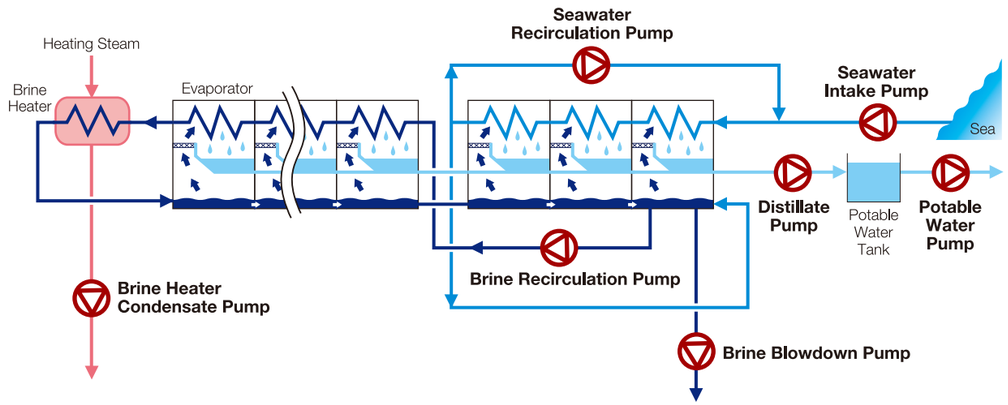
The useable fresh water in the world amounts to 0.01% of the world's water. There is no doubt that water demand is increasing with the growth of population and industrialization. Consequently the necessity of seawater desalination plants is rapidly increasing. This requires innovative pumping solutions to provide clean drinking water to all.

Desalination pumps are required to operate in harsh climates 24 hours a day, 365 days a year; they must be highly durable, resistant to corrosion from seawater, and outstanding efficiency to minimize power consumption.

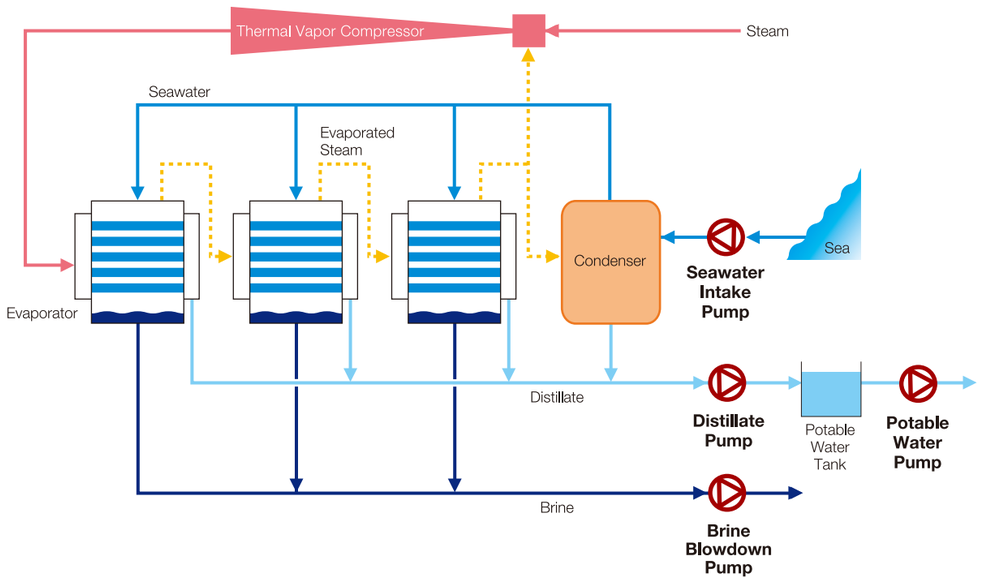
Torishima has met the challenge of those demands, and has supplied pumps for a wide range from low to high pressure applications for all desalination processes, MSF, MED and RO, for 40 years. There are now over 2,100 pumps operating in desalination plants in about 20 countries around the world. Our global desalination projects include some of the largest desalination plants currently in operation.

