Comprehensive Services for Transcritical CO2 Cold Storage Freezer Facility

To support the company's objective of slashing emissions by 50%.

A pet food manufacturer faced a storage space shortage for both raw materials and finished products at one of its U.S. manufacturing plants. To address this, the company opted to build an 824,000-square-foot distribution facility with a 120,000 square-foot racked storage freezer, refrigerated cold dock and CO_2 cold storage facility nearby.

CoolSys Services:

We helped them each step of the way, including:

- ☑ Turnkey refrigeration and refrigeration control design
- ☑ Freezer slab frost-heave prevention design
- ☑ Project Management
- ☑ Startup
- ☑ Ongoing preventative maintenance

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The Problem:

The pet food manufacturer faced four primary challenges:

1. **They needed help designing and managing the construction of the distribution and cold storage facility's 120,000-square-foot freezer with space for nearly 15,000 pallets and a 12,000-square-foot refrigerated cold dock.**

2. **The project had to meet federal, state and local regulations, adhere to AIB food standards, and conform to FM Global design guidelines.**

3. **Implementing energy-efficient measures and selecting refrigerants with a low global warming potential (GWP) was imperative to decrease greenhouse gas emissions, supporting the company's ambitious objective of slashing emissions by 50% by 2030.**

4. **The manufacturer's in-house technicians lacked expertise in the latest, high-end industrial systems.**

The Solution:

Leverage CoolSys' team experience to bring this custom solution to life.

CoolSys leveraged its teams of Professional Engineers, Program Managers, Sustainability Experts, System Installation, Start up and Maintenance teams to tailor a comprehensive solution that solved each of the customers problems.

CoolSys Energy Design (CED) engineered the freezer and cold dock to safely move and store raw materials and finished products while maintaining a -10°F temperature in the freezer space. The team's comprehensive engineering drawings satisfied stringent safety design standards for the facility and enabled maximum racking and pallet positions.

CED's design incorporated a CO_2 refrigeration system — a natural refrigerant solution that satisfies the customer's operational requirements and environmental goals.

System Specifications Included:

- Two packaged CO_2 refrigeration systems with minimal footprints, providing close-coupled systems to handle the required refrigeration load while minimizing pipe run lengths. The refrigeration system installation utilized stainless steel refrigeration piping and polyiso insulation.
- Two industrial CO_2 outdoor packaged systems (120/90 bar design) and two adiabatic gas coolers (one per rack), providing approximately 400 tons of refrigeration.
- Large-capacity transcritical reciprocating compressors and variable frequency drives for capacity control.
- A freezer slab frost-heave prevention system utilizing heat recovery from the CO_2 discharge gas, as opposed to a more energy-intensive boiler-based system.
- An integrated central control system with distributed evaporator control panels, enabling advanced control integration and remote interfaces to enhance operability and visibility.

The CoolSys Program Management team successfully conducted the equipment RFP for the client, overseeing procurement, delivery and installation of the transcritical CO_2 systems, adiabatic gas coolers and advanced control systems. Despite facing delays from other trades, the team adeptly rearranged non-essential construction tasks, ensuring the project's timely completion.

Gas cooler installation

CoolSys Energy Solutions installed and tested the controls and set the alarm parameters to ensure that the overall refrigeration system's energy consumption could be initially and continuously optimized while safety systems and alarming could continue to be supervised, as required.

Furthermore, CoolSys managed the refrigeration system startup, overseeing the commissioning and warranty processes.


Remote defrost panels

The Impact:

A satisfied manufacturer with plans for future upgrades.

CoolSys provided a one-stop source for a broad array of services the pet food manufacturer required to complete its design-build project, executing all tasks within the agreed-upon time and budget. Furthermore, CoolSys' team of expertly trained CO_2 technicians takes charge of the systems' preventative maintenance and continuous repair to guarantee peak performance, easing the customer's in-house technician workload.

The pet food manufacturer, impressed by CoolSys' work, is now considering utilizing CoolSys' comprehensive solutions to upgrade its manufacturing facilities across the U.S.

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Project Highlights:

CoolSys coordinated it's wide network to bring this vision to life.

- ☑ OEM equipment RFP
- ☑ Project completed on time and within budget
- ☑ Ongoing systems maintenance

To learn more about CoolSys' food manufacturing and cold storage solutions or to get a quote for an upcoming project, scan the QR code or visit the link below.

CoolSys.com/Markets/Industrial

END TO END MANAGEMENT

Engineering Teams	General Contractors
Individual Trades	Design Teams
OEM Teams	Installation Teams
Startup Teams	Commissioning Teams

2 TRANSCRITICAL CO2 SYSTEMS

- 690 HP System 1
- 510 HP System 2

24 EVAPORATORS

- 20 in Freezer
- 4 in Cold Dock

CUSTOM ENGINEERING

REFRIGERATION + REFRIGERATION CONTROLS

C02 SYSTEMS + EMS CONTROLS

Installed	Started
Tested	Comissioned

132,000 SqFt TOTAL FOOTPRINT

- 120,000 SqFt Freezer
- 12,000 SqFt Cold Dock