# Mechanical Vapor Compression (MVC) Desalination

## The Most Robust & Reliable Seawater Desalination Solution for the Power Industry

IDE Technologies | Your Water Partners

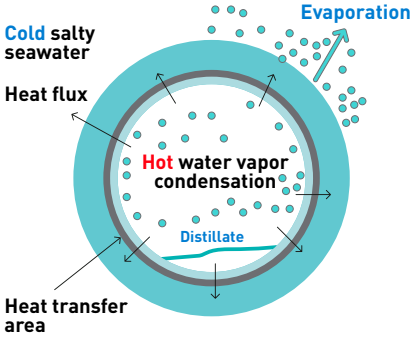
Desalinating Water Since 1965 with Excellence

www.ide-tech.com

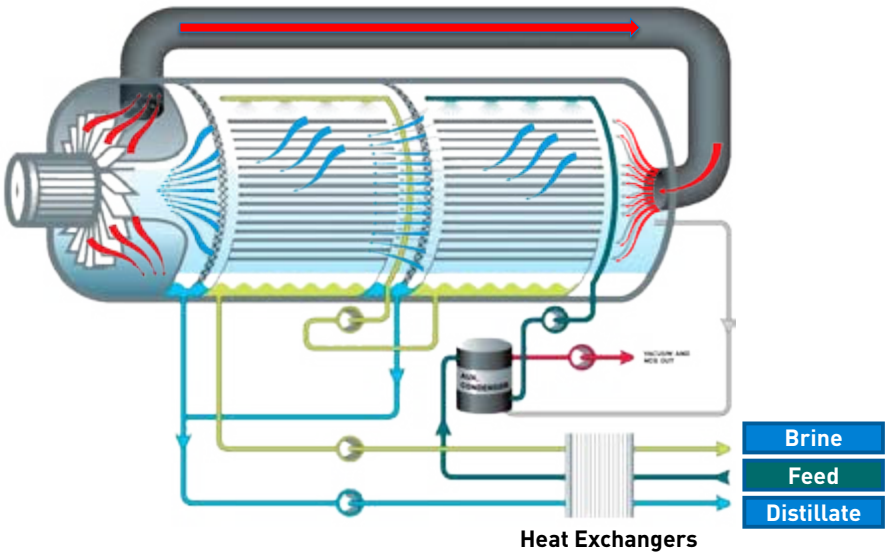
# Mission Critical

IDE's MVC unit is a reliable, cost-effective desalination solution for power plants, refineries, process industries. Dozens of power plants with a critical need for stable and reliable sources of process water have installed our MVC desalination units as an affordable, low-maintenance, workhorse desalination solution.

# MVC Desalination solution




### Horizontal Falling Film MVC Evaporator




The MVC process is a compressor driven, low pressure, desalination process, in which seawater flows into the unit through a set of heat exchangers where it is heated by exchanging residual heat from the product and brine, which is rejected from the unit.

After the heat exchangers, the seawater flows into an auxiliary condenser where it is deaerated prior to entering the MVC evaporator-condenser.

In the evaporator-condenser, the seawater is sprayed as a falling film on the upper surface of the horizontal heat exchanger tube bundles, and exchanges heat with the water vapor that flows in the tubes.

This heat exchange causes part of the seawater to evaporate, while the water vapor in the tubes is condensed to permeate.

The seawater that is not evaporated is circulated and sprayed again on the upper surface of the heat transfer tubes until it reaches the target salinity. It is then rejected from the MVC unit as brine.

The generated water vapor is evacuated from the evaporator-condenser through mist eliminators, using a mechanical compressor, which is the heart of the MVC process.

The role of the compressor is to drive the process by continually evaluating the generated water vapor, compressing it to a higher pressure and temperature, and extracting it into the heat transfer tubes.

The MVC process can be implemented in a single stage or multi-stage arrangement, in which water vapor that is generated in one effect flows into the heat transfer tubes of the next effect to generate additional water.

