

By Gabriel Gutierrez, Sales Manager Latin America Region, Colmac Coil Manufacturing, Inc.

### REVERSIBLE AIR FLOW EVAPORATORS

The cooling and freezing of food is one of the most important applications of refrigeration. The process of cooling and freezing food effectively reduces the activity of microorganisms and enzymes, slowing deterioration. Furthermore, the crystallization of water reduces the amount of liquid water in food and inhibits microbial growth (Heldman 1975). The majority of food refrigeration and freezing operations use blast freezers in a batch process, while a number of products are cooled or frozen by spiral, fluidized bed, or plate freezers.

Colmac Coil has been manufacturing evaporators for applications in chillers and freezers since 1971, as both complete units and also bare evaporators for install in spiral freezers and fluidized bed tunnel freezers. Working with the needs of clients and designers of refrigeration systems, Colmac Coil developed a line of Reversible Air flow Evaporator Units. The great advantages and benefits that the equipment offers has led to its extraordinary demand from facilities freezing fish, meat and prepared foods.

Traditional Blast Freezers use an evaporator placed in the top half of the freezing chamber with the cooling air flowing one direction the entire time. The result is a longer freezing time and a variation in product quality based on its placement in the freezer. Product the furthest from the air entrance takes much longer to freeze and results in lower quality.

The Reversible Air Flow Blast Freezer designed and manufactured by Colmac offers a number of advantages in the process of cooling and freezing:

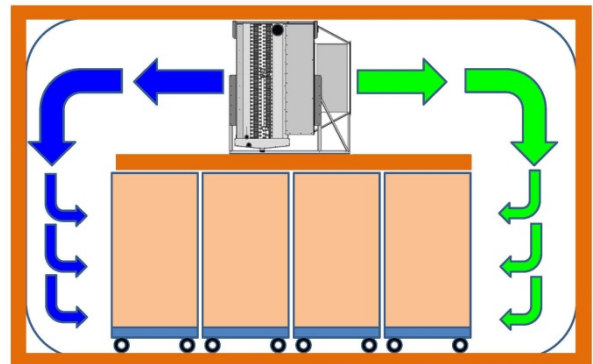
- Shorter freezing times
- Reduced power consumption of the evaporator
- Reduced power consumption of the refrigeration system
- Uniform quality of frozen product throughout the batch
- Reduced defrost cycles required to clear the coil of frost

#### Principle of Operation

The design of Reversible Air Flow evaporators allows the fan motors to operate fully in two directions of air flow, i.e. forced (**blow-through**) or induced (**draw-through**). This allows the rows of products that are initially in the back of the freezer to be switched to the front, reducing freezing time once the direction is reversed.



Reversible Air Flow Evaporator



**Diagram of Reversible Air Flow Freezer**

Blue indicates blow-through air flow  
Green indicates draw-through air flow

## Capacity Expansion Project, Baja Marine Foods - Ensenada, Mexico

Baja Marine Foods is a subsidiary of Tri-Marine Fish Co. of San Pedro, CA. It engages in the production and marketing of sardines, calamari, and other small fish. These products are frozen whole for domestic and international markets, primarily for human consumption. The project added 4 new Reversible Air Flow freezers and retrofit 4 existing freezers to this technology. The new Reversible Air Flow freezers have shown a better ability to freeze product, with a decrease in freezing time of 20%. This represents a substantial energy savings, cost reduction and improvement in product quality.

Mr. Adrian Gutierrez, General Manager, said: "This technology was chosen based on our many years of experience in freezing our products and we have seen that the design offered by Colmac has resulted in shorter freezing times, and consequently in cost savings and better quality. We are very pleased with the results and we plan to continue using the technology of reversible air flow in our upcoming projects. "



Draw-through Air Flow Direction



Blow-through Air Flow Direction

For more information, please contact Colmac Coil Manufacturing, Inc.  
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