

Wap-Flaro, waste heat powered Chilled Water Production Facility

OPEC, UK

The main principal of Wap Flaro (WF) is to increase the heat transfer rate whilst simultaneously reducing the volume of water used. This is achieved by increasing the working efficiency of heat exchangers and/or condensers of an existing process. This applies particularly to oil refineries and petrochemical plants as well as rayon fibre production, paper industries, pharmaceutical processes, meat packing, food processing, thermal power plants and so on.

WF is a patented technology

Completely stand alone to the flow of an industrial process

A self contained unit

Designed as a plug-in facility

Core components have no moving parts reducing the need for regular maintenance

Custom designed to meet local conditions and capacity requirements

Running costs are low – there is no additional fuel costs

Manpower is minimal

Only needs steam and water to operate

Fully automated using a digital control system

Multifunctional – can be utilized for many processes within an industry

Modular, units can be added to the plant to increase capacity at a later date

Long life span – depending on local conditions can be up to 25 years

Proven technology since 15 years– the first installation was commissioned in 1987

WAP FLARO – GREEN REFRIGERATION

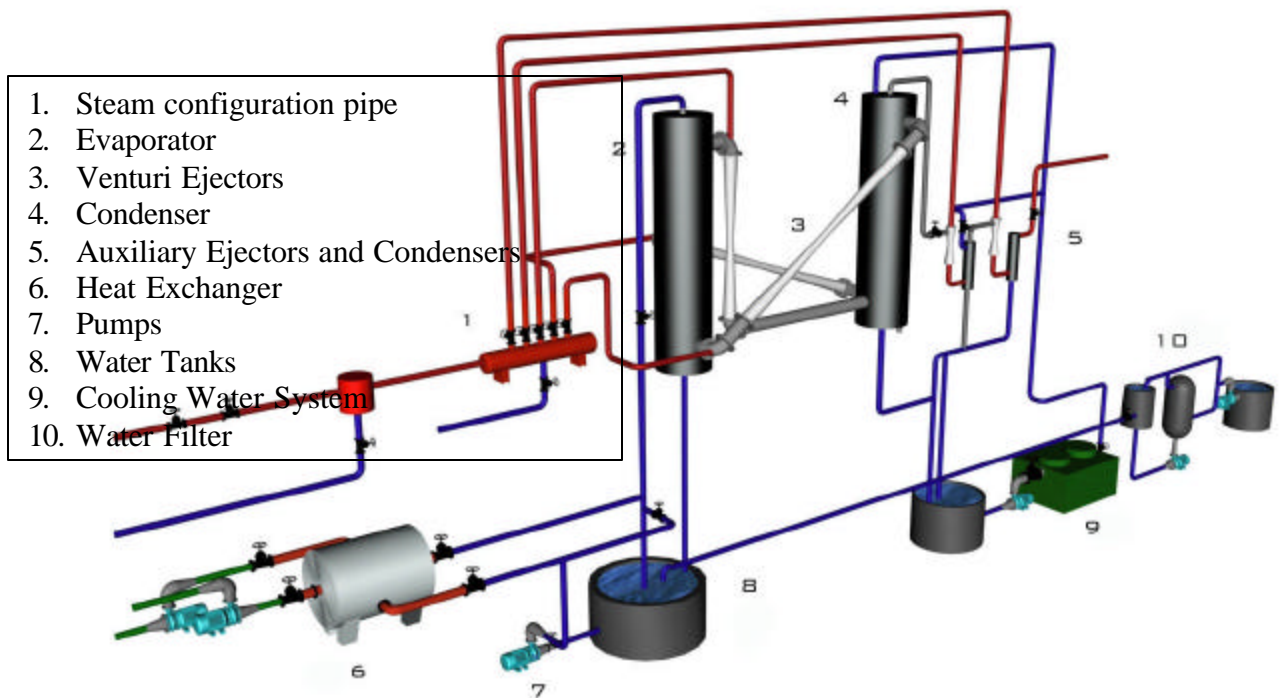
There are many different types of refrigeration technologies present in today's market place.



These vary from absorption chilling and compressors to air-cooled systems. However, to achieve high flow rates of water at low temperatures the 'conventional' refrigeration methods are not usually economically viable.

Conventional refrigeration needs compressors and coolants to enable the process to work. These systems require much energy and regular maintenance. They are costly to run and in some cases contribute to greenhouse gas emissions themselves, (with the use of ammonia or lithium bromide).

WF is a form of **'jet refrigeration'** and does not require coolants or compressors to produce large volumes of chilled water and needs only **steam** and **water** to operate.



The process utilises the theory of jet refrigeration. Low pressure waste steam passes through a series of ejectors and condensers which cools down circulated water within the facility. The generated chilled water flows through heat exchangers. It is these heat exchangers where the circulation water from the industrial process meets with the WF chilled water and is cooled to the desired temperature. WF is a closed loop system controlled and automated by the use of an integral Digital Control System (DCS), which enables this process to adhere to specific working parameters.

One module is capable of producing 200m³ per hour of chilled water at approximately 4-6°C.

To achieve this approximately 2500kg/h of low pressure waste steam between 2-4 bar is passed through the ejectors. Approximately 10% of the chilled



water production is from make-up

water, thus every module requires approximately 20m³ per hour of make-up water. The use of a modular design enables increased chilled water production capacity by simply applying additional modules to the design.