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WHAT ARE THE VARIOUS TYPES OF AIR LOSSES IN A BUILDING?

There are three prime mechanisms through which conditioned air contained inside is lost via an opening in a building;

1. Natural Convection
2. Natural Ventilation
3. Mechanical Ventilation

Let's discuss what they are and how to combat the issues with the help of air curtains.

Natural Convection

Cold air is denser than warm air, which allows cold air to settle down. Across an unimpeded boundary between a heated and a

cool area, conditioned cool air will escape from the bottom of the opening. This process will naturally allow Hot Air to enter the conditioned space, from the top of the opening, which is known as natural convection.

This process happens due to the thermal properties present *i.e.* the tendency of a hotter and hence, less dense air to rise and a colder air to sink under the influence of gravity resulting in transfer of heat into the surroundings.

Under these conditions, an air curtain can limit the exchange of air between the two zones by creating a barrier to impede air flow.

The turbulent flow of air curtain creates a secondary layer that makes Air Curtains work effectively and also affect the natural air flow pattern in the thermal convection.

Natural Ventilation

An airtight building is never possible. There is invariably some openings and crevice, such as doors, windows and cracks that prove to be the facilitator of cold air to pass as well as hot air to enter in the building in order to replace it through the mechanism as very well explained in the previous process.

The prevailing wind conditions and directions can exacerbate this natural ventilation mechanism, relative to the openings.

In this type of situation, the use of an air curtain can reduce the ill effects of air loss as a natural consequence of wind-driven natural ventilation, through the doorways. Air Curtains have got the ability to work wonderfully well on Doorways and can reduce the losses significantly on conditioned Air and prevent entrance of mosquitoes, flies and dust.

Mechanical Ventilation

The mechanical ventilation, also referred to as artificial ventilation, uses artificial fans, such as Ventilation System, Exhaust Fans, Gravity Ventilators and several more.

A region within a building, or the interior of a building, can be very well pressurised under the three separate conditions:

- a. Pressurised positively, where the Air is moving out of the area in consideration
- b. Pressurised negatively, where the Air is moving in the area in consideration
- c. Non-pressurised (with no pressure differential between zones).

All these variations in pressure difference across an opening between zones can be its natural consequence of a poorly balanced ventilation system, ineffective controls or in few cases of a well-thought design decision.

Air curtain solutions have the ability to work in almost all of these scenarios (controlled conditions). The Flow of Air Curtains is hugely affected if there is properly ventilated building. Nonetheless, they are most effective if the pressure differential across the air stream is minimum.