» Pumps for Thermo Desalination System

Flowchart of Multi-stage Flash System



Flowchart of Multi-effect Distillation System

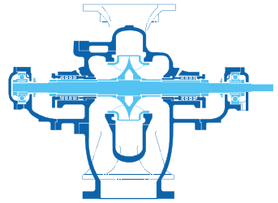


• MSF / MED Application Chart

	CDKS	CDKTV	CDM	CPC	MMTV	SPSY	SPTV	SPV
Seawater Intake Pumps			●					●
Brine Recirculation Pumps		●					●	
Brine Blowdown & Distillate Pumps		●		●			●	
Brine Heater Condensate Pumps	●				●			
Seawater Recirculation Pumps			●			●		
Potable Water Pumps			●					●

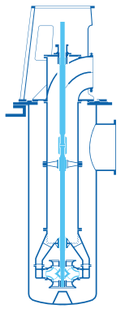
CDKS
Horizontal radially split double-suction pump

Capacity : up to 3,000m³/hr
Total head : up to 300m
Size : 200 to 500mm



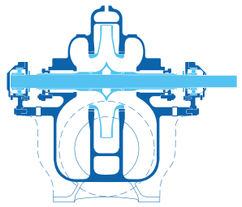
CDKTV
Vertical double-suction pump with canister

Capacity : up to 20,000m³/hr
Total head : up to 100m
Size : 500 to 1,500mm



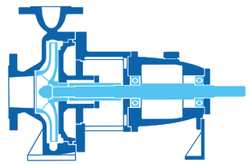
CDM
Horizontal axially split double-suction pump

Capacity : 180 to 33,000m³/hr
Total head : 3 to 300m
Size : 200 to 1,400mm



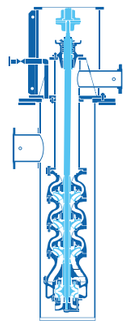
CPC
End-suction volute pump

Capacity : up to 1,500m³/hr
Total head : up to 220m
Size : 32 to 250mm



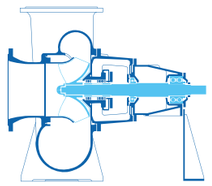
MMTV
Vertical mixed-flow multistage pump with canister

Capacity : up to 2,900m³/hr
Total head : up to 390m
Discharge pressure : up to 4MPa (39.2bar)
Size : 40 to 400mm



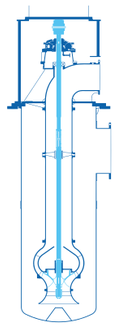
SPSY
Horizontal mixed-flow volute pump

Capacity : up to 20,000m³/hr
Total head : up to 50m
Size : 350 to 1,200mm



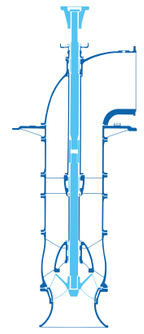
SPTV
Vertical mixed-flow pump with canister

