

# Cold storage warehouse takes advantage of low ambient temperatures

## Result

- Floating head pressure system allows saturated condensing temperature to drop down to 60°F.
- Calculated payback due to energy savings of \$600,000 over 30 months based on four condensing units with a total of eight Copeland Discus™ compressors.
- R-404A refrigerant charge cut by 60%.
- Low pressure drop system architecture keeps compression ratios low and attributes lower life cycle cost of equipment.
- No service calls in the first seven years of operation.

## Application

Blast freezing operation and cold storage warehouse.

## Customer

Oxford Energy Solutions (OES), a leading commercial, industrial and agricultural HVACR service company in Ontario, Canada. The end user is a commercial blast freezing and storage warehouse operation also located in Ontario.

## Challenge

Blast freezing and cold storage warehouses are an important part of the food distribution network that supplies grocery stores, restaurants and institutional facilities. Perishable food must be delivered fresh or frozen, with food safety as the top concern. The refrigeration load on a warehouse can vary greatly, while operators focus on operating costs, efficiency and performance.

Storing millions of pounds of perishable food on a daily basis demands a reliable and efficient refrigeration system. Because refrigeration is such a large operating expense, the cold storage warehouse operator wanted to ensure that the refrigeration systems were running at peak efficiency. They called in OES to assess the refrigeration systems. After investigating, OES determined that equipment upgrades with the use of Copeland Discus™ and Emerson EX valves would yield quick paybacks through energy savings.



*"The Copeland Discus™ compressors and Emerson EX valves made the start up a breeze. It only took us 2 hours to complete the start up and commissioning on the four new systems. Everything ran great from the start. We immediately saw a lower amp draw compared with other equipment. We also liked the streamlined look of the new Copeland Discus compressors."*

– Ben Kungl, Oxford Energy Solution Inc.



## Solution

The new Copeland Discus compressor was recently launched by Emerson Climate Technologies for larger refrigeration systems. When Oxford Energy Solutions brought the cold storage warehouse opportunity to Emerson's attention, a field trial with the new compressor was recommended.

Emerson's engineers knew the large Copeland Discus refrigeration compressor would be a perfect candidate for this location in Canada because of its ability to float head pressures down to 60°F SCT (saturated condensing temperature). Refrigeration systems must be sized for worst-case conditions on the hottest day of the year, but rarely operate at these ambient temperatures. The ambient temperature in Ontario is 60°F or colder 80% of the year. The key to cutting annual electricity consumption is to ensure that the refrigeration system is running at peak efficiency when the outdoor temperatures drop.

The result of floating head compared with conventional systems running at a minimum 110°F SCT, is significant energy savings. The end-user's calculated payback due to energy saving by operating at a minimum of 60°F SCT with 8 new Copeland™ 6D compressors is \$600,000 over 30 months. The excess compressor capacity from operating at lower condensing also allows for faster pull down time. The end user was able to double his annual blast freezing volume thereby significantly improving his profitability. The key to being able to operate efficiently at varying head pressures is the Emerson EX electronic valves and EC3 controls. It has ability to optimize the evaporator's performance under all operating conditions.

The Oxford Energy Solutions **low pressure drop** system architecture allows for reduced system complexity thereby lowering the expected equipment life cycle cost. Another benefit was a 360 pound reduction in R-404A refrigerant. Usually 600lb, this system only uses 240 pounds. At a refrigerant cost of \$18 per pound, this was an up-front end user capital cost savings of over \$6,000.

The end user is extremely satisfied with the OES design utilizing Emerson solutions and expects a long, trouble-free lifetime for the product.



## Resources

Learn more about Emerson Cold Chain solutions at:  
[Emerson.com/ColdChain](https://www.emerson.com/ColdChain)