AIRAH Water Usage
In Cooling Towers

Perth June 20th 2012

1/ Water Usage in Cooling Towers

2/ Cooling Tower Efficiency.

Comfort cooling using PVC fill without water

Cooling Towers designed to save water.

Approximately 95% saving
compared to a once through system

Water usage in a tower ?

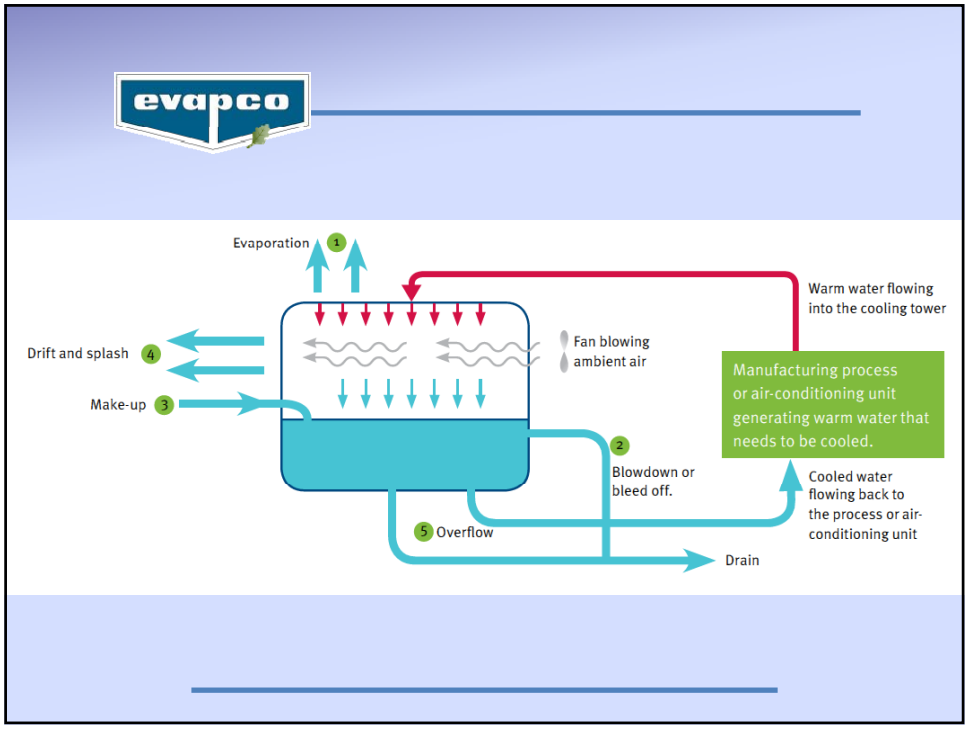
1/ Evaporation

2/ Drift losses from the tower

3/ Bleed off

4/ Splash out and leaks

5/ Overflow



Evaporation proportional to THR

L/S = THR (kW) / 2425 (Enthalpy of Evaporation)

Approximately 0.01% of circulating water flow

Reduce the heat load on the system

Drift is normally expressed as a percentage of water flow through the tower

Currently drift is required to be no greater than 0.02%.

Fitting more efficient eliminators could save approximately 312 lph for an average 1000 kW tower.

30,000 towers fitted with 0.001% eliminators could save approximately

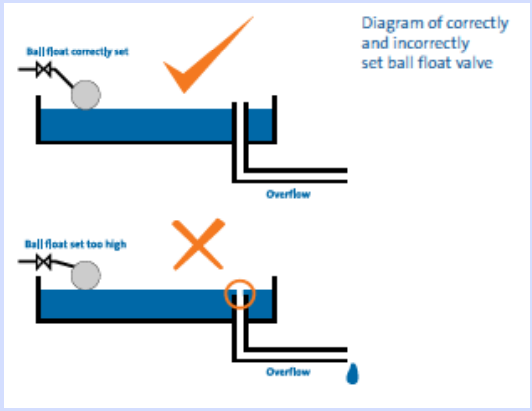
300,000 litres a year

Splash can occur through air inlets or from poorly fitted water distribution systems.

Fitting efficient inlet louvers, correctly fitting spray system and ensuring correct operating water levels can help eliminate or minimise splash out.

Overflow can occur when basin water levels are not set correctly or piping is poorly designed.

The amount of pipe work above the normal operating level of the basin should be minimised as much as possible. Ensuring the basin has adequate volume to accommodate any water in overhead pipe work.



Air Cooled versus Water Cooled.

No water consumed *****
No chemical treatment required
Lower overall maintenance
Low environmental health risk

Air Cooled versus Water Cooled.

Higher energy consumption 3 to 4 times
Larger electrical infrastructure required
Lower heat transfer efficiency.
Very hot days possible system failure.
Higher initial cost
Noise
Large floor area required

Air Cooled versus water cooled.