Capacity : 600 to 81,600m³/hr
Total head : 3 to 100m
Size : 300 to 3,000mm



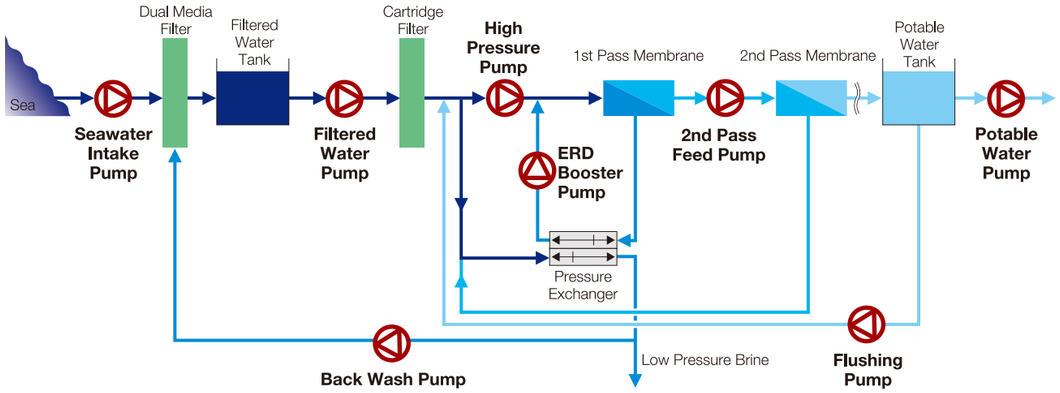
SPV
Vertical mixed-flow pump

Capacity : 600 to 80,000m³/hr
Total head : 3 to 100m
Size : 300 to 2,800mm



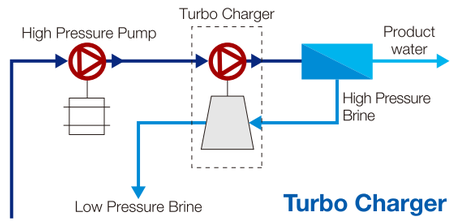
» Pumps for Reverse Osmosis System

Flowchart of Reverse Osmosis System (With Pressure Exchanger System)

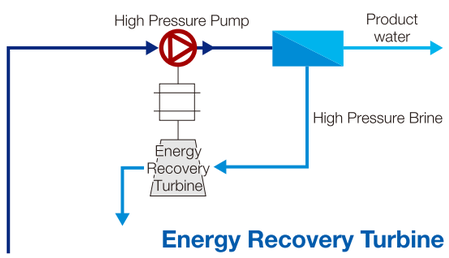


Energy Recovery System

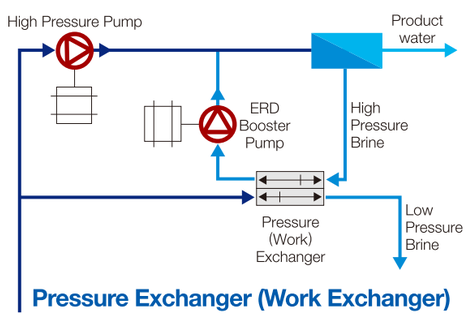
In the reverse osmosis seawater desalination system, high pressure enriched seawater is produced simultaneously with product water.
The running cost of the plant can be reduced significantly by recovering energy of the enriched seawater utilizing an energy recovery system.
We can provide pumps for all types of energy recovery systems.



Turbo Charger



Energy Recovery Turbine



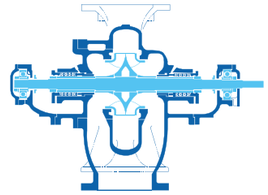
Pressure Exchanger (Work Exchanger)

RO Application Chart

	CDKS	CDM	CFHV	CPC	CBR	MHA	MHH	MML	MSH	MSH-T	SPV
Seawater Intake & Filtered Water Pumps		●									●
High Pressure Pumps		●				●	●	●	●	●	
ERD Booster Pumps	●		●		●						
2nd Pass Feed & Back Wash & Flushing Pumps		●		●							
Potable Water Pumps		●									●

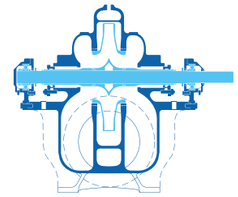
CDKS
Horizontal radially split double-suction pump

Capacity : up to 3,000m³/hr
Total head : up to 300m
Size : 200 to 500mm



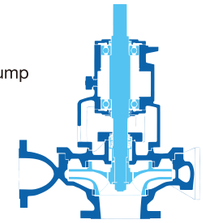
CDM
Horizontal axially split double-suction pump

Capacity : 180 to 33,000m³/hr
Total head : 3 to 300m
Size : 200 to 1,400mm



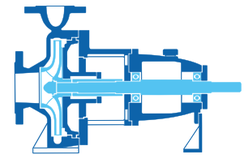
CFHV
Vertical centrifugal volute pump

Capacity : up to 1,940m³/hr
Total head : up to 125m
Discharge pressure : up to 10.78MPa (110bar)
Size : 40 to 500mm



