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**Template D -- (Cooling Tower Automatic Filtration)**

**Evaporator Fouling**

Fouling in the evaporator tubes will also increase energy costs. Fouled evaporator tubes can cause a drop in refrigerant evaporating pressure that reduces its density. As a result, the compressor must pump the gas to a higher pressure to remove an equivalent amount of heat from the chilled water. Again, the compressor must work harder, which increase energy requirements.

Fouling of 0.001 Increases Energy Consumption by 10%

Based on \$0.07 per kWh electricity cost and Power Factor of \$ 0.91 on a Efficient Chiller at 40% load = \$ 0.25 kW/Ton

Based on \$0.07 per kWh electricity cost and Power Factor of \$ 0.91 on a Efficient Chiller at 100% load = \$ 0.57 kW/Ton

An Example of a 500 Ton Chiller operating at 100% for 2000 hours a season, which if you averaged a seasonal load this is fairly common and fouling often exceeds 0.0042.

When making ICE for thermal storage units you can modify the hours and still reach the same costs.

Fouling of	Reduction in Chiller Efficiency	kW/Ton/100% load	Wasted Energy/Ton/Season	500 Ton
0.0008	9%	0.62	\$100.00	\$ 50,000.00
0.0017	18%	0.672	\$204.00	\$102,000.00
0.0025	27%	0.724	\$308.00	\$154,000.00
0.0033	36%	0.775	\$410.00	\$205,000.00

Side stream filtration down to 100 micron filtration can save real energy dollars on chiller efficiency.

\_\_\_\_\_ Tower Basin & Condenser Tube Cleaning Cost

\_\_\_\_\_ Cooling Water Chemical Treatment Cost / Filtering out Solids reduces Bioside Cost by 20%

\_\_\_\_\_ Condenser Efficiency x Tonage x kW/Ton x 2000 hours/season (Clean vs. Fouled)

\_\_\_\_\_ Make Up Water Savings keeping TSS counts down