No water consumed *****

Electrical generation uses water

1000 kW tower – 11 kW

1000 kW Air cooled 45 kW

34 kW variance = 60,000 litres per year

4 times the CO_2 generated

Cooling Tower Efficiency

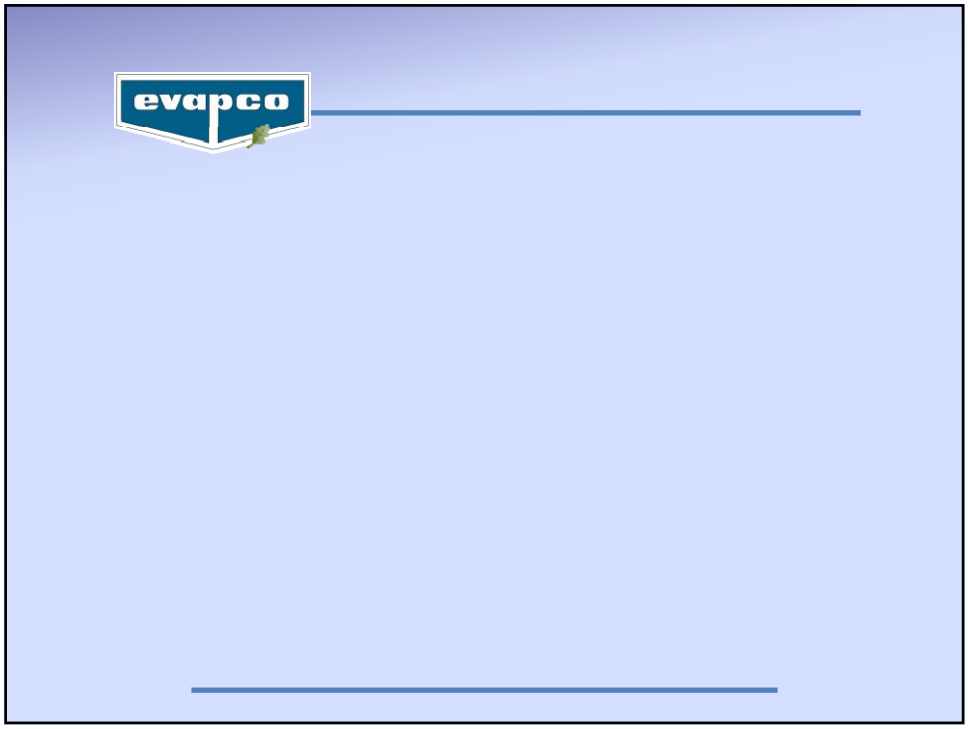
Range ^{o}C / Water Inlet Temp - WB

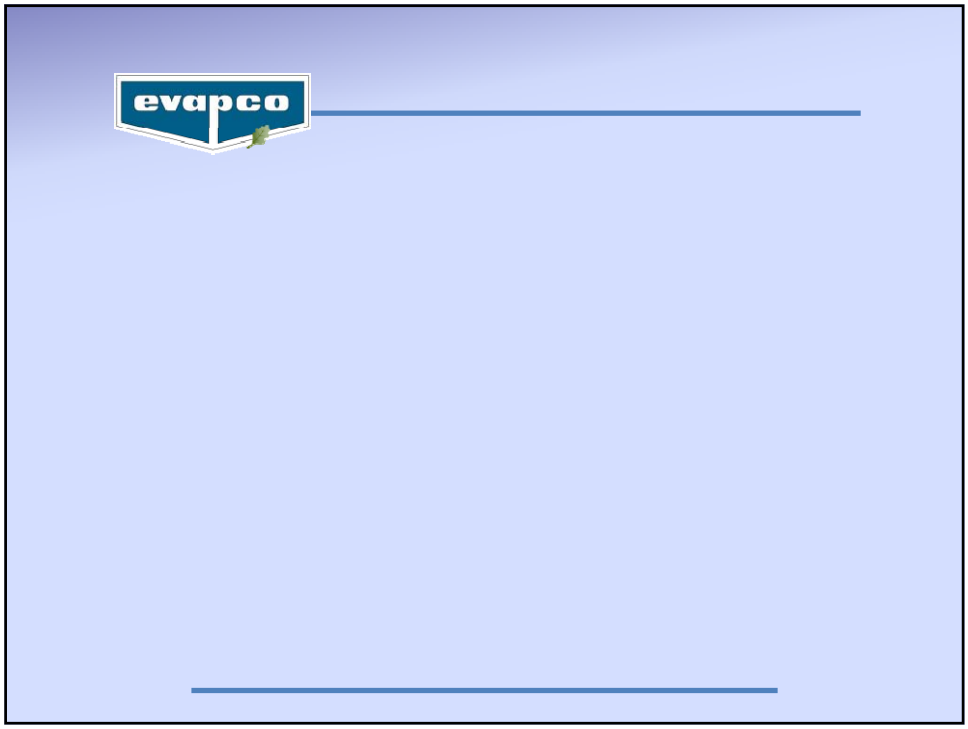
Capability is based against design duty

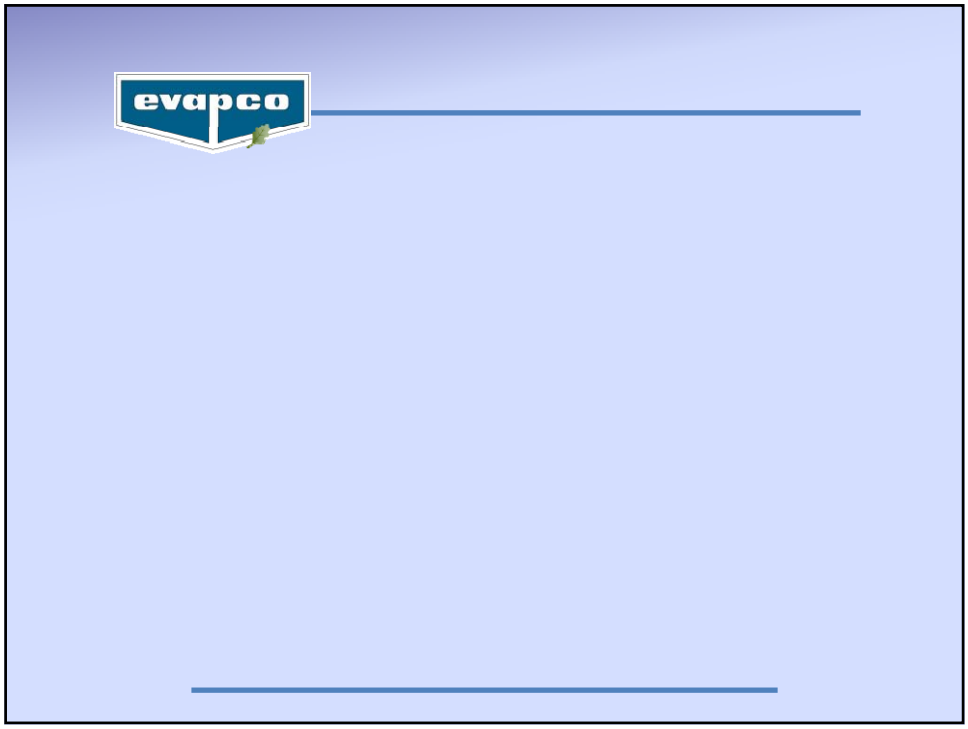