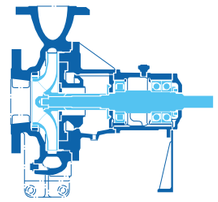
CPC
End-suction volute pump

Capacity : up to 1,500m³/hr
Total head : up to 220m
Size : 32 to 250mm



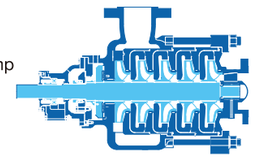
CBR
End-suction volute pump

Capacity : up to 2,000m³/hr
Total head : up to 70m
Size : 125 to 400mm



MHA
Horizontal end-suction multistage ring section pump

Capacity : 200 to 800m³/hr
Total head : up to 800m
Size : 125 to 250mm

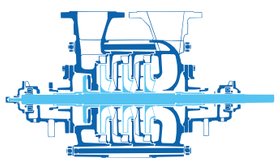


MHH
Axially split multistage pump

Capacity : 200 to 800m³/hr
Total head : up to 800m
Size : 100 to 300mm

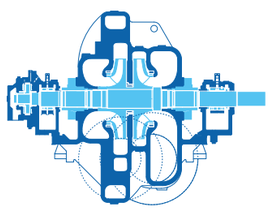
MML
Horizontal multistage ring section pump

Capacity : up to 1,000m³/hr
Total head : up to 500m
Size : 40 to 350mm



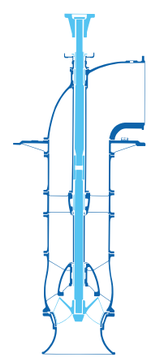
MSH
Horizontal axially split multistage volute pump

Capacity : 150 to 1,500m³/hr
Total head : 100 to 750m
Size : 100 to 300mm



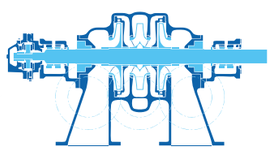
SPV
Vertical mixed-flow pump

Capacity : 600 to 80,000m³/hr
Total head : 3 to 100m
Size : 300 to 2,800mm



MSH-T
Horizontal twin-suction axially split multistage pump

Capacity : up to 3,000m³/hr
Total head : up to 800m
Size : 200 to 350mm



» For Customers' Satisfaction

Torishima engages in our best efforts to improve pump performance through test, R&D and aftermarket service.

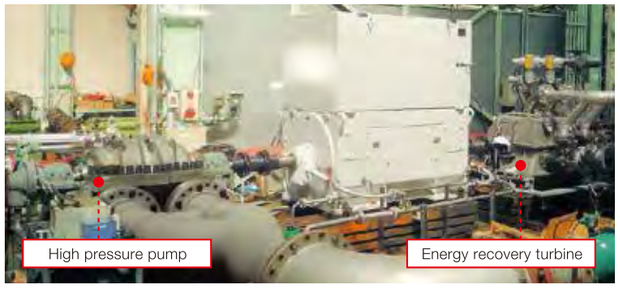
Materials

Torishima can meet the customers' needs and suggest the most appropriate materials for each seawater desalination plant.

- Super Duplex Stainless Steel
- Duplex Stainless Steel
- Austenitic Stainless Steel
- Ni-Resist
- Any others on customers' request

Testing

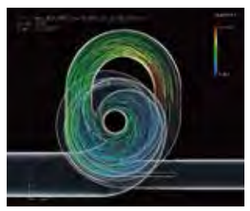
Torishima has the full test facilities for pumps for seawater desalination and always conducts a performance test before delivery. Our quality procedures and continual testing ensures the high quality standards.



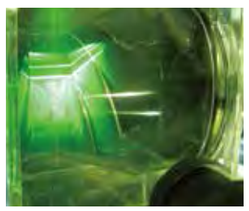
String test of high pressure pump with energy recovery turbine for RO desalination system

Research & Development

Torishima is fully committed not only to providing innovative designs for future applications but the continual improvement of existing designs to maximize efficiency and increase the reliability of pumps for seawater desalination.



