

## > EVAPORATIVE PRECOOLER DESIGN GUIDE DATA

All Energy Saver evaporative precooler systems are designed, engineered and manufactured to attach directly to the condenser section of air conditioning or refrigeration equipment. The precooler is designed to utilize the air flow of the air conditioning or refrigeration equipment condenser fan for operation. The precooler unit is normally designed not to exceed 450 feet per minute face velocity. In no case should the face velocity ever exceed 500 feet per minute.

Evaporative precoolers rely entirely on the evaporation of water for operation. As water moves downward through the media, drawn by the air velocity of the condenser fan, some of the water evaporates. This evaporation cools the air before it reaches the condenser coil. The condenser unit of the air conditioning system operates more efficiently than otherwise possible when temperatures exceed 80°F dry bulb. Most manufacturers provide data regarding the operation of the air conditioning unit across a broad range of ambient temperatures. This information can be used to determine the efficiency that can be obtained using an evaporative precooling system. The 4-inch media used by Energy Saver provides 62% evaporative efficiency. This means that the precooler can remove 62% of the difference from your design wet bulb and dry bulb. Using the 1% ASHRAE design standards for your location can provide you with the maximum design characteristics of your precooler and help in determining customer expectations.

$$(EDB^{\circ}F - EWB^{\circ}F) \times (\% \text{ Evaporative Efficiency}) = \text{Temperature Drop (TD)}$$

$$(EDB^{\circ}F - TD) = \text{Leaving Air Temperature of Precooler}$$

Our experience with energy savings has shown significant reduction in the total KWH consumption of up to 25% during the hottest part of the day with up to a 20% reduction of compressor head pressure. Not only does the unit perform more efficiently with a precooler, it also has to work less. Most users find increased efficiency across a range of increasing dry bulb temperatures when compared to a unit without a precooler.

This data is based on measurements taken from over 100 commercial facilities in the Phoenix, Arizona area and represents the savings, which may be expected with the addition of an evaporative precooler.

Ambient Conditions		Evap. Air Outlet	Unit Power Draw (Kw)		Unit Cooling Capacity (per 1000 cu.ft.)		Expected Energy Savings %
Temp (°F)	Relative Humidity (%)	Temp °F	Without	With	Without	With	
90	25	77	10.9	9.8	543	609	20
95	23	80	10.9	9.9	530	609	21
100	18	83	10.9	10.0	507	609	24
105	20	87	11.4	10.0	478	607	31
110	13	89	11.9	10.1	471	601	33
115	10	91	12.6	10.3	457	587	36