Webinar Follow-Up:
Choosing the right oil free chiller bearing technology

QUESTION & ANSWER | April 2017

Craig Campbell from Johnson Controls presented a webcast Thursday, April 20, 2017 called "Choosing the right oil free chiller bearing technology." The following question and answer document was compiled to capture some of the questions asked during and after the presentation.

If you missed the webinar or want to re-visit the content, you can access the recording here:
https://attendee.gotowebinar.com/register/2669009882532258306

WHAT CAPACITY RANGE IS POSSIBLE WITH THE YMC² CHILLER?

At standard AHRI conditions, the YMC² chiller is available from 165 to 1000 TR (580-3500 kW).

HOW IS IT POSSIBLE TO OPERATE IN AN INVERTED MANNER WHILE STILL CIRCULATING THE REFRIGERANT?

Typically, the customer is concerned about water temperatures but we are concerned about refrigerant temperatures and pressures. Just because the temperatures entering and leaving the chiller are inverted does not mean the saturation temperatures inside the chiller are inverted. We are always maintaining a positive pressure differential between the condenser and evaporator. Because of this we are always able to move refrigerant throughout the system to maintain these conditions.

HOW MUCH TIME IS ACTUALLY AVAILABLE BELOW 55° F?

This will vary widely based on location of the chiller installation. However, there are significant amount of hours below 55° F. It is highly recommended that for every chiller installation a full weather analysis is reviewed to see how many hours are available at any of the temperatures. Even warm locations like Florida have well over 10% of their hours are below 55° F, which is significantly more than the 1% of hours that the chiller will see at the design point.

IF WE HAVE YMC² CHILLERS INSTALLED, CAN THESE CHILLERS SUPPORT INVERTED OPERATION? OR IS A NEW SYSTEM REQUIRED?

There is nothing needed to retrofit existing YMC² chillers, you can just start supplying colder tower water, turn it down and let the system run.

ARE THERE ANY PLANS TO OFFER AIR-COOLED MAGNETIC BEARINGS FROM JOHNSON CONTROLS?

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 being exceedingly focused on first cost. We find that screw compressors are the best suited technology to meet the lift requirements that air-cooled chillers typically demand.

CAN THE YMC² CHILLER SUPPLY CHILLED WATER TEMPERATURE AT 28.5 DEGREE (GLYCOL BASED SYSTEM)?

The YMC² chiller can handle leaving chilled water temperatures with glycol or brine down to 10 ° F

WHAT IS THE MAXIMUM LIFT CAPABILITY OF THE YMC² CHILLER?

The YMC² chiller has a lift similar to a single stage water-cooled centrifugal chiller, 70 ° F. The YMC² chiller can handle slightly higher than that based upon the speed and the way our capacity control is designed, but we are also