Cooling Tower Efficiency

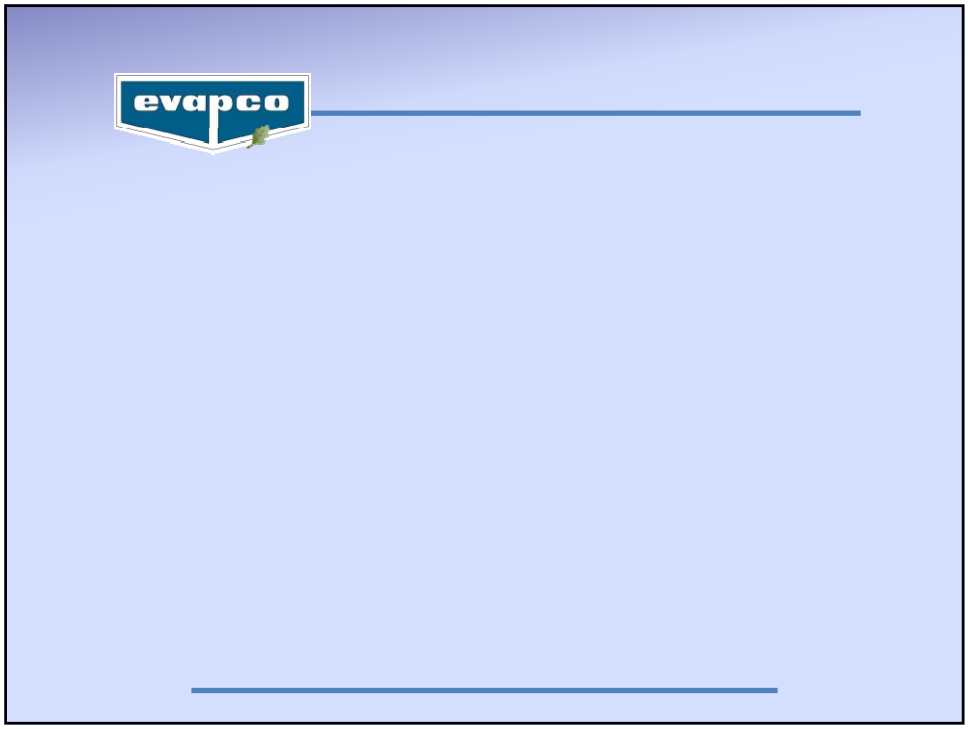
Does not directly decrease water usage

One degree increase in water temperature will mean a 3 to 4% decrease in chiller efficiency and a corresponding increase in chiller kW input requirement.


evapco


evapco


evapco


evapco


ACCESS RENTAL

Efficient inlet louvers prevent splash out

Counter flow induced draft cooling tower