# Why an MVC thermal seawater desalination solution?

### Reliability & Availability

- Practically zero down time for maintenance
- 100% independent source of UPW for emergency situations
- Robust process design to treat a wide range of seawater conditions with no pretreatment

### Cost Effective

- Proprietary high efficiency one stage solution
- Unique evaporator and compressor design leading to lower energy consumption and reduced footprint
- Low temperature thermal desalination

### Proven Track Record

- Hundreds of units successfully operating since 1965

# Geared Towards Efficiency

- **Highest efficiency compression ratio** - unique one stage axial compressor design
- **Heat transfer efficiency** Horizontal falling film low temperature evaporation and condensation
- **Compact design -** mounted steel frame

# Nuclear Power Corporation of India (NPCIL) - Success Repeating Itself

Nuclear Power Corporation of India Limited (NPCIL) is a public sector enterprise under the Department of Atomic Energy (DAE), Government of India. In 2006, NPCIL chose IDE's MVC desalination units to supply the power plant's UPW needs. Since then, IDE's four MVC desalination units, each with a capacity of 2,560 $m^3$/day (0.68 MGD), have been in continuous operation, exceeding their performance expectations year after year.

It was only natural that when NPCIL decided to expand the power plant they chose IDE to supply the UPW units for the expansion, and four new MVC desalination units were contracted to be supplied by 2020.

IDE also provides O&M services to the power plant, ensuring the high availability of the mission critical desalination plants.

## Overview

- Total capacity : 10,240 $m^3$/day (2.7MGD)
- Project type : Engineering – Procurement – Operation and Maintenance (EP & O&M)
- Location : Kudankulam, Tamil Nadu, India
- Footprint : 60m x 50m
- Commissioned : 2006

## Highlights

- Track record of continuous successful operation for over 13 years
- Technological leadership
- Optimized design results in highly cost effective, reliable operation, with low energy consumption

**Our MVC desalination technology is the most reliable and trusted seawater desalination solution for the power-generating industry. Our unique compressor design makes the MVC desalination plant a workhorse for delivering UPW at the most stringent conditions.**

# Main References

- **NPCIL, Tamil Nadu, India**
  Capacity: 4 x 2,560 $m^3$/day (2.7 MGD) | Commissioned: 2006
- **JGC Corporation Japan, Turkmenbashi, Turkmenistan**
  Capacity: 2 x 3,000 $m^3$/day (1.6 MGD) | Commissioned: 2002
- **Guacolda AES, Huasco, Atacama, Chile**
  Capacity: 4 x 840 $m^3$/day (0.9 MGD) | Commissioned: 2016
- **Sarlux, Sardinia, Italy**
  Capacity: 6 x 2,880 $m^3$/day (0.8 MGD) | Commissioned: 1999
- **Southern Peru Copper Corporation, Fundicion Ilo, Peru**
  Capacity: 2 x 1,320 $m^3$/day (0.7 MGD) | Commissioned: 2005
- **Nueva Ventanas, Chile**
  Capacity: 2 x 1,200 $m^3$/day (0.6 MGD) | Commissioned: 2009
- **Reliance Industries, Kudankulam, India**
  Capacity: 2 x 1,200 $m^3$/day (0.6 MGD) | Commissioned: 2008
- **Hellenic Refinery SA, Athens, Greece**
  Capacity: 1,920 $m^3$/day (0.5 MGD) | Commissioned: 1999
- **Maire Engineering, Puerto Coronel, Chile**
  Capacity: 1,920 $m^3$/day (0.5 MGD) | Commissioned: 2009
- **Dynegy, Moss Landing, California, USA**
  Capacity: 1,450 $m^3$/day (0.4 MGD) | Commissioned: 2002
- **Enersur, Ilo, Peru**
  Capacity: 1,500 $m^3$/day (0.4 MGD) | Commissioned: 2006
- **Besos, Barcelona, Spain**
  Capacity: 768 $m^3$/day (0.2 MGD) | Commissioned: 2010

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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

**MIT Technology Review 2015 -16**
50 Smartest Companies

**2016 Fortune Change the World List**
2nd place