SUMMARY OF THE INVENTION

The invented system solves this problems in wet cooling towers ; During cooling tower function and rejecting heat from water and transferring to atmosphere , some portions of circulating water are vaporized and some portions by the wind are discharged with air from tower , also percent of basin water blowdown and waste . Water vapor plumes (fog) will form out of cooling tower. Water evaporation causes deduction in circulating water at 1 to 2 percent (or more) in the cycle, which known as the main problem of wet type cooling towers . Up to 83% - 88% of water deduction is subjected due to EVAPORATION .

Wind effect causes deduction in circulating water at 0.05 to 0.15 percent in the cycle , up to 1.5% - 2% of water deduction is subjected due to WINDAGE . Blowdown and waste the water from tower basin causes water deduction at 0.2 to 0.4 percent in the cycle , Up to 10% - 15% of water deduction is subjected due to BLOWDOWN AND WASTE .

Deduction in water quantity necessitates adding make up water to the system, so proving extra water, leads to increase in costs, deduction in regional water resources, and impact to environment and even in the case of water shortage the whole system will become inefficient. Furthermore, water deduction due to evaporation and windage , increases water sediments, which results in some difficulties in pipes and pumps that it persuade us to blowdown and waste basin water . In addition, exhaled fog creates visual pollution in environment, increase the risk of freezing tower adjacent roads, and can precipitate of ice and rain around tower during cold seasons.

A foresaid facts show that problems of cooling towers fog , blowdown and consequently water deduction in water cycle have not solved effectively yet. Therefore, ground water sources, wells, and other water resources will be consumed to supply lots of cooling towers in urban residential areas and huge cooling towers of power plants, oil refineries, steel industries, and other industries with exothermic processes, which will increase the costs and will acquire dryness for the regions . The wet cooling towers are the best choices for exothermic processes in terms of economic and technical , but a lot of water consumption of this towers can challenge the environment , economy and agriculture . Therefore must consider the best solution for this challenge , by restoring outlet fog to cooling tower simply and cost effectively. The system consists of main components, pump, waterfall and pertaining piping and micron fog eliminator. In this system wet discharged air is passed through a waterfall. (A pump provides water for waterfall from tower collection basin). Some portions of fog particles in discharged air with diameter around 10 microns are condensate during this process and pour down. Remaining droplets of the fog grow in size after passing through the waterfall and entering between fog eliminator blades together with air at a proper velocity. These larger particles are entrapped between fog eliminator blades, leave the air, and therefore adhere to the blades' walls and restore to circulating water of the tower. Temperature of cooled water in tower collection basin remains constant during the function steps of invented system.

When the invented system is installed in cooling tower, about 75% of outlet fog can be restored to tower water cycle annually in distilled water mode and cause the amount of blowdown and basin waste water limit to zero (more than 55% in summer and more than 95% in winter). In addition to reduction of environmental and agriculture problems, this amount causes a noticeable saving in water consumption and reduces dryness problems in adjacent areas to tower, so reduces cost of makeup water consequently. It's noteworthy that restored water is obtained from condensing outlet fog, so it is

completely pure and therefore feeding this kind of water instead of makeup water, solves problems of using impure water in the cycle like sediments, water hardness and dissolved gases. Solving these problems reduce minor expenditure for water treatment service and repairs. Use of this system can be taken into consideration when cross or counter flow wet cooling tower is going to be designed or can be installed on fabricated towers or even operating one (with cross or counter flow) only after minor modification and changes on them .

This technology can be used for the towers that will be designed and also towers that are working .

The MECHANICAL DRAFT COOLING TOWERS are working in important sites such as power plants , refineries , petrochemical plants and steel plants are always made of several cells , that one cell is stand-by another cells. The implementation of this technology is done separately for each cell , that the stand-by cell will replace for each cells .

For using this invented technology in NATURAL DRAFT COOLING TOWERS , maybe we should install the suitable fans in this towers.

If a cooling tower is made of only one cell , we should install a replacement cooling tower beside the main tower to prevent disorder in main site working .

We have made an industrial prototype that shows and compares two cooling towers with this technology and without this technology . (above image)