CFD (Computational Fluid Dynamics) analysis of volute shapes



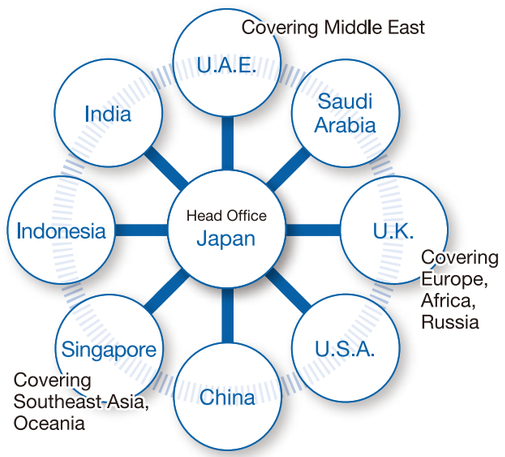
PIV (Particle Image Velocimetry) measurement

FEM (Finite Element Method) analysis of structure

Hydraulic pressure test

Service Solutions

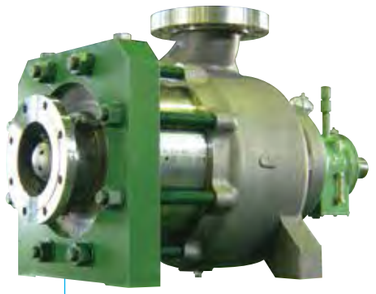
Torishima continues to develop its global network of service solutions to deal with customers' needs all around the world. Our innovative solutions can enhance performance and increase the life span of pumps. This allows operators to maximize efficiency, reduce maintenance costs and conserve energy.



» Typical Applications

Service : 1st Pass RO HP Pump
Type : MSH300/2T
Material : Super Duplex Stainless
Location : U.A.E.
Project : Fujairah 2 RO Seawater Desalination Plant

Service : Main Pump
Type : CDM 800 x 500
Material : Duplex Stainless
Location : U.A.E.
Project : Shuweihat Water Transmission Scheme



Service : 1st Pass RO HP Pump
Type : MHA150/5
Material : Super Duplex Stainless
Location : Chile
Project : Planta Desalinizadra de Agua de Mar Valle de Copiapo

Service : Seawater Recirculation Pump (MSF)
Type : SPSYX700
Material : SCS16
Location : Kuwait
Project : Az-Zour South Distillation Plants Stage Ⅲ

Service : Brine Recirculation Pump (MSF)
Type : CDKTV1200
Material : Duplex Stainless
Location : U.A.E.
Project : Jebel Ali M

Service : Seawater Intake Pump (MED)
Type : SPV900
Material : Duplex Stainless
Location : Libya
Project : Zaiwa desalination Plant

You may not know our name, but now you know where our pumps are!

Africa & Middle East

- Project / Plant (Delivery Year) MSF / MED / RO Desal Capacity m³/day

ALGERIA

- Tahiyat Myah Magtaa Spa (2010) RO 500,000m³/day
- Hamma Water Desalination Spa (2006) RO 200,000m³/day
- Kahrama SpA / Arzew Desalination and Power Complex (2004) MSF 88,887m³/day
- Complex Matieres Plastiques Skikda (1974) MSF

