

BEST OF SUBJECT CATEGORY AWARD ENGINEERING – DELHI NATIONAL FAIR

Efficiency Enhancer for Portable Air Conditioners

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Air Conditioning consumes a major part of energy in residential and commercial buildings. Portable and split unit Air Conditioners forms a major segment of the total Air Conditioning installed. The aim of the present project is to improve the efficiency of these air conditioners with a simple add on system without tempering with their original design.

The cooling efficiency of an air conditioner is directly proportional to the cooling of its condenser fins. The large capacity air conditioners use cooling towers & heat exchangers to extract the heat from its condensers, but due to design limitations normally high temperature atmospheric air is blown through the condenser of a portable Air Conditioner to cool down its condensers, which is not that efficient.

In this project, this supply air to the condenser fins was first cooled by passing it through electronically controlled water sprayed, evaporative cooling pad. Due to the evaporation of some of the water the air temperature falls as its sensible heat is converted into latent heat & the cooling of condenser of condenser is accelerated. This is an open loop refrigeration cycle where the refrigerant (water) is lost to the air without any pollution.

Lower the humidity of the air, higher the temperature drop (up to 20 ° C) of the supply air was observed. The efficiency of the system was measured by comparing the power consumption of Air Conditioner (with & without this system) in identical situations. A very encouraging drop in power consumption (Up to 40%) was observed in initial experiments with this system on.

Fitting this simple, non-polluting & economical add on unit to the existing Portable Air Conditioners could make them highly energy efficient especially in low humid & high temperature areas. The impact of total energy saving globally could be astronomical.