

## Innovative Technology to Promote Energy Efficiency

### Jet Towers: Liquid Jet Technology in Cooling Towers

– Mr. Shailesh Harani, Managing Director, AMREC Group

Jet-type fanless cooling towers work on water/liquid jet principle. The water to be cooled is circulated through specially designed nozzles, which are located at the top of the jet tower. These nozzles are arranged in such a way that the water flowing out of the nozzles covers the entire top cross sectional area of the jet tower. The water flowing out of the nozzles is in the form of small droplets (with high momentum) falling in an umbrella-like pattern. Spraying in this manner creates a low pressure zone below the nozzles. The spray provides a large contact area as well as contact time between air and water. Fresh air from outside is drawn in because

of the pressure difference, giving rise to a continuous “induced draught”. Excellent cooling is achieved because water and air are in direct contact with each other without any obstacle in between.

#### Features of Jet-type fanless cooling towers

- **Maintenance free:** Since there are no fans, fills or gear boxes, there is no related maintenance.
- **Energy efficient:** In cooling towers of this kind, there are no electricity-consuming motors; they can be designed using the unique ‘no drift-losses’ design, saving water.

- Expansion of presently running cooling towers is possible
- **Capacity available:** 5 m<sup>3</sup>/hr to 2000 m<sup>3</sup>/hr single cell; higher capacity possible in multicell configuration. Jet cooling towers can be used for a wide range of applications, right from Air Conditioning to effluent cooling, that is, low delta T to high delta T, total range is covered.
- Jet towers can be installed in all kinds of environments including those with high wet bulb temperatures, high ambient temperatures, dry and hot areas, areas with high humidity and so on.



Figure 1: Jet-type fanless cooling towers





**Figure 2: Installation of Jet Cooling Towers at GT2 Power Plant, BPCL site.**

- This technology is being used in different industries, viz. sugar, pulp and paper, aluminium, cement, fertilizers, iron and steel, chemicals, pharmaceuticals, forging, glass, thermal power plants, hotels, hospitals, rubber, agro based plants, commercial buildings, plastic, textile, petroleum and automobiles.

### Case Study: Installation at Bharat Petroleum Corporation Limited

Bharat Petroleum Corporation Limited (BPCL) is an Indian state-controlled oil and gas company with its headquarters in Mumbai, Maharashtra. The Corporation operates two large refineries located in Mumbai and Kochi.

The Jet cooling tower of 550 m<sup>3</sup>/hr capacity was installed at the Gas Turbine 2 power plant in 2014 in Kochi refinery, with the following key features:

- The fanless cooling tower has no fills or rotating parts and is virtually maintenance-free.
- Reliability issues due to fan failure, dislocation of distribution header branch pipes, disintegration of fills and its carry over have been eliminated.
- Drift losses are reduced due to extended sump
- Fast installation.

### Impacts and Benefits

- **Energy savings:** The absence of fans in this type of cooling results in savings of electrical energy about 30kW of power

were saved upon removal of the two induced draft fans in the old cooling tower.

- **Financial implications:** The total amount of money invested in implementing the project was Rs. 55 lakhs and Rs. 25 lakhs have been saved per annum.

### About the technology supplier

ARMEC Group is based in Mumbai and manufactures user friendly Induced Draught Fan less Jet Type FRP Cooling Towers without fans and fills.