Ghana

- Nugua SWRO Desalination Plant (2013) RO 60,000m³/day

LIBYA

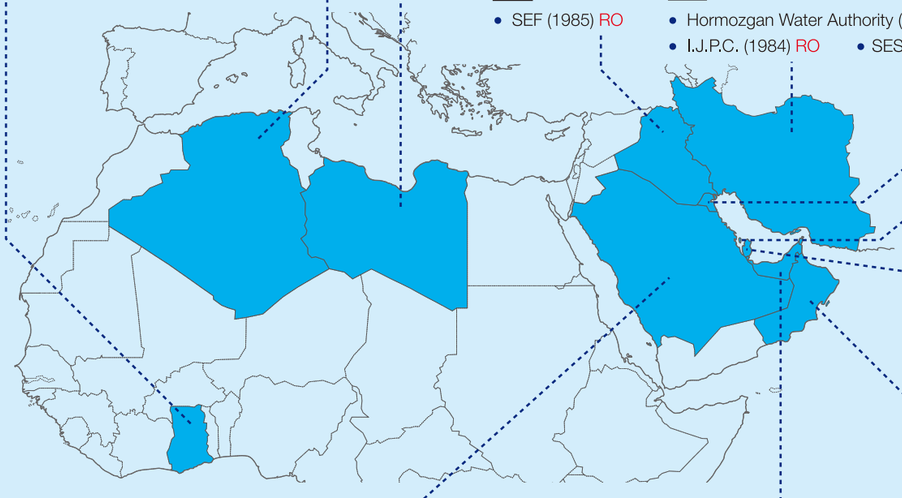
- Khoms Desalination Plant (2012) MSF 43,000m³/day
- Zawia Desalination Plant (2008) MED 80,000m³/day
- Soussa Desalination Plant (2008) MED 26,000m³/day
- Derna Desalination Plant (2008) MED 40,000m³/day
- Abu Taraba (2005) MED 40,000m³/day
- Zuara Desalination Plant (2004) MED 40,000m³/day
- Municipalty of Zliten, Libyan Arab Jamahiriya (1989) MSF
- Misurata Iron Works (1982) MSF

IRAQ

- SEF (1985) RO

IRAN

- Hormozgan Water Authority (1987) MSF
- I.J.P.C. (1984) RO
- SES (1982) RO



SAUDI ARABIA

- Yanbu 3 (2014) MSF 550,000m³/day
- Yanbu (2012) MED 68,000m³/day
- Ras Al Kair Power and Desalination Plant P1 (2012) RO 306,000m³/day
- Jeddah Phase Ⅲ (2010) RO 240,000m³/day
- Shuaibah RO Expansion (2008) RO 150,000m³/day
- Shuaibah IWPP Project (2008) MSF 880,000m³/day
- Desalination Plant (MED-9000T/P) (2007) MED
- Rabigh Arabian Water and Electricity Company (2006) RO 192,000m³/day
- R/C Yanbu Desalination Unit9 (1998) MSF
- S.W.C.C.SWRO- Ⅱ (1998) RO
- Shuaibah Ⅱ (1996) MSF
- Medina / Yanbu (1994) RO
- R/C Yanbu Desalination Unit 7&8 (1994) MSF
- Jeddah Ⅰ, Phase 2 (1993) RO 56,800m³/day
- Jeddah Ⅰ, Phase 1 (1988) RO 56,800m³/day
- New Dahran Airport (1986) RO
- Al-Jubail Stage- Ⅱ (1981) MSF 38,400m³/day
- Jeddah Oil Refinery Co. (1981) MSF
- Medina / Yanbu (1979) MSF
- Aramco Overseas Company (1978) MSF
- Yanbu Industrial Complex (1977) MSF

U.A.E.

- Mirfa (2015) RO 136,350m³/day
- Fujairah F1 (2014) RO 136,000m³/day
- Shuweihat S2 IWPP (2010) MSF 500,000m³/day
- Fujairah 2 (2009) RO 136,000m³/day
- Jebel Ali M (2008) MSF 637,000m³/day
- Kohor Fakkan (2007) RO 45,000m³/day
- Layyah & Khor Fakkan Power Plants (2006) RO 46,000m³/day
- New Al-Taweelah B Extention Plant (2006) MSF
- Arabian Power Company / Umm Al-Nar
- Independent Water and Power (2005) MSF
- Al-Taweelah A2 (2000) MSF 227,000m³/day
- Umm Al-Nar Station B (2000) MSF 284,125m³/day
- Abu Dhabi National Oil Company (1995) MSF

OMAN

- Barka Ⅰ Desalination Plant Expansion Project (2013) RO 45,460m³/day
- Salalah IWPP, Oman (2010) RO 68,200m³/day
- Oman Sur (2008) RO 80,200m³/day
- Barka Desalination Plant (2007) RO 120,000m³/day
- Ghubrah Ⅴ (1995) MSF 27,240m³/day
- Ghubrah Ⅲ (1991) MSF 54,720m³/day
- Ghubrah Ⅱ (1985) MSF 27,360m³/day

