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## ENGINE IMPROVEMENTS:

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# Air Curtains

## Can Make a Difference

### Invisible Wall to Separate Environments

**ONE OF THE MOST FRUSTRATING** problems for industrial building energy managers is large openings between conditioned and non-conditioned spaces. Often dock doors, warehouse access doors and other openings need to be kept open to facilitate movement of personnel, equipment and goods. Unfortunately, these openings also represents a major building energy leak and source of indoor contamination. A solution to this challenge that is increasingly being used is air curtains, sometimes called air barriers. These can not only help reduce energy loss, but can prevent entry by other environmental contaminants such as fumes, dust and insects.

#### Challenges Where Environments Meet

Most industrial buildings have several openings to the outdoor environment, or openings between a non-conditioned warehouse environment and conditioned storage or manufacturing spaces. These are problem areas because forklift, conveyor and foot traffic require that doors be kept open much of the time. Yet open doors allow the escape of conditioned air and entry of outdoor air contaminants. Various solutions have been tried.

One approach has been to use suspended vinyl strip doors. While these can be effective in separating environments, they have several drawbacks. According to one industry spokesperson, "Vinyl strip doors are unsightly and do not provide effective environmental separation."

#### Potential Visibility Hazard

Though quite transparent when new, vinyl strips quickly become scratched, stained and dusty, particularly if they are used for motorized traffic, creating a potential hazard for traffic through or near the doors. When there is a breeze on one side of the door,

they are of limited usefulness in preventing intrusion of outdoor conditions. They can require frequent maintenance because the strips are often damaged by forklift operations.

In addition to doors to the outside and between conditioned and non-conditioned spaces, another area where environmental separation is needed is entrances to refrigerated spaces and freezers, particularly where forklift transport is being used. Where these are high-traffic entrances, physical barriers like motorized doors or vinyl strips are impractical and inevitably slow down production. Here also, a better solution is needed.

#### A Better Solution for Reducing Infiltration

The approach that is gaining in popularity is the use of air curtains. These use an overhead air pressurizer that directs a narrow laminar flow of recirculated air down or across the door opening. This high-speed stream prevents entry of outdoor environmental elements and escape of conditioned indoor air. This is achieved without any visual or physical barrier to foot or motorized traffic.

Enershield Industries, headquartered in Edmonton, Alberta, is a manufacturer of air barriers for the U.S. and Canadian markets. Dan Hallihan is the Regional Manager for the firm and was a recent presenter at a Technology & Market Assessment Forum sponsored by the Energy Solutions Center. Hallihan indicates, "One of the greatest energy inefficiencies in any building is an open door. Enershield Air Barriers can create up to a 90% seal on open doors against a 15 mph wind. We supply our clients with an energy loss calculation using an ASHRAE formula to show what the client is losing in energy as well as what we can save them based on the amount of time the door is opened."

Hallihan feels there are numerous locations in the industrial building where it is important to prevent the infiltration of out-

side air into facilities. "This not only affects indoor temperatures but in some cases also affects manufacturing processes. When outside air infiltrates into a facility, it puts an instant demand on either the heating or cooling system. The installation of an air barrier helps to reduce the cycle time of those systems and thus reduces wear and tear on those units and saves facility energy."

Air curtains are often designed to start automatically when the physical door is opened and stop when it is closed. Often, conditioned warehouse facilities have rows of multiple bay doors. Where each of these is equipped with an air barrier, the indoor environment remains stable and comfortable, and temperature sensitive products and equipment are protected. Air curtains are available for doors in a wide range of sizes. Systems are available for openings as small as retail food takeout windows, or as large as aircraft hangar doors.

### Air Barriers Withstand Tough Environments

Standard models are typically constructed of a welded, powder-coated frame with a galvanized metal jacket. Manufacturers also

produce models for harsh, damp climates or areas that require a frequent washdown and need to be able to tolerate a wet environment. Other considerations in specifying an air barrier are building orientation to prevailing winds and the local climate.

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◆ Even relatively small office and retail doors that are frequently open can benefit from an air curtain installation.  
Photo courtesy Enershield.

◆ Long rows of loading dock doors can be individually protected with air curtains that switch on when the door is opened.  
Photo courtesy Enershield.

