Top Interview

YORK YMC² Chiller Realizes Lower Ownership Costs and Higher Efficiency

At the 2017 AHR Expo, Johnson Controls Inc. showcased many offerings. Among them, was the YORK YMC² chiller. JARN interviewed Laura Wand, vice president of global chillers, Johnson Controls Inc., to hear about the YORK YMC² chiller. The interview focused on the market acceptance and advantages of the new chiller along with the new refrigerant adoption.

Laura Wand, Vice President of global chillers

YORK YMC² chiller

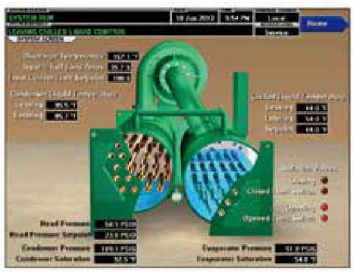
JARN (J): More than six years have passed since Johnson Controls introduced the YORK water-cooled, oil-free, magnetic bearing centrifugal chiller, the YMC². How is customer acceptance of this chiller?

Laura Wand (W): We have seen tremendous growth in the lubrication-free magnetic bearing market over the past few years. Many customers are repeat buyers who have experienced the benefits of reduced energy consumption and reduced maintenance after the installation of their first YMC² chiller. We also see large organizations install YMC² chillers in multiple locations after a single site realizes the total cost of ownership savings from YMC² chillers.

J: What are the most valued benefits of the YORK YMC² chiller for customers?

W: Every site and customer is unique, but the many benefits of the YMC² chiller appeal to a wide range of customers. YMC² chiller customers understand that purchasing a water-cooled centrifugal chiller is a significant investment as this equipment lasts over 25 years. When performing a life-cycle cost analysis to account for first cost, operating/energy costs, and maintenance costs, the YMC² chiller consistently demonstrates significant savings compared to other chiller technologies.

In addition to valuing the lowest total cost of ownership, customers also value the ability of the chiller to handle a wide range of operating conditions without nuisance trips or the need to modify the control strategy of the building at high or low tower water temperatures from the range of 100% to 10% chiller load.



The YORK OptiView Control Center enhances chiller performance

J: What is the product cost of a magnetic bearing chiller as compared to a conventional centrifugal chiller?

W: Although there is a premium first cost for magnetic bearing chillers, the better discussion to have around cost is total cost of ownership – considering first cost, operating/energy costs, and maintenance costs. The YORK YMC² chiller with its high efficiency and low maintenance due to no lubrication and fewer moving parts means it has a lower total cost of ownership. In many cases, payback is less than a year for YORK YMC² chiller owners.

J: Last year, Johnson Controls extended the capacity range of the YORK YMC² chiller up to 1,000 USRT (3,500 kW). Are YMC² chillers sold as a mainstream centrifugal chiller?

W: Yes, the YORK YMC² chiller capacity was extended to cover a total range of 165 to 1,000 USRT (580–3,500 kW) to meet market demand for these highly efficient chillers in larger capacity facilities. Where overlap exists, the YMC² chiller is often chosen over more traditional oil or refrigerant lubricated bearing chillers. The benefits of high efficiency, a wide operating map, reliability, and low sound levels make the YORK YMC² chiller a top choice.

J: Compared to traditional oil bearings, magnetic bearing technology is relatively new to chillers. What hurdles were overcome to apply this technology in a chiller?

W: Since the late 1990s we have successful installations in the petrochemical industry with the YORK industrial OM chiller product line using magnetic bearings. As of 1998, through YORK Navy Systems, we have used magnetic bearing technology in over 125 mission critical naval applications throughout the world. We have also partnered with a manufacturer that has been designing and selling permanent magnet motors and magnetic bearings for over 50 years in various applications throughout the world. The reason this technology has become mainstream over recent years is mostly due to commercialization of the design and the reduction in first cost of the magnetic bearing technology which significantly reduces the payback period.

J: Kindly tell us about the features of YORK magnetic bearing centrifugal chillers as compared to those of magnetic bearing centrifugal chillers that have been released by other manufacturers?

W: Beyond our superior energy efficiency and sound levels, the feature our customers are most excited about is the greatly expanded operating map versus other magnetic bearing chillers in the market and conventional oil lubricated chillers. The YORK YMC² chiller has the ability to operate at a wide range of load and head conditions with ease. This chiller maintains smooth operation at high and low loads where other manufacturers are not able to operate or must implement building automation control strategies to limit the range of tower water or system flow through the machine. It has the ability to run inverted, which is sometimes called 'running upside down'. It means it can operate when entering condenser water temperatures are below the leaving chilled water temperature. This extended operating map means the YMC² chiller can meet specific requirements of customers and also achieve very high efficiency values, as low as 0.1 kW/ton at part load. This wide operating range allows the YMC² chiller to be over 80% more efficient than a similar constant speed chiller at the same part load capacity. The YMC² chiller can actually replace the need for a waterside economizer, by utilizing its ability to operate at very low entering tower water temperatures at extremely low kW/ton values.

The YORK YMC² magnetic-bearing technology enhances chiller's durability

J: Centrifugal chillers seem to differ in specifications depending upon regions in which they are installed. Where is the YMC² chiller available?

W: The YMC² chiller is a global product available in all regions. It was recently launched in the Middle East to round out the global availability of the chiller product line. The YMC² chiller is manufactured in multiple Johnson Controls' facilities around the world. Each region has its specific design requirements to meet or exceed local safety or efficiency standards and the YMC² chiller was designed to be compliant with all application requirements across the globe.

J: Have you any intention to develop air-cooled magnetic bearing chillers?

W: We are always researching, testing, and considering new designs for our YORK chillers to meet and exceed our customer's expectations. At this time we are not offering air-cooled magnetic bearing chillers due to the nature of the air-cooled market and its operating conditions. We find that variable speed screw compressors are the best suited technology to meet the lift requirements that air-cooled chillers typically demand, while delivering high efficiency.

J: Johnson Controls has announced that the new low global warming potential (GWP) refrigerant R513A is compatible with the YORK YMC² chiller. Will R513A also be applied for other centrifugal and screw chillers?

W: As of January 2016, all YORK air-cooled and water-cooled screw and centrifugal chillers are compatible with the low-GWP refrigerant, R513A. This means a YORK R134a chiller is compatible with R513A, offering peace of mind with the uncertain refrigerant regulations of the future. This offering also provides a very strong and long-term investment.