KUWAIT

- Az-Zour North (2014) MED 486,000m³/day
- Az-Zour South (2012) RO 136,000m³/day
- Shuaiba North (2009) MSF 204,500m³/day
- Shuwaikh RO Project (2009) RO 136,260m³/day
- Shuaiba South Power and Water Distillation Plant (2006) MSF
- Sabiya Desalination Plant Phase Ⅲ (2006) MSF 227,100m³/day
- Sabiya Desalination Plants Phase Ⅰ & Ⅱ (2005) MSF 227,100m³/day
- Az-Zour South, Stage Ⅲ (2000) MSF 130,920m³/day
- Sabiya RO Desalination Plant (1998) RO
- Az-Zour South, Stage Ⅱ (1997) MSF 109,100m³/day
- Az-Zour South, Stage Ⅰ (1986) MSF 261,600m³/day
- Doha West Ⅱ (1982) MSF 392,400m³/day
- Shuwaikh C (1979) MSF 81,900m³/day

BAHRAIN

- RAJ RO Plant, Expansion Project (2005) RO 14,400m³/day
- Bahrain Caltex (1993) MSF
- Arab Iron & Steel Company (1982) MSF
- Caltex Petroleum Corp., (1972) MSF 450,000m³/day

QATAR

- Ras Abu Fontas A2 (2013) MSF 163,656m³/day
- Ras Laffan C (2009) MED 286,400m³/day
- Ras Laffan B IWPP (2008) MSF 272,760m³/day
- Ras Abu Fontas (2007) MSF 465,000m³/day

Central & South America

MEXICO

- CT Manzanilo Ⅱ (1991) MSF
- Comision Federal de Electricidad (1982) MSF

CHILE

- Copiapo (2012) RO 52,000m³/day

Asia & Oceania

CHINA

- Qingdao Desalination (2011) RO 100,000m³/day
- Shougang Jingtang Desalination (2008) RO 10,000m³/day
- Yang Shu Electric P/S (1984) RO

THAILAND

- Desalination Plant in Rayong SWRO-1 (2006) RO

SINGAPORE

- Tuas Ⅱ (2012) RO 318,000m³/day
- Ulu Pandan NEWATER Plant (2006) RO
- Purau Seraya P/S (1985) RO
- National Iron Steel MIlls Ltd. (1984) RO

INDONESIA

- Muara Tawar CCPP PLN (1996) MSF
- Tambok Lorok CCPP Block 1 x 2 (1996) MSF
- Muara Karang CCPP (1994) MSF
- Janjung Priok (1992) MSF
- P.T. Bakrie Corp. (1991) MSF
- Pertamina Balikpapan (1989) MSF
- KSL-KALTIM Ⅱ (1983) MSF

AUSTRALIA

- Victorian Desalination Plant (2010) RO 450,000m³/day
- Sydney Desalination Plant (2008) RO 250,000m³/day
- Gibson Island (2008) RO 45,000m³/day
- Gold Coast Desalination Plant (2007) RO 133,000m³/day

JAPAN

- National LPG Stockpiling, Namikata Terminal (2004) RO
- Shikoku Electric Power Co., Inc. Ikata Nuclear P/S (1992) RO
- Huis Ten Bosch (1991) RO
- Kansai Electric Power Co., Ltd. Ohi Nuclear P/S (1988) RO
- Kyushu Electric Power Co., Inc. Genkai Nuclear P/S (1987) RO
- SONY Nagasaki Corp. (1986) RO
- Dainippon Screen Mfg. Co. Ltd (1986) RO
- Toshiba Ceramics Co., Ltd. (1984) RO
- Fukushima-cho Nagasaki Pref. (1978) RO
- Fukui Joint Electric Power Co., Inc. (1977) RO
- Oki Electric Industry Co., Kashima (1976) RO
- Kaneka Corporation (1974) RO
- Kansai Electric Power Co., Inc. Tanagawa P/S MSF
- Kashima Joint Electric Power Co., Inc. (1974) RO
- Showa Sangyo Co., Kashima (1973) RO
- Sumitomo Metal Industries Ltd. k Kashima (1972) RO 10,000m³/day