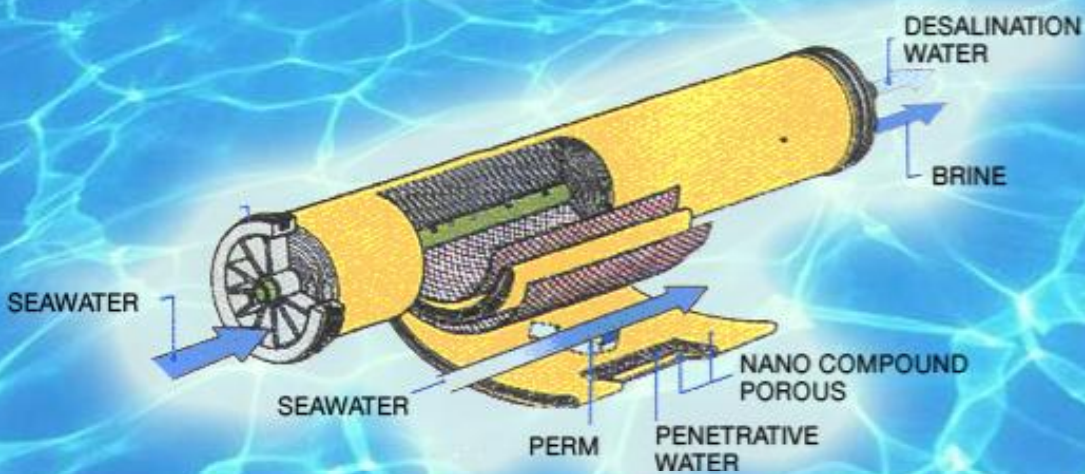


TriTech

A HOST OF LATEST WATER TECHNOLOGIES

UnitCell Desalination System (UDS) / DESALINATOR / RO MEMBRANES





TriTech® Diesel Powered small to medium scale Desalinator (DPD)

We are providing a series of products, Diesel Powered small to medium scale Desalinator (DPD) with production capacities ranging from 1m³/day up to 500m³/day.

Series No	Production Capacity (min.)	Size (mm)	Estimated total weight including weight of container (tons)
TriTech® DPD-001	1m ³ /day	700×1200×600	1.0
TriTech® DPD-003	3m ³ /day	800×1200×700	1.5
TriTech® DPD-005	5m ³ /day	1000×1200×1000	2.2
TriTech® DPD-012	12m ³ /day	1500×1500×1200	4.8
TriTech® DPD-020	20m ³ /day	1500×1800×1200	6.0
TriTech® DPD-050	50m ³ /day	4000×2000×1500	8.0
TriTech® DPD-100	100m ³ /day	4500×2000×1600	18.0
TriTech® DPD-150	150m ³ /day	4800×2000×1600	20.0
TriTech® DPD-200	200m ³ /day	5000×2000×1600	22.0
TriTech® DPD-250	250m ³ /day	6000×2000×1600	25.0
TriTech® DPD-500	500m ³ /day	12000×2350×2350	35.0

The water produced by TriTech® DPD meets the requirements of WHO for freshwater.

There are numerous excellent features in comparison with the conventional desalination plant:

- **Easy transportation and installation:** All types of TriTech® DPD can be packed into one SINGLE container with access windows for ease of operation and maintenance.
- **More energy efficient:** As we have adopted a special designed RO membrane combination system coupled with energy recovery setup, our TriTech® DPD is much more energy efficient. The specially designed RO membrane system makes the production process at least 30% more energy efficient than the conventional desalination plant.
- **Less cost for operation:** Our TriTech® DPD requires much less operational cost in general compared with the same scale traditional Seawater Desalination Plant.
- **High production rate:** The production rate is approximately 15% to 20% higher compared with the same scale traditional Seawater Desalination Plant.
- **Less requirement of inlet seawater requirement:** We have specially designed membrane system to work with a less stringent requirement to the inlet seawater.
- **Most economical solution for many cases:** As the range of water supply is from 1m³/day to 500m³/day, TriTech® DPD will be able to provide the most suitable and yet economical solution to different customer's need.
- **Long life span and stable performance:** With proper maintenance and partial replacement, the life span of TriTech® DPD can exceed 10 years. TriTech® DPD has stable performance and is easy to maintain.

TriTech® Solar Powered small to medium scale Desalinator (SPD)

All types of TriTech® Diesel Powered small to medium scale Desalinator (DPD) can be equipped with solar panel to make use of solar energy; i.e. Solar Powered small to medium scale Desalinator (SPD) with production capacity ranging from 1m³/day up to 500m³/day.

