

# Pharmaceutical company eliminates HFCs with low-charge ammonia approach

## Result

- Factory-engineered and assembled packaged refrigeration system
- Low ammonia refrigerant charge (less than 500 pounds for 478 tons of refrigeration)
- Lower on-site assembly costs
- Time saving installation and commissioning
- Refrigerant is confined to packaged refrigeration system, and not to operation spaces
- Space saving compact design
- Factory warranty
- Part-load efficiency performance guarantee

## Application

400 horsepower pharmaceutical processing chiller using low charge of natural refrigerant.

## Customer

The Roche group is the world's sixth-largest healthcare company whose principal businesses are pharmaceuticals and diagnostics. It is active in over 150 countries and employs around 62,000 people worldwide.

## Challenge

Roche started a corporate initiative to eliminate HFC refrigerants and seek green refrigerant solutions. They wanted a refrigeration system that was not only environmentally-friendly, but also energy-efficient.



*“Certainly I made a great selection by choosing Vilter as my chiller provider. Everyone was very knowledgeable and very open. To me it is very important to do business with the best and I think your product is among the best there is; but more so, I value doing business with good people and you all demonstrated that to me.”*

Ruben Hernandez, Roche operations  
Ponce, Puerto Rico

When working with ammonia refrigerant, Roche wanted to hold refrigerant charges below 500 pounds in packaged refrigeration systems.

Power is very expensive on the island of Puerto Rico, and the chillers needed to run very efficiently even when unloaded. Roche wanted the package supplier to issue a performance guarantee, and planned to validate the part-load performance through carefully monitoring.

## Solution

Emerson worked with Roche to build a refrigeration package that uses a low refrigerant charge (about 1 lb/ Ton of refrigeration) that improves safety and reduces certification costs. The whole system was factory built and ready to operate when it delivered to the site. Ready to operate packages like this allow simultaneous construction of the site foundation and equipment, saving time and reducing lead time. The jobsite installation costs are considerably less than field erected chilling systems.

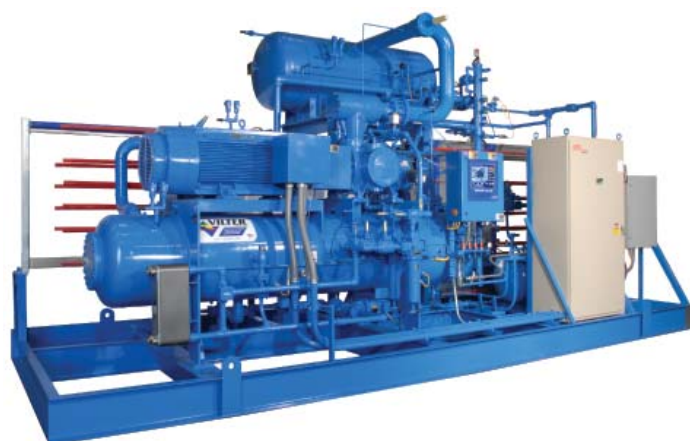
By using ammonia, Emerson's compressor technology solution offered Roche a refrigerant that has a good environmental profile (non-ozone depleting and zero global warming impact) and provides superior performance benefits. In addition, the balanced radial and axial force design of the single screw compressor reduces stress on the unit's bearings, resulting in very low operating and maintenance costs while delivering a performance unachievable with any other type of compressor.

The symmetrical design of single-screw compressors allows parallel capacity and compression ratio slides. This primary advantage over twin-screw compressors allows single-screw compressors to independently control capacity and compression ratio, allowing the system to operate at optimal efficiency at full load and part-load conditions. Part load efficiency on single-screw systems can be further improved by application of variable speed drivers in large compression ratio applications, but is unnecessary for compression ratios below 6.0. Performance of the single screw can be optimized in high compression ratio applications with large dual economizer ports. These allow much greater flow rates into the machine for improved COP efficiency and can be used to allow the compressor to pull in intermediate temperature loads from other sources.

Single-screw compressors benefit from balanced forces around the main rotor. Balanced axial and radial forces offset one another so that, effectively, the only net force on the main rotor of the single screw compressor is gravity. The low bearing loads result in long compressor life and high reliability. Vilter is able to offer a fifteen year bearing warranty. As a result, operators can greatly reduce maintenance costs by avoiding costly bearing replacements and downtime events.

## Resources

Emerson's Vilter single screw compressor technology is proving extremely adaptable in meeting the needs of other customers seeking increased performance efficiency. For example, a candy manufacturer in Europe is using Emerson's Vilter single screw compressor in a refrigeration application to cool chocolate while capturing the extracted heat to warm water to 140°F to separate the chocolate from the shaping molds. It's just another way Emerson technology is helping customers around the world operate their businesses in a more energy efficient and environmentally sound manner.



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