

# Design Modifications in Window Air Conditioner to Ameliorate Cooling Performance Equipollent to Split Air Conditioner

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## Abstract

This study proposes an efficacious design concept in which subsisting window air conditioner is integrated with a contrivance, designed for ameliorating air flow, thereby ameliorating its cooling performance like that of a split-type air conditioner. This contrivance consists of duct pipeline, and a distributor which can be fabricated utilizing steel or aluminum with an insulation cladding to eschew heating of aligid air from evaporator afore it is alimented inside room to be cooled. The design was tested virtually with software and results demonstrate an efficacious amelioration in air flow under the optimal design condition.

**Keywords:** Air conditioning, Window AC, Split AC

## Introduction

Air conditioning is the process of abstracting heat and moisture from the interior of an occupied space, to amend the comfort of occupants. Air conditioning can be utilized in both domestic and commercial environments. This process is most commonly used to achieve a more comfortable interior environment, typically for humans and animals; however, air conditioning is additionally used to cool/dehumidify rooms filled with heat-engendering electronic contrivances, such as computer servers, power amplifiers, and even to exhibit and store some delicate products, such as artwork.

## Domestic Air Conditioner Designs

Nowadays various designs are bet technical performance in any system is considered as most important parameter in any design. Following are the two basic designs used for domestic air conditioning in India:

### Window AC

Window unit air conditioners are installed in an open window. The interior air is cooled as a fan blows it over

the evaporator. On the exterior the heat drawn from the interior is dissipated into the environment as a second fan blows outside air over the condenser. A large house or building may have several such units, allowing each room to be cooled separately.

### Split AC

A split AC system typically supplies air to a single room of a building. The split AC has two separate motors, due to which electric consumption is also increased. Though the split AC is comfortable but the air throw remains less, so there are still chances of room being cooled improperly.

**Table 1. Comparison of Window and Split AC Designs**

Requirement	Window AC	Split AC
Window	Yes, accessible from both sides	No
Height of installation	Depends on the window, mostly at a lower height	Always installed near the roof
Air circulation	Really low	Most of the room is covered

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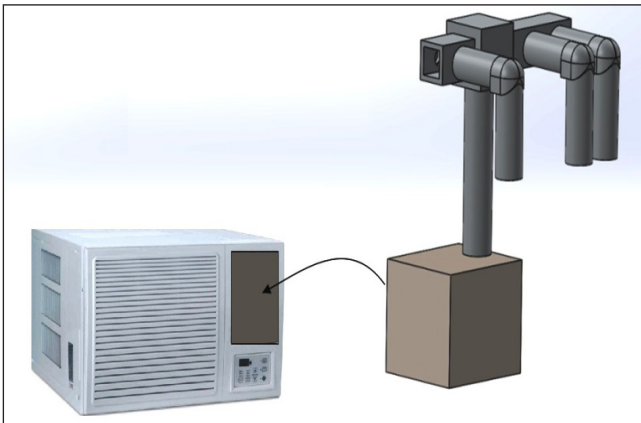
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## Proposed Modification in Window AC

A window AC has the facility to cool only a miniscule area. The component of the room far away from the AC is not cooled congruously, thereby reducing the comfort. In such a case, the efficiency of the window AC can be incremented by diminutive modifications. A duct pipe can be connected to the blower of the AC and the exit can be placed at a height and at a number of locations. This increases the air flow and circulation in the room and the cooling capacity of the window AC can be incremented.

A simple design has been illustrated in the diagram given in Fig. 1.



**Figure 1. Proposed Attachment at Front of Air Flow Grill of a Window Air Conditioner**

## Conclusions and Future Scope

While not an incipient technology, but by integrating the duct pipe as proposed in Fig. 1 along with window air conditioner, we can prosperously incrementing the cooling effect by ameliorating the air circulation while utilizing a window AC. This shall play a major role in the households of people who are in the lower-middle class. They do not have to transmute the subsisting AC or install highly sophisticated cooling machines, but can install this duct in the subsisting window AC and make it more efficient without much involutions or challenges. To ascertain that designs are efficient, it is consequential that design engineers take into account the many considerations like congruous CFD analysis so as to make this design modification a prosperity.

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