

Berner International Corp.
Fairborn Equip. Co.



**Ohio Industrial Loading Dock
& Door Dealer Solves Food
Processor's Freezer Energy
Losses & Icing**

Vertical air curtain combined with existing high-speed roll-up door cuts thousands of dollars in monthly energy and maintenance costs.

Columbus, Ohio—When an eastern Ohio food processor sought to curb exorbitant energy losses and icing maintenance costs at its cold storage freezer doorway, industrial door equipment dealer Fairborn Equipment Co. of Ohio solved the green challenge with a customized air curtain installation.

Fairborn, a distributor of loading dock, industrial door and specialty industrial plant products, reviewed several technology options to solve its food manufacturing client's doorway energy and maintenance challenges.

The client had already installed a high-speed, insulated rollup door that reduced -5°F freezer air emigration and 60 to 95°F summertime ambient air infiltration from the shipping door area, which is 50 feet away. Despite the high-speed door, humid ambient air still infiltrated through the top of the 12 x 12-foot doorway during its hundreds of daily cycles. The greatest concern was a freezer temperature fluctuation of 8-degrees, which is unacceptable to the client's internal product quality, refrigeration equipment wear-and-tear and energy conservation standards.

The significant energy losses are no surprise according to the refrigeration standards handbook of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), which states that air infiltration in open doorways is the leading cause of increased refrigeration loads at cold storage facilities. Bob Hare, general manager of Fairborn's Columbus, Ohio office, estimated his client's energy losses combined with maintenance costs amounted to thousands of dollars per month.

Besides energy losses, humidity infiltration also required periodic ice removal from the ceiling-hung ammonia refrigeration system's piping, coils, valves and controls just inside the 20,000-square-foot freezer's doorway. The fire door roller tracks also were continually iced. Additionally, the potential for forklift accidents loomed due to icy floors near the threshold, which also required ongoing maintenance.

Options to Energy Loss Solutions

As a trusted vendor, the client relied on the expertise of the design and engineering departments of Fairborn as well as its air curtain supplier, Berner International, New Castle, Pa. Fairborn began as a dock seal and shelter manufacturer in the 1970's and later became a full-line loading dock and door solution dealer by adding brands such as Rytec, Jackson, Wis., PowerAmp, Germantown, Wis., DLM--div. of Systems Inc., Malvern, Ark., Wildeck, Waukesha, Wis., and Berner.

One option Fairborn offered was a full perimeter door that re-circulates air horizontally. At a price of more than \$30,000 however, the full perimeter door was a cost-prohibitive retrofit. A more economical and equally functional option was a Berner 12-foot-wide, two-speed, 2,304-cfm Model VSB air curtain mounted above the doorway at one-fifth the cost. Like the full perimeter re-circulating air doorway, an air curtain is up to 80-percent efficient at separating two environments. Additionally, an air curtain and a rollup door combination--the latter which the client already had already purchased and installed--is a proven effective solution to energy losses in cold storage freezer applications.

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Custom Engineering a Solution

To eliminate the need to cantilever the air curtain away from the high speed door mechanism, Berner recommendation was to install the air curtain vertically. Because the unit was originally designed for horizontal mounting, Berner's engineering department modified the air discharge nozzles to produce a thinner, higher velocity air stream, so that the air curtain reaches the volume, velocity and uniformity required to seal a doorway. The modification helps minimize doorway air balance issues between adjoining rooms with significant temperature differentials that are inherent in cold storage facilities.

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The freezer door activation is now executed with the following sequence:

- A Falcon motion sensor, manufactured by BEA, Pittsburgh, Pa., detects an oncoming forklift and activates the air curtain, which needs one second to ramp up to full air velocity.
- A second Falcon sensor activates the rollup door, which opens after the air curtain is at full velocity.
- After the forklift passes through, the door closes and the air curtain shuts off one second later.

The result of the air curtain installation has reduced the 8-degree freezer temperature fluctuation to less than 2-degrees. Subsequently, ice maintenance costs have been significantly reduced and the potential for slippery floors has been eliminated.

Most importantly, Fairborn is realizing an energy and maintenance cost reduction of thousands of dollars per month. Managing better environmental separation at the freezer entry has also prolonged refrigeration equipment lifecycles by cutting back on operational wear-and-tear. The cost of the project is equally impressive for the client because the payback on the air curtain is less than one year, according to Hare.