

Report

A quick guide to cold store logistics

Cold stores and more commonly temperature controlled zones are an essential part of the supply chain in the food & beverage and pharmaceutical industries. Be it meat, vegetables, fish, dairy items or indeed medicine, the products have to be stored, retrieved, sorted or picked in a temperature controlled zone. Without doubt this is an expensive affair to manage and so the correct design and equipment should be considered in order to provide a safe and productive operation. At an age where building and energy costs come at a premium, cold store plan and design should be looked at in great depth in order to keep these high costs to an absolute minimum. Furthermore working in environments of -20 C and below can easily hinder productivity in which case exposure to these extreme temperatures by your staff should be kept to a minimum. Below we will examine a few basic principles with regards the design and operations of these environments.

What is a temperature controlled zone?

A temperature controlled zone is no more than a room enclosed in insulated panels (thickness varying between 100-300 mm) and operating one or more freezer units inside the chamber, thus keeping the environment at the constant desired temperature. Access to this room is achieved by means of sliding panel doors which can also seal shut when the chamber is not in use by operators.

Typical temperatures in these areas comprise of:

Meat and pastry products @ -18 to - 20 C

Dairy products @ + 5C

Fish and vegetables @ -23 to -25 C

Certain pharmaceutical items @ +2 to +8 C

Order picking/ preparation zones @ 0 to +5C

Make no mistake; to maintain these temperatures in the most cost effective manner is not easy. Below are some pointers that will enable one to minimize building costs, maximize efficiency and at the same time minimize energy losses, which is undoubtedly the most important factor for anyone planning a cold store due to the high on-going expenditure involved.

Construct a marshalling area

It is common practice in cold store design to construct a chill room adjacent to the deep freeze chamber, which will enable staff to arrange and prepare orders in a more comfortable environment and outside of the typical subzero temperatures. Such rooms are usually maintained at around +5 C. It is important to remember that goods in this area have only a limited time available before they start to thaw out so order preparation should be fast and loaded onto the freezer trucks in a timely fashion. Typical time allowance for marshalling areas is about 30 minutes as allowed by HACCP.

Staff operating picking duties in deep freeze environments will not only be less productive, they will also be exposed to health hazards. It is more suitable therefore to have a dedicated driver in a forklift (preferably with a heated cabin) that operates in the deep freeze and feeds pallets to and from the order preparation area.

Note that for the safety of your staff it is advisable to have underfloor heating (especially around the entrance areas to the cold room) as ice build up would be common due to the condensation created from the temperature differences. High speed doors come in many looks and feels but they all have 2 things in common; their fast open/close speed, and long term durability when it comes to heavy usage. Installing a high speed door as an access from the marshalling to the freezer chamber is crucial, and can offer you invaluable cost savings to your operations.

High speed doors for cold stores are specially designed to operate in these severe temperatures. With the traditional 2 door solution, the operator opens the sliding door at the start of the shift and then operates the high speed door throughout the day's activities. These special doors are installed on the cold side and have in built heaters to avoid the build-up of ice. The motors and moving parts have cold resistant oils to stop them from freezing over.

The new generation door from Efaflex however can provide a single door solution combining high speed and almost hermetic sealing when closing. With this solution the single door is installed on the warm side. The video below shows details of this door and it is well worth the investment.

Many companies use the freezer's sliding freezer door as a means of going in and out during the daily operations. While this door may open somewhat quickly, energy is still wasted as most of the times the operator will forget or not be bothered to close the door behind him. One can imagine how much air loss this means when done

consistently throughout the day. A high speed door on the other hand will be programmed to close automatically the minute the operator passes through and hence he can focus on doing his work instead of having to remember to close doors. Furthermore, sliding freezer doors are not built for numerous open/close cycles and so their lifespan will be shortened considerably.

Another common feature is to see the use of PVC strip curtains in the chamber hatch. This is not as beneficial however as strip curtains do not seal the opening, wear very quickly and curl up at the ends due to the extreme temperatures. They will also accumulate large amounts of condensation and scratches from forklifts over time, hindering visibility and thereby increasing accident risks especially during high traffic periods.

High speed doors are a proven solution for temperature controlled logistics. They ensure the fastest access to the chamber and minimal opening time. Open/ close cycles can be achieved either by pull cord or automatic infrared or laser sensors that can in addition distinguish machine from person. In some instances, crash protection doors are also available making it easy to fit the door curtain back into the frame, on occasions when the forklift accidentally hits it and pops it out of its position.

With an average open time of about 2 seconds followed by automatic closing this means enormous energy savings throughout the day. But the benefits don't stop there; your products reach optimal temperature quickly, temperature fluctuation is minimal and the compressor units don't have to work as hard to maintain constant temperatures. Multiply this daily throughout your year and the door pays for itself very quickly!

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