

**Area** : **REFRIGERATION / ENERGY EFFICIENCY**

**Title** : **ADIABATIC AIR COOLING SYSTEMS FOR AIR-COOLED HEAT REJECTION EQUIPMENT**

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**Summary;**

Air cooled heat rejection systems (air cooled condensers, chillers and dry coolers) relies on dry bulb which is generally between 5 and 15 °C higher than the wet bulb temperatures. Traditionally, large heat rejection systems use cooling tower or evaporative coolers in order to reduce the heat rejection equipment size as well as the overall energy consumption due to lower condensing temperatures. However, the water based corrosion, maintenance and health problems such as legionella disease moved the industry towards dry heat rejection systems.

By simply intermittently spraying water over a wired mesh area in front of the heat rejection surface introduces wet bulb temperature during only peak high ambient periods. Adiabatic cooling process introduces water into an air stream which rapidly evaporates the water and the hidden energy of water provides a cooler down stream air temperature as much as 10 ~ 25 °C lower than the incoming air. Lower air on temperature results in lower condensing temperature and therefore save as much as 30% peak power consumption by simple using water directly from the tap.

The majority of the time the water presence remains with the sealed main water pipe and it is based on Total Waste principle. Hence, the health risk involved with a standing water reservoir is completely eliminated.

Test sites in the UK last summer indicated between 20~35% peak electricity reduction and the concept can be considering as a simple DIY kit for both New and Refrofit applications. Hence, the potential for the energy saving and Carbon Emission reduction for the industry as a whole is significant and this can be achieved by simple using the tap water.