ICERACK™
Resiliency for Refrigeration

A PRODUCT OF: MichaelsEnergy

IMPROVING BLAST FREEZER PERFORMANCE with IceRack™

PROJECT SNAPSHOT

- Application: Blast Freezers
- Facility: Food Manufacturing Plant
- Refrigeration System: Ammonia-Based
- Technology: IceRack™ Thermal Energy Storage
- PCM Format: 40 x 48 in pallets (~800 lbs each)
- Cooling Capacity: 99,000 Btu per pallet

THE CHALLENGE

Blast freezers operate under highly variable conditions. When warm product is loaded, room temperatures can rise quickly, and frequent door openings introduce large transient heat loads. These rapid load changes can reduce refrigeration efficiency, increase compressor demand, and extend freezing cycles.

A food manufacturer wanted to evaluate whether thermal energy storage could help buffer these transient loads and improve blast freezer performance.

THE SOLUTION

A pilot project installed PCM thermal storage pallets in front of the evaporators inside two blast freezer rooms. Positioning the pallets in the return-air path allowed them to absorb heat and moisture before that load reached the evaporator coils. Because the system operates passively, it required no changes to existing refrigeration controls, defrost sequences, or room setpoints.

This configuration allowed the thermal storage to respond immediately during door openings and loading events, helping stabilize freezer conditions during peak loads.

RESULTS

- **5–12°F**
  Colder Evaporator Coil Operation
- **25–35°F**
  Return-Air Cooling During Door Openings
- **Up to 18 Tons**
  Transient Refrigeration Load Absorption
- **~27 kW**
  Estimated Compressor Demand Reduction
- **12,000–20,000 kWh**
  Estimated Annual Energy Savings per Freezer

Operational testing showed significant cooling impact during loading events. Testing also indicated the potential to shorten blast cycles by approximately 5–10% by delivering colder air to the freezing process sooner.

KEY TAKEAWAY

This project demonstrates that **IceRack™ thermal energy storage can improve process refrigeration performance, not just shift energy loads.** By buffering transient heat loads during product loading and door openings, the system can stabilize freezer operation, reduce compressor demand, and potentially improve freezing throughput - all without requiring changes to existing refrigeration controls.

Explore more at MichaelsEnergy.com/IceRack