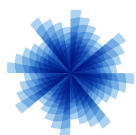


Multi Effect Distillation (MED)

Robust & Reliable Thermal Seawater Desalination



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Desalinating Water
Since
1965
with Excellence

www.ide-tech.com



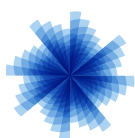
The Clear Choice

Environmental awareness has pushed the industry into maximizing the utilization of industrial waste heat.

For over 50 years IDE has led the industry in the development and execution of cost effective thermal desalination solutions.

MED's ability to utilize a wide variety of waste heat sources for high-quality water production, together with its robustness and ability to use existing infrastructure, makes it perfectly suitable for power plants, refineries & petrochemical facilities.

IDE, the pioneer and leader in the delivery of thermal desalination plants, offers low-temperature thermal distillation that desalinate seawater to produce high-quality potable and process water.



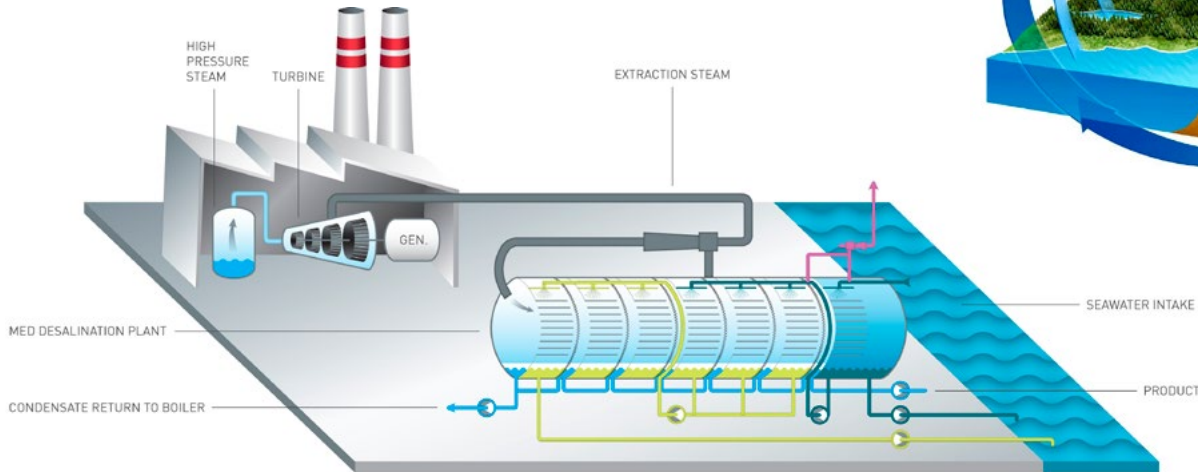
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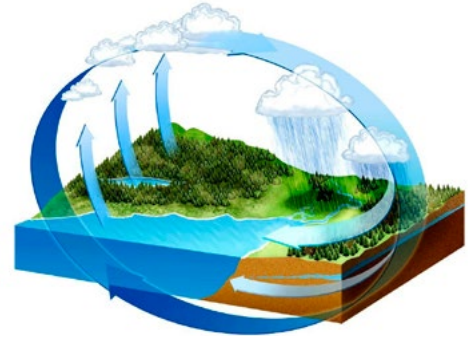


MED- How it works

How IDE does it



How nature does it



The MED process utilizes waste heat for highly efficient distillation of seawater, based on a series of evaporator-condensers. IDE's years of experience result in an optimized MED process that provide the most efficient and cost effective MED solutions in the market. According to the IDE MED design, seawater flows into a falling film condenser, where it is deaerated and moderately heated. From there, the water flows to a series of evaporator-condensers, called effects.

The water flows into groups of effects, from the last effect to the first, in a configuration known as backward feed.

In the first effect of the MED, waste heat, in the form of low pressure steam is injected into bundles of heat transfer tubes where it exchanges heat with the seawater that is sprayed on top of the tube. In this heat exchange process, some of the seawater is evaporated and flows into the next effect – where it condenses and provides heat for an additional evaporation process, and so on, according to the number of effects. The non-evaporated seawater flows into the next group of effects for further evaporation, until the brine from the last group is discharged from the MED as final brine. The condensate water from each effect is collected and flows out of the MED as product. The ratio between the MED distillate production and the waste heat used in the process is called GOR (Gain Output Ratio), which is used to evaluate the efficiency of the MED process.

