



**UNDOUBTEDLY, DISTILLATION PRODUCES THE PUREST OF WATERS AND PREVIOUSLY, THE COSTLIEST – MPI'S VAPCO HAS CHANGED THAT!**  
**MPI Distillation Now Competes Favorably with Other Water Treatment Methods.**

Potable water standards govern its usage for domestic consumption in homes, hotels, commerce, and industry. The VAPCO system now produces distilled potable water that competes favorably with Other Treatment Methods and in a purer quality.

Distillation has been with us for centuries. Literature is replete with technical discussion on this process as it relates to higher value products or commodities. However, it has been all but replaced when the demand for supplying potable water became the purview of lower cost and somewhat less efficient methodologies. Advances made by manufacturers of treatment equipment soon accounted for significant operating and capital cost savings. VAPCO advances a technology developed from these sources and basic distillation principles.

**CONVENTIONAL DISTILLATION**

Simply stated, a liquid boils in an evaporator, cools in a condenser, and produces a pure distillate. In an effort to conserve energy the use of heat exchangers, vacuum and multiple effect evaporator techniques were introduced over time by distillation designers.

These distilling processes consumed an unimpressive 2,000+ Kwh/1000gal. The growing demand for low cost potable water soon excited other technologies, for example reverse osmosis (R.O.) which produces a less pure product but whose 20+ Kwh/1000 gal energy cost is impressive.

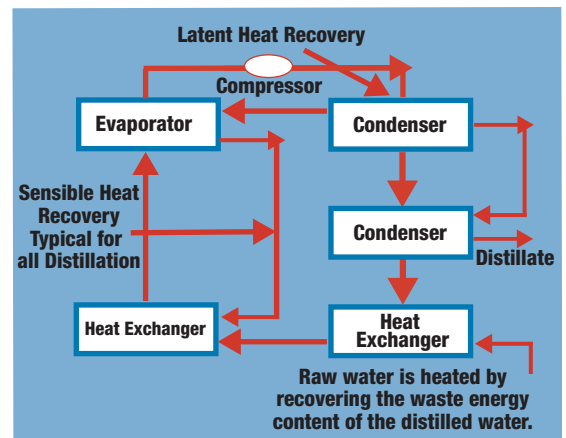
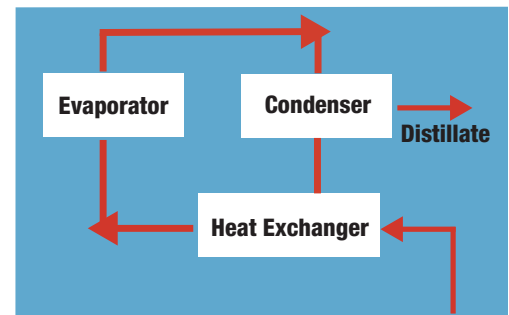
The problem of full, effective, energy recovery by the distillation method centered on a need to recapture both heat phases:

- Sensible Heat is energy that goes into raising the water temperature to the boiling point, about 252 btu/gal (49 kw/cu. m) and,
- Latent Heat, the greatest energy potential, is stored in and during the evaporation process. The fact that this heat, about 8,000 btu/gal (1,570 kw/cu. m) can only be extracted under constant temperature challenges recovery methodologies.

**MALONEY PROCESS DISTILLATION**

VAPCO is a Vapor Compression technology to extract both Sensible Heat and the Latent Heat to produce distilled water. We estimate the energy cost at about 0.3c/gal. (based on 2005 California rates). The Vapco system is unique in that its modified Vapor Compression System uses more effective heat transfer elements and media fluid.

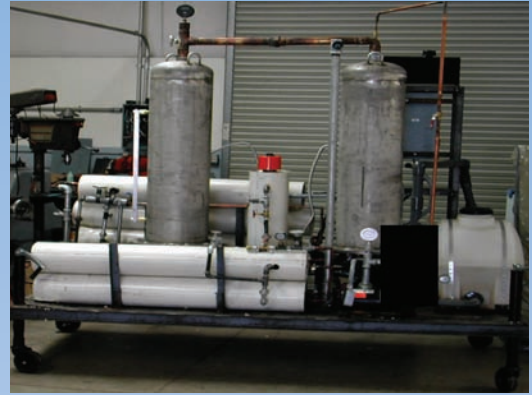
The economics of this evaporation and condensation technique is enhanced by both the compression of and recovery of the Latent Heat component.

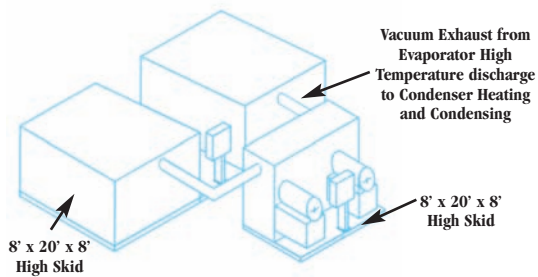


# HIGH PURITY WATER THROUGH A VAPOR COMPRESSION PROCESS

## FEATURES

- ◆ Skid mounted and factory tested modules
- ◆ The main process skid has two separate enclosures that thermally isolate the evaporator, and condenser sections
- ◆ The mechanical skid has a separate enclosure
- ◆ These enclosures can be strengthened for security reasons
- ◆ Tamper-proof enclosure design available
- ◆ Each enclosure can be separately removed for inspection purposes
- ◆ Each 17,000-gpd (190 cu.m) evaporator/condenser combination can be separately operated
- ◆ Evaporators and condensers are housed in separate insulated towers
- ◆ Quick disconnect features allow access to tower internals and to mechanical skid
- ◆ Distillation process skid is self-contained (piping, electrical etc.)
- ◆ The 50,000-gpd module has three (3) of the towers evaporate 17,000 gpd (190 cu.m/d) each, and three (3) towers condense 17,000 (190 cu.m.) gpd each
- ◆ Towers are 24" W x 4' L x 8' H (600cm W x 120cm L x 240cm H)
- ◆ High towers operate under slight vacuum
- ◆ System operates on a binary fluid heat transfer principle
- ◆ System can evaporate and/or concentrate wastestreams
- ◆ System is designed for seawater desalination
- ◆ Pumps, compressors, automated valves, electricals and Controls, are located on a separate mechanical skid
- ◆ Removable mechanical skid enclosure has thermal and noise insulation
- ◆ Motor control center for the compressor and pumps are on the mechanical skid
- ◆ All skids are designed for ocean containers and/or mobile rigging
- ◆ Binary fluid pumps are 18-8 stainless steel
- ◆ Waste brine pumps are titanium at liquid contact points in seawater applications
- ◆ Standby compressors and pumps are optional





**SYSTEM ENCLOSURE**

Process area is completely enclosed and insulated, but with ready quick disconnect access. Immediate access to system to minimize heat loss.

**50,000 gpd UNIT:**

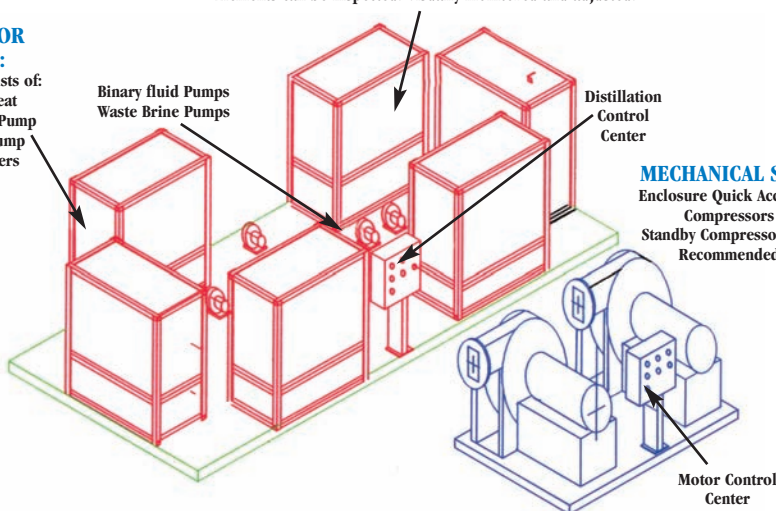
The system processes about 17,000 gpd of distilled water through each of the three individual and independent tower sets. Any set can be off-line while the other two remain in service. Tower internals can be readily exposed, examined, removed and replaced while the rest of the system remains in operation. Metallurgy is available to address seawater and wastewater attack. Pretreatment is generally not required for most wastewater applications.

**CONDENSER TOWERS**

Upper Tower is removable with Hoist Provided with System. Elements can be inspected. Visually monitored and adjusted.

**EVAPORATOR TOWERS:**

A tower set consists of:  
 Condenser Heat Exchange Fluid Pump  
 Waste Brine Pump  
 Heat Exchangers



**APPROXIMATE FOOTPRINT DIMENSIONS**

NOTE: The shipping height of all systems is approximately 8 feet (245 cm). The operating height, installed, is about 12 feet (360 cm).

MODULE CAPACITY gpd	SKID(S) DIMS		BLOWER NO.	HP	HX FLUID PUMPS		MISC. POWER KWH	TOTAL PLANT FOOTPRINT*
	MECHANICAL	PROCESS			NO.	HP		
17,000	n/a	1	1	15	2	5	5	8 ft x 24 ft
50,000	8 ft x 8 ft	1	1	50	2	5	12	16 ft x 30 ft
100,000	12 ft x 8 ft	2	2	50	3	5	19	30 ft x 60 ft
200,000	20 ft x 8 ft	4	4	50	4	5	22	60 ft x 24 ft
300,000	30 ft x 8 ft	6	6	50	6	5	32	84 ft x 24 ft
500,000	40 ft x 8 ft	10	10	50	10	5	53	180 ft x 36 ft
1,000,000	50 ft x 8 ft	20	20	50	20	5	107	340 ft x 50 ft

MODULE CAPACITY Cu m/d	SKID(S) DIMS		TOTAL Kwh/DAY	Kwh PER 1000 GAL	MAKE UP HEAT BTU/h	TOTAL PLANT FOOTPRINT*
	MECHANICAL	PROCESS				
4.5	n/a	1	21	31	100,000	8 ft x 24 ft
13.2	8 ft x 8 ft	1	52	26	350,000	16 ft x 30 ft
26.4	12 ft x 8 ft	2	100	25	700,000	30 ft x 60 ft
52.8	20 ft x 8 ft	4	184	24	1,400,000	60 ft x 24 ft
79.3	30 ft x 8 ft	6	275	23	2,100,000	84 ft x 24 ft
243.2	40 ft x 8 ft	10	458	23	3,500,000	180 ft x 36 ft
264.2	50 ft x 8 ft	20	920	22	7,000,000	340 ft x 50 ft

\*Total plant footprint does not include receiving and storage tanks.

NOTE: Values are approximate. Makeup heat is supplemented by the blower adiabatic efficiency factor. Makeup heat can also come from waste heat sources.

## PARTIAL LIST OF PROJECTS

### CHEMICAL AND MINING PLANTS

Interprovincial Coop – Regina Canada  
Stauffer Chemical – Henderson NV.  
PRC – Long Beach CA  
Kerr McKee – Grants NM  
Anamax Copper – Twin Buttes AZ

Amer. Gilsonite – Gilsonite CO.  
McGean-Rohco – Downey CA.  
Alumi. Precision – Santa Ana CA  
Inspiration Copper – Globe AZ  
Anaconda Corp – Anaconda NM

American Cyanamid – Savannah GA  
Parker Chemicals – Buena Park CA -  
Kennecott Copper – Kearney AZ.  
Bluebird Copper – Globe AZ  
U.S. Steel – George West TX

### OIL FIELD PRODUCTION

Mobil Oil – San Ardo CA  
Shell USA – Santa Maria  
Chevron USA – California Locales  
Tenneco – Taft CA  
Exxon – off-shore OST Barge

Conoco – California locales  
Texaco – California Locales  
Union Oil – Santa Ynez CA  
Helman Lease – Seal Beach CA  
Union Oil – Platform Gina

Exxon – Seal Beach CA  
Champlin Petroleum – Long Beach CA  
Strategic Oil Reserve – Louisiana  
LBOD – Long Beach CA  
Scholl Canyon Landfill – Burbank CA

### METAL FINISHING & PRINTED CIRCUIT BOARDS

United Technology – Industry CA  
Northrup – (4) Calif. Locales  
Dibble Electronics – San Diego CA  
Sargent Fletcher – El Monte CA  
Cherry Textron – Santa Ana CA  
Deutsch Fasteners – El Segundo CA  
Janco Corp – Burbank CA  
Lamination Tech. – Santa Ana CA  
WestCoastCoatings – Santa Ana CA

Xerox – Pomona CA  
Aerospace Corp. – Buena Park CA  
IWT – Ontario CA  
Davis Walker – Irwindale CA  
Carrier Corp – Industry CA  
Norris Industries – Los Angeles CA  
General Dynamics – Pomona CA  
Polyclad Laminates – Santa Ana CA  
Peterson Detention – Orange CA

Easton Aluminum – Van Nuys CA  
Likit Doors – San Leandro CA  
Voi Shan – Van Nuys CA  
BFM – Santa Ana CA  
Knappe and Vogt – Buena Park CA.  
U.S. Navy Reserve – Elk Hills CA  
Electroply – El Segundo CA  
AirResearch Corp. – Torrance CA.  
Flying J – Bakersfield CA

### TEXTILE

Playtex – Camarillo CA  
LAWC – El Segundo CA

FOI Industries – Los Angeles CA  
El Quadrato – Puebla, Mexico

Titay's – Compton CA.  
Santa Fe Dye – Santa Fe Sprgs CA.

### JEWELRY - CYANIDE TREATMENT

St. Vincent Jewelry – Los Angeles  
JTB – Los Angeles

Western Jewelry – Los Angeles Ca  
Ca. Jewelry Mart – Los Angeles

WJM – Los Angeles

### FOOD PROCESS

Crosby Foods – Fontana CA  
El Cuadritos Dairy – Guanajuato, Mexico

Kellogg Co. – Queretaro Mexico  
Sunkist Growers – Corona Ca

La Pasteurizadora – Celaya Mexico

### MUNICIPAL & MISCELLANEOUS

City of Westmoreland – Imperial CA  
Iron Springs Water District – AZ  
Ojai Grower Coop – Ojai CA  
NASSCO – San Diego CA  
Midland Ross – Santa Ana CA  
Petrochem Corp – Corpus Christi TX  
San Diego Zoo – CA

Bass Lake Water District – CA  
EMWDist – Hemet CA  
Ridgecrest WD – CA  
Princess Cruise Lines  
ARCO Carbon – Long Beach CA  
Japanese Deer Park – Buena Park CA  
Norwegian Cruiselines

Belize – U. S. Govt.  
Mammoth Water District – CA  
Teledyne Products – Pomona CA  
PG&E-Diablo Canyon – CA  
Magic Mountain Park – Valencia CA  
Crystal Cruiselines

For more information Call...



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