

Emerson helps equipment manufacturer achieve ENERGY STAR requirements



Result

- Standalone, reach-in freezer optimized and tested with Emerson components and controls
- System efficiency increased by 13% by replacing fixed speed compressor with variable speed solution
- Compressor cycling reduced by 90%
- Compression ratio relaxed by as much as 43%
- Manufacturer exceeds ENERGY STAR performance levels
- Future-proof, low-GWP natural refrigerant

Application

Testing and optimization of a two-door standalone, reach-in freezer

Customer

A major U.S. refrigerated foodservice equipment manufacturer

Challenge

Tougher energy efficiency regulations have left many manufacturers struggling to improve system performance. Some of the most stringent energy requirements fall on refrigerated foodservice equipment, such as standalone refrigerators and freezers. Many original equipment manufacturers (OEMs) have already incorporated high-efficiency component options such as high-efficiency condensing units and electronically commutated evaporator fan motors (ECM). In addition, many OEMs want to achieve ENERGY STAR performance to compete in the market. This leaves few cost-effective design options remaining.

This standalone, reach-in freezer with two solid doors was a popular model, but changing energy expectations had made the design non-competitive with other freezers on the market. The system was already leveraging high-efficiency R-290 refrigerant. Emerson's test labs have confirmed that R-290 yields more than 20 percent average energy-efficiency

improvements compared to R-404A, a commonly used hydrofluorocarbon (HFC) refrigerant targeted for phase-down.

Solution

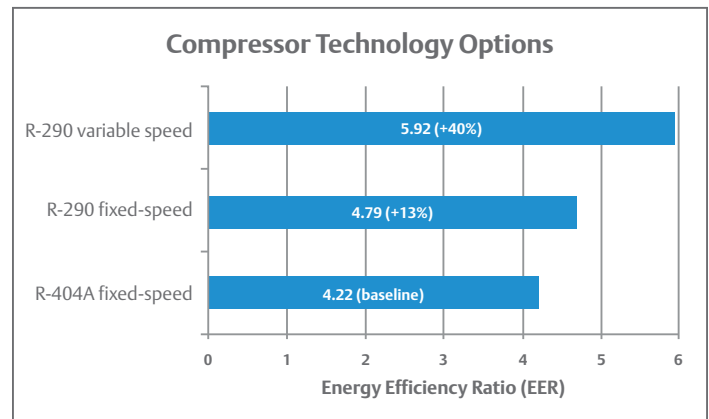
Emerson was able to test and optimize a two-door standalone, reach-in freezer in just a few weeks. The lab first ran a CEC-400 Baseline Energy Efficiency Test and also tested to ASHRAE 72 / ARI-1200 Standards as well as 10CFR Section 431.64. The lab carefully collected data over a 24-hour period and reported on energy, temperatures, and pressures. Then, our engineers analyzed the data and compared the results to the energy standards such as CEC, ENERGY STAR, and NRCan.

The reach-in unit that we recently tested failed to meet current ENERGY STAR requirements, and just barely met federal DOE energy efficiency requirements. A drop-in R-290 variable speed compressor and drive significantly improved energy efficiency. The result was a 13% reduction in energy savings and a unit which passed ENERGY STAR standards.

Precise temperature control and significant energy savings are now available with Copeland™ variable speed reciprocating hermetic compressors. Building on the field-proven Copeland reciprocating hermetic compressors platform, the variable speed compressor and drive delivers superior cooling and energy efficiency in scientific, medical, industrial, foodservice and food retail applications.

Copeland reciprocating hermetic compressors provide cost-effective solutions to systems requiring a wide range of evaporating capability. More than 300 models of variable speed and fixed speed compressors are available from Emerson including low-, medium-, and high-temperature models for foodservice, ice machines, soft serve machines, frozen carbonated beverage machines, air dryers and beverage dispensers.

The new design reduces annual power consumption by 13%. The natural refrigerant has an ultra-low global warming potential (GWP) of 3. The compressor cycles on and off less, which reduces wear and tear on components. Freezer temperature can be held precisely after a fast pulldown.



Note: * Capacity shown at low temperature -10/110 rating point. Variable speed at 3900 RPM for comparison. Compressor capacity range is 1600-5000 RPM.