Why MED?



Reliability & Availability

- Robust design
- High availability - over 98%
- Minimal pretreatment requirements
- Simple operation



Cost Effective

- Industry's highest GOR design for maximized production with your available heat
- Optimal utilization of low grade waste heat
- Lowest electrical energy consumption
- Low manpower requirements



Proven Track Record

- Over 5 decades of successful operation
- Unique proprietary technology

The Perfect Solution for Refineries and the Power Industry

- Utilizing waste heat to produce a high quality distillate for:
 - » Boiler feed water
 - » Process water for refineries and petrochemical
 - » Demineralized water
 - » Cooling tower makeup
 - » Fire water makeup
 - » Potable water
- Robust, low maintenance solution and high availability
- MED unit can share the existing industrial infrastructure, such as seawater intake and brine outfall
- Can be used as a heat sink for the steam, eliminating the need for condensers
- When coupled with power plants the MED unit provides operational flexibility for alternating between water and power production during peak hours

Geared Towards Efficiency

- Optimized design to prevent scaling and fouling
- High GOR design for minimal steam consumption and maximal production
- Increased thermal efficiency due to state of the art design and use of highly conductive tube materials
- Eliminates corrosion through de-aeration of the seawater in the MED condenser
- Unique evaporator design for extended lifetime, with protection against galvanic corrosion





Main References

- **Tianjin SDIC, China - 2010, 2013**
8 units, total capacity: 200,000 m³/day (53 MGD)
- **Reliance Industries, Jamnagar, India – 1998, 2005, 2008, 2015**
12 units, total capacity: 158,500 m³/day (42 MGD)
- **Essar, Gujarat, India – 2006, 2012**
4 units, total capacity: 65,000 m³/day (17.2 MGD)
- **Water & Power Authority (WAPA), Virgin Islands, USA - 1981, 1982, 1983, 1992, 1993**
7 units, total capacity: 29,600 m³/day (7.8 MGD)
- **MAEC Kazatomprom, Kazakhstan - 2007**
2 units, total capacity: 12,000 m³/day (3.2 MGD)
- **Kish Island Development, Iran - 1978**
6 units, total capacity: 12,000 m³/day (3.2 MGD)
- **Refineria Di Korsou (Isla), Curaçao Island, Netherlands Antilles – 1986, 1987**
2 units, total capacity: 9,000 m³/day (2.4 MGD)
- **Hovensa Refinery, US Virgin Islands - 2002**
1 unit, total capacity: 6,000 m³/day (1.6 MGD)



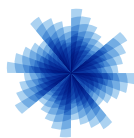
Reliance Jamnagar

The world's largest refinery & largest desalination plant in India

IDE has been delivering high quality process water, as well as potable water, to Reliance, India's largest oil refinery, for almost 20 years. This partnership has flourished and capacity has been expanded twice since first commissioning. Using a reliable Multi-Effect Distillation (MED) seawater desalination solution, IDE proves that eco-awareness, operational innovation and cost savings can go hand in hand.

- **Location:** Jamnagar Refinery, Gujarat, India
- **Total Capacity:** Total MED: 230,000 m³/day (61 MGD);
Total SWRO: 168,000 m³/day (44 MGD)
- **Commissioning date:** 1998, 2005, 2008, 2015, 2017
- **Project type:** EP + Supervision





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IDE - Over 50 Years of Experience

A world leader in desalination and water treatment solutions, IDE is at the forefront of the development, engineering, construction and operation of enhanced desalination, industrial water treatment and water reuse facilities. IDE's headquarters are in Israel, with offices in the USA, China, India, Chile and Australia, facilitating client partnerships across the globe.

- Innovative water treatment technologies that provide our clients with end-to-end solutions
- Developed some of the most advanced membrane-based and thermal solutions
- Designed, built and operates some of the world's largest desalination plants
- Successful implementations in more than 400 plants in over 40 countries



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2nd place

