Prioritizing Performance

Vilter™ single screw compressor delivers reliable performance and low maintenance for European food manufacturer

Background

For a leading European provider of frozen bread, puff pastries, donuts and a variety of high-quality snack foods, its Lithuanian production facility is home to one of the most modern bakeries in the Baltic states. Combining the best techniques of making 100 percent natural bread, the goals of the facility are to produce the finest, most delicious offerings across their various product lines and consistently exceed customer expectations.

Industrial-grade refrigeration is essential to their production capabilities. In Europe, where environmental compliance and corporate sustainability initiatives drive refrigeration selection, systems that utilize carbon dioxide (CO_2) and ammonia (NH_3) are preferred for their low-global warming potential (GWP) technologies. To meet these criteria, the company had installed an industrial CO_2/NH_3 cascade refrigeration system. It features four Vilter ammonia compressors on its high side, and two other reciprocating CO_2 compressors on its low side.

Over time, plant managers observed that the cascade refrigeration system began to develop a variety of issues related to the CO_2 compressors. Plant managers collaborated with Emerson and a Vilter distributor/contractor partner, Genys, to design a system upgrade that would deliver much-needed reliability and performance improvements. The core of the upgrade was Vilter's new high-pressure, low-displacement, single screw industrial compressor, which was more than capable of handing the pressure demands of the CO_2/NH_3 cascade system.

Challenge

Since the time of the plant's original refrigeration system commissioning, the reciprocating CO_2 compressors had required significant maintenance. Plant managers had to plan production around preventative maintenance schedules that were required twice a year, each of which could take up to five days. But it was the unplanned emergency repairs that began to cause more frequent disruptions to production.

The culprit of a persistent maintenance problem was an oil carry-over issue in the reciprocating CO_2 compressors. But even after taking steps to mitigate this, the reciprocating compressors required excessive maintenance. The system

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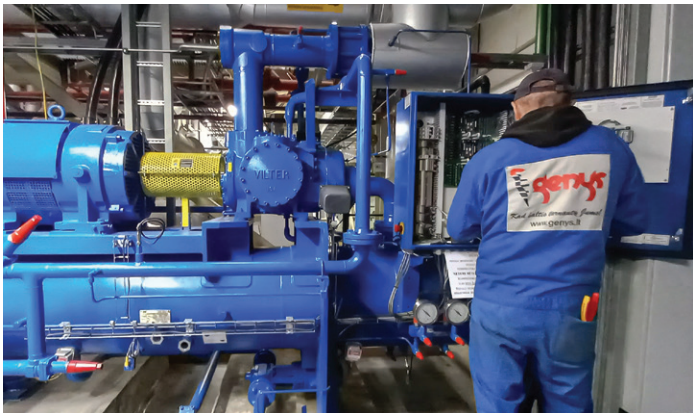
also suffered from a faulty capacity control mechanism, which prevented it from matching fluctuations in refrigeration load and performing optimally. Because of these persistent problems, plant managers started exploring ways to upgrade their refrigeration system.

Four Vilter ammonia single screw compressors were used on the high side of the plant's CO_2/NH_3 cascade refrigeration system. Throughout Europe, its simple and effective design had earned a reputation as a durable compressor requiring minimal maintenance. Emerson worked closely with Genys and the plant managers to deploy a similar approach for the low side of the system, based on the capable CO_2 Vilter single screw compressor.

Solution

Emerson and the Genys implementation team were eager to demonstrate how the Vilter CO_2 single screw compressor could deliver increased reliability, superior performance and environmental sustainability — while requiring much less maintenance. Within months of completing the installation, the solution had already achieved the team's desired results.



Because of its higher capacity, one Vilter CO_2 single screw compressor replaced the existing two reciprocating CO_2 compressors. In fact, the cooling capacity of a CO_2 single screw compressor is 830 kW at -40 °C (-40 °F) evaporation and -7 °C (19 °F) condensation temperatures — nearly doubling the capacity of its predecessors. Ideal for subcritical CO_2 applications, the Vilter CO_2 single screw compressor now serves as a reliable anchor for the low side of the system.

The system still uses the original four Vilter ammonia compressors on its high side. For added reliability and continuity during scheduled maintenance, the system was designed to repurpose the previous reciprocating CO_2 compressors in a backup role.

Results

Since completing the system upgrade in late 2021, the production facility has enjoyed reduced maintenance demands, thanks to its new Vilter CO_2 single screw compressor. It has more than 1,500 runtime hours and is now delivering much higher reliability and performance. According to Mindaugas Zabiela, Genys CEO, the Vilter CO_2 single screw compressor is proving to be an excellent, durable and substantiable alternative to reciprocating CO_2 units.

"We are proud to contribute to the customer's efficiency objectives while helping them to achieve their environmental sustainability goals with the first installation of a Vilter CO_2 single screw compressor in Europe," said Zabiela.

For more information about Vilter's CO_2 single screw compressor, please visit our website.