TriTech® SPD has the following series of products

Series No	Production Capacity (min.)	Size* (mm)	Remarks
TriTech® SPD-001	1m ³ /day	700×1200×600	Equipped with Diesel Engine
TriTech® SPD-003	3m ³ /day	800×1200×700	
TriTech® SPD-005	5m ³ /day	1000×1200×1000	
TriTech® SPD-012	12m ³ /day	1500×1500×1200	
TriTech® SPD-020	20m ³ /day	1500×1800×1200	
TriTech® SPD-050	50m ³ /day	4000×2000×1500	
TriTech® SPD-100	100m ³ /day	4500×2000×1600	
TriTech® SPD-150	150m ³ /day	4800×2000×1600	
TriTech® SPD-200	200m ³ /day	5000×2000×1600	
TriTech® SPD-250	250m ³ /day	6000×2000×1600	
TriTech® SPD-500	500m ³ /day	12000×2350×2350	

* Excluding solar panel

TriTech® SPD can save up to 60% of daily energy consumption for a 24 hours operation.



Small to medium size water treatment apparatus for sewage water/lake/river/reservoir/other polluted water sources are also available at customer's requests.

TRITECH a host of latest water technologies



RO MEMBRANES

●●●● Tritech is supplying new types of RO membrane made of polymer and nano powder compound.

TriTech® Polymer and Nano Compounded (PNC) RO Membranes

Performance of Tritech® PNC RO Membrane

Tritech® PNC RO membrane can work stably in the following condition:

- Maximum operation pressure: 1000 psi (69 bar)
- Maximum pressure difference: 15 psi (1.0 bar)
- Highest working temperature: 50°C
- pH range of inlet water: 2 - 11
- pH range under temporary backwash condition: 1 - 12
- Maximum SDI of inlet water: SDI 5

Performance of Tritech® PNC RO Membrane for Seawater Desalination

Parameters	Tritech® PNC RO Membrane	
Size (inches)	4" x 40"	8" x 40"
Working Pressure (mPa)	5.5-6.0	5.5-6.0
Production (m³/d)	6.0-7.5	30-35
Nominal Rejection (%)	99.2	99.5
Nominal Area (m²)	7.2	34.4

Quality of Permeates by Tritech® PNC RO Membrane

Test Results of Seawater Desalination by Using Tritech® PNC RO Membrane

Parameter	Unit	Specification	Test results by using PNC RO Membrane
Chromaticity	degree	<15	<5
Turbidity	NTU	<1	0.22
Odour	-	N/A	N/A
Visible Suspension	-	N/A	N/A
pH	-	6.5 - 8.5	6.82
Total Hardness	As CaCO ₃ (mg/L)	<450	12.4
Iron	mg/L	<0.3	<0.004
Maganese	mg/L	<0.1	<0.002
Copper	mg/L	<1.0	<0.002
Zinc	mg/L	<1.0	<0.002
Phenol	mg/L	<0.002	<0.002
Sulfate	As SO ₄ ²⁻ (mg/L)	<250	3.72
Chloride	As Cl ⁻ (mg/L)	<250	226
Total Dissolved Solids	mg/L	<1000	326
Fluoride	As F ⁻ (mg/L)	<1.0	<0.02
Cyanide	mg/L	<0.05	<0.002
Arsonium	mg/L	<0.05	<0.005
Selenium	mg/L	<0.01	<0.0003
Mercury	mg/L	<0.001	<0.0004
Cadminium	mg/L	<0.005	<0.0002
Chromium	mg/L	<0.05	<0.004
Lead	mg/L	<0.01	<0.0005

Aluminum	mg/L	<0.2	0.0054
Ammonia	mg/L	<20	<0.02
Oxygen Demand	mg/L	<3	1.09
			Conclusion
			Satisfied

Available Sizes of TriTech® PNC RO Membranes

Model No.	Size (in.)	Test Pressure (mPa)	Production		Nominal Rejection (%)	Nominal Areas (m²)
			(gpm)	(m³/d)		
PNC-4040	4"x40"	5.5	27-33	6.0-7.5	99.2	8.0
PNC-8040	8"x40"	5.5	132-155	30.0-35.0	99.5	46.0
PNC-8080	8"x60"	5.5	203-220	46.0-50.0	99.5	52.0

Tritech® Super low pressure Polymer and Nano Compounded (SPNC) RO Membrane

Size Available of SPNC RO Membrane

Tritech® SPNC RO membrane is further improved products which are proudly presented by Tritech Water Technologies Pte Ltd.

TriTech® SPNC RO Membranes

Model No.	Size (in.)	Test Pressure (mPa)	Production (m³/d)	Nominal Rejection (%)	Nominal Areas (m²)
SPNC HD4040	4"x40"	3.0-4.0	6.0-7.5	99.2	7.2
SPNC HD8040	8"x40"	3.0-4.0	33.0-36.0	99.5	44.4
SPNC HK4040	4"x40"	0.6-1.0	8.0-9.0	99.5	10.5
SPNC HK8040	8"x40"	0.6-1.0	35.8-38.0	99.5	46.5

Performance of Tritech® SPNC RO Membrane

Comparison of Polymer, TriTech® PNC and SPNC RO Membranes for Seawater Desalination

Parameters	Normal Polymer RO Membrane		Tritech® PNC RO Membrane		Tritech® SPNC RO Membrane	
	4"x40"	8"x40"	4"x40"	8"x40"	4"x40"	8"x40"
Size (inches)	4"x40"	8"x40"	4"x40"	8"x40"	4"x40"	8"x40"
Working Pressure (MPa)	5.0-8.0	5.0-8.0	5.5-6.0	5.5-6.0	1.0-1.5	1.0-1.5
Production (m³/d)	4.5	18.9	6-7.5	30-35	6.0-9.0	33-39
Nominal Rejection (%)	99.2	99.5	99.2	99.5	99.2	99.5
Nominal Area (m²)	6.8	13.9	7.2	34.4	7.2-10.5	44.4-46.5

Tritech® PNC and SPNC RO membranes have many advantages over the normal polymer membrane in the market. For example, Tritech® PNC and SPNC RO membranes have higher permeate, higher strength, higher flexibility, less stringent requirement for the inlet water, less requirement of the maintenance including backwash, and longer working life span.

TriTech

A HOST OF LATEST WATER TECHNOLOGIES

●●● Tritech is a niche player focusing on water treatment and desalination business by providing technology-based solutions driven by sheer commitment and innovation of technically qualified and experienced professionals.

UDS – UnitCell Desalination System (UDS)

Tritech has researched and developed an innovative method of desalination, i.e. the claimed **UnitCell Desalination System**, or in short form UDS since 2002, it was estimated that the invention could reduce capital and operation costs by 25% and 50% respectively.

DPD – Diesel Powered Small To Medium Scale Desalinator (DPD)

Tritech has been supplying a series of Diesel Powered small to medium scale Desalinator (DPD) to meet the demand of different range of desalination capacity for fresh water. The production capacity ranges from 1m³/day up to 500m³/day.

SPD – Solar Powered Small To Medium Scale Desalinator (SPD)

Tritech has developed a new type desalination plants by using solar power with different range of production capacity from 1m³/day to 500m³/day, i.e. Solar Powered small to medium scale Desalinator (SPD) with production capacity of from 1m³/day up to 500m³/day.

PNC – Polymer and Nano Compounded (PNC) RO Membrane

Tritech is supplying a series of complete new type high performance RO membrane, i.e. Polymer and Nano Compounded (PNC) RO membrane for water treatment and desalination plant.

SPNC – Super low pressure Polymer and Nano Compounded (SPNC) RO Membrane

Tritech has been developed a new type membrane, i.e. Super low pressure Polymer and Nano Compounded (SPNC) RO membrane to make the expected total energy consumption is about 1.3 to 1.5 kilo-watt hour (kWh) per cubic meter of water produced.

UnitCell Desalination System (UDS)

Field of Invention

This invention relates to desalination of seawater. Its effective and efficient method, design and apparatus, which rely on seawater reverse osmosis technologies, require lower initial capital cost and enable reduced operating costs relative to existing methods in seawater desalination. The process flow is simple and not complicated by systems of mechanism which are common amongst most prevailing methods. Accordingly, the energy requirement for the seawater conversion is substantially minimised. The cost due to maintenance operations is also significantly reduced.

Key Features of Invention

- Independent RO production units.
- Shallower vertical shaft.
- No need for pressure vessel.
- Modular RO membrane.
- Availability of RO membrane.
- Use of hydrostatic pressure.
- Faster circulation of seawater and brine discharge.
- Gravitational seawater inlet.
- Minimal environmental impact at brine discharge point.
- Multiple discharge points of fresh water.
- Scalability of the plant.
- National Security and Interest.

It is expected that there will be 30% cost saving of capital cost and 60% of cost saving for operation cost with adoption of UDS technology.

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