

REVERSING AIR FLOW EVAPORATORS

Traditionally blast freezing and cooling cells have been designed with airflow moving in one direction only through the product. Research at Colmac Coil using Computational Fluid Dynamics (CFD) software validated by field experience has shown dramatic improvements in both freezing time and product quality when designing for reversing airflow through the product during the freezing (or cooling) cycle. Using recently developed fan blade technology, Colmac offers evaporators with the ability to effectively move air through the product in alternating opposite directions. This new fan technology is cost effective and can be applied to most A+Series™ evaporator configurations.

Using CFD modeling, Colmac engineers can accurately predict airflow patterns and air pressure drop through the product in your facility to optimize the design of your blast freezing or cooling cell. Using reversing airflow evaporator technology has shown freezing times can be reduced by as much as 20% and finished product temperature variations can be reduced to as little as + or - 0.5 deg C.

Reversing Airflow Evaporators designed and manufactured by Colmac offers a number of advantages in the process of cooling and freezing:

- Shorter freezing times
- Reduced evaporator power consumption
- Reduced compressor power consumption
- More uniform temperature and quality of frozen product
- Reduced number of defrost cycles required

Principle of Operation

The design of Reversing Airflow evaporators allows the fan motors to operate fully in two directions of air flow, i.e. forced (**blow-through**) and 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.

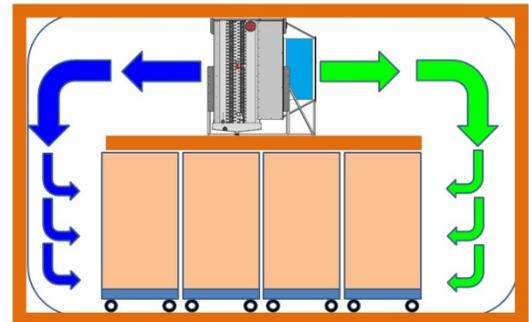
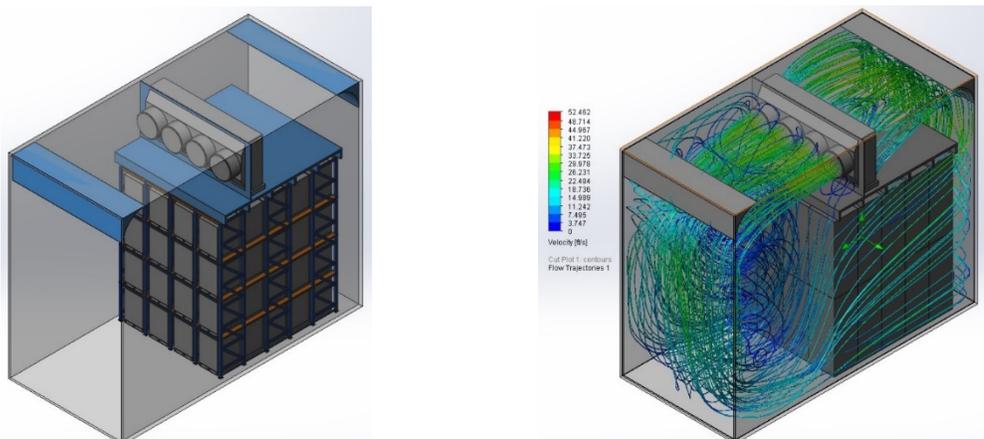
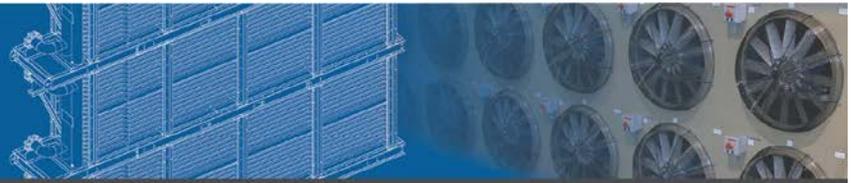


Diagram of Reversing Air Flow Freezer
Blue indicates blow-through air flow
Green indicates draw-through air flow

CFD Analysis

Colmac can assist you with CFD modeling of your blast cell to predict airflow patterns and fan power requirements.





Technical Bulletin

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 Reversing Airflow retrofitted 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.



Reversing Airflow Evaporator

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, operating cost savings, and better quality. We are very pleased with the results and plan to continue using the reversing airflow technology in our upcoming projects. "



Draw-through Air Flow Direction



Blow-through Air Flow Direction

For more information contact Colmac Coil Manufacturing, Inc.
www.colmaccoil.com | P: 800.845.6778 or 509.684.2595
 P.O. Box 571 | Colville WA 99114-0571
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