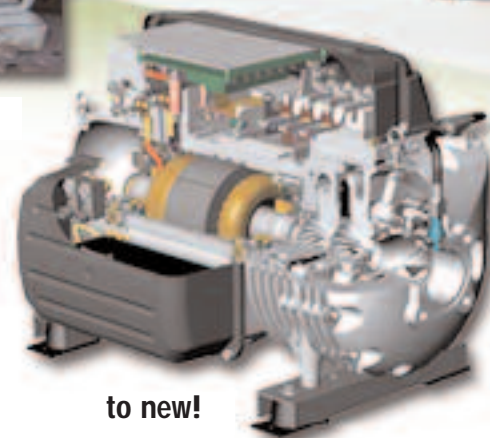


Advanced Compressor Technology Solves Retrofit Problem

Keith Sinclair had a problem. He owned an attractive and ideally located office building in South Pasadena, in Los Angeles County. The five-story building at 1499 Huntington Drive had 28,000 square feet of rentable office space, and Sinclair's goal was to keep it rented. But in recent years, a failing comfort system was causing occasional building cooling failures, and the rising costs of system maintenance were cutting into the profitability of the building. He needed a change. The solution he selected is one from which others in the same situation can learn and profit.



From old...



to new!

Aging Comfort Plant Causes Problems

This building is more than thirty years old, and the comfort system for the facility was a double-duct air conditioning system with DX cooling and two duct furnaces. The system was centralized in a penthouse equipment room which housed the DX cooling coils in an air handler, which in turn was served by two 40-ton Worthington reciprocating compressors. These were connected to a rooftop evaporative condenser. The compressors were at the heart of the problem. They had outlived their useful life, and were prone to frequent breakdowns. Further, even when they were operating, the energy costs seemed to be out of line with those in other similar buildings.

Sinclair went to the local office of ACCO, a large design-build mechanical contractor headquartered in Los Angeles, with whom he had dealt in the past. He asked Jacob Coble from ACCO to evaluate the situation and make recommendations. Coble says, "Keith told us to do a complete evaluation, to tell him what needed to be done to solve the comfort system problem. We made several recommendations." The first was to upgrade the conditioned-air delivery system, going from a constant volume system to a double duct VAV system, and to add an outside air economizer. The second was to replace the existing evaporative condenser with a new unit, equipped with a variable speed fan drive.

Looked at Compressor Options

But the most important recommendation was to get rid of the existing compressors and replace them with new equipment. Coble says, "New compressors were a given. We considered screw compressors, but were concerned about noise levels and vibration. That's when we started looking at the Turbocor compressor. We'd been learning about this technology and it seemed extremely promising."

"Keith Sinclair had established priorities for us," says Coble. "He wanted a solution that would have high efficiency, high reliability and would allow him to offer improved comfort to his tenants. With this in mind, the Turbocor seemed like a perfect fit." He notes that they specifically were looking for a compressor that would be simple to install as a retrofit. In this area also, the Turbocor got high marks with its small size and simple connections.

Extremely Compact and Lightweight

The Turbocor product is an extremely compact and efficient centrifugal compressor with an oil-free design. In recent years, it has been surprising engineers and designers with its high operating efficiency and low noise and vibration levels. It is available in a range of sizes upwards from 60 tons, and is remarkably small and light in weight. ACCO asked for recommendations from Dan Thatcher, Vice President of Aftermarket Businesses representing Turbocor in nearby Westlake Village CA. He was able to answer questions about product performance and sizing, and to discuss suitability for retrofit applications.

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For the Sinclair building, Thatcher recommended evaluating an 80-ton Turbocor unit, replacing the two existing 40-ton units weighing a total of 6400 lbs. Remarkably, the Turbocor compressor only weighed 265 lbs. The unit is a two-stage centrifugal compressor with an integrated variable frequency drive (VFD), and can achieve an IPLV under ARI conditions of less than .4 kW/ton. It would fit easily on just one of the two existing equipment pads in the mechanical room. Another benefit of the Turbocor product is that it uses R-134a as a refrigerant, and replaced the existing system which previously used R-22.

Coble indicates that the efficiency improvement of the Turbocor compressor over the existing reciprocating machine was critical to the sale. Coble said he was able to demonstrate that the conversion would pay for itself in less than two years in the energy savings alone. In addition, because the Turbocor compressor is oil-free, the maintenance costs were projected to be cut in half. "That made it very attractive to Keith Sinclair," he notes. In view of this evaluation, Sinclair approved going ahead with the project using the Turbocor product. Sinclair says, "I'm not a technical person and I relied heavily on the representations of ACCO Engineered Systems. At the time of my decision, I was impressed with the technology, it made economic and operating sense and I was convinced that my building would be a better product with Turbocor as a part of the retrofit equation."

Building Upgrade Went Quickly

Coble points out that the compressor replacement went very easily. "We had to do a little work matching pipe sizes and matching the building controls to the compressor, but that's normal in any retrofit." In addition to the compressor replacement, they also did the airside improvement and wrapped up the project in September 2003. Sinclair says the conversion went very painlessly. "It was very well planned and ACCO had the staff and talent level to execute this type of a major undertaking. The demolition, installation, piping and start-up were consistent with my schedule that had been prepared so there were no surprises for me or my tenants."

Sinclair noticed the results of the improvements right away. "First of all, the compressor is so quiet. It used to be that you had to shout at each other in the mechanical room. Now you can talk in a normal voice, and given the ongoing background noise of the equipment room, you can almost not hear the compressor run." He indicates that he is also very pleased with the performance of the new compressor. "When I'm in the equipment room, it's almost incredible to believe that something that small can cool the entire building." He has also noticed the combined impact of the improvements in his energy bills.

Major Energy Savings

In the six months since startup, the monthly energy usage in the Sinclair Building has declined by an average of 29%. Sinclair has been so pleased with the performance of the building that he is now offering an additional half-day of air conditioning to tenants on Saturdays at no extra charge. He also says, "The tenants have definitely noticed a change in the comfort level in the building. And now, especially on hot days, the reliability of the system is no longer suspect."

The required maintenance work on the Turbocor is also minimal, consisting mostly of an annual dusting of the electronic cards, and replacing a set of capacitors every five years. The low maintenance is a result of the machine being oil-free, and having but one moving part. While it may be a cliché, it is true: Simpler is better.

Throughout the country, there are thousands of buildings that face the same problems found in the Sinclair Building. The Turbocor compressor is only a part of the solution for buildings like this, but it can be an important part. The unit is suitable for a wide range of applications in both new buildings and in this retrofit market. For many owners, the conversion can be financed through the energy savings alone. The improved comfort and reliability comes along for free.

The Turbocor compressor is an exciting technology that provides solutions for hospitals and other health care facilities. To learn more about Turbocor, visit our Web site at www.turbocor.com.



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