

140% Efficient Gas Water Heater

“THERMOSORBER” Thermal Heat Pump

- The thermal heat pump advances gas-fired water heating efficiency to unprecedented levels.
- Double-acting heat pump – produces free chilling simultaneously with heat pumping.
- Reduces electric demand, versus the increased electric demand of electric heat pumps.
- More energy efficient on a prime fuel basis than electric heat pumps.
- Can be powered by exhaust heat or 250°F solar thermal heat, further magnifying the energy savings.
- Powered by gas, not electricity.
- Not a gas engine – a simple ammonia-water absorption cycle, consisting of heat exchangers and pumps – low maintenance, very quiet.
- Provides the gas industry a product that competes favorably with electric heat pumps.
- Reduces CO₂ and NO_x emissions.
- Eighteen month warranty – extended warranty available.

The following standard Thermosorber sizes are available:

MODEL	TS 25	TS 50	TS 100	TS 200
WATER HEATING OUTPUT (THOUSAND BTU/HR)	800	1600	3200	6400
GAS HEAT INPUT (THERMS/HR)	5.7	11.4	22.8	45.6
FREE CHILLING (TONS)	25	50	100	200
ELECTRIC DEMAND (KW)	1.5	2.8	5	10
SKID DIMENSIONS (FT)	2.5x4	3x5	4x6	6x8
WEIGHT (LB)	1400	2500	4900	9600
NH ₃ CHARGE (LB)	48	95	180	350
COST PREMIUM ⁽¹⁾ (\$K)	41	64	102	168
ANNUAL UTILITY SAVINGS ⁽²⁾ (\$K)	21	45	93	188

(1) Cost premium over conventional equipment = 50% of purchase price

(2) 8¢ electric, 80¢ gas, 5000 hours per year

APPLICATION GUIDE – THERMOSORBER Thermal Heat Pump

“An intriguing thermodynamic cycle – uses heat to make cold, then converts back into even more heat”.

- Standard sizes and custom models available
- Sized for heating load
 - Water heating
 - Space heating
 - Drying
- Heating temperatures up to 160°F
- Simultaneous chilling as low as 32°F
- Utility savings of approximately half the heating cost
- Target initial applications:
 - Heating bill at least \$50K per year
 - At least 4000 hours per year utilization
 - Coincident chilling load
- Promising initial applications:
 - Food processors
 - Meat
 - Poultry
 - Dairy
 - Beverage
 - Recreation complexes
 - Swimming pool heating plus dehumidification
 - Ice rink freezing plus space heating
 - Locker room DHW and heating
 - Hotels with restaurant and on-premises laundry
 - Industrial laundries
 - Continuous washers
 - Dryers
 - Pulp and paper mills
 - Drying
 - Lumber
 - Fabric and yarn
 - Processed food

References:

- THERMOSORBER Technical Report from CEC PIER Program.
www.energy.ca.gov/pier/final_project_reports/CEC-500-2005-094.html.
- November 2007.
- “Application Assessment Report #0708 Field Study of a Thermosorber System.” PG&E Emerging Technologies Program. April 2008.
- “Thermally Powered Heat Pump/Chiller Sets New Efficiency Standard.” IEA Heat Pump Centre Newsletter. Volume 25-No. 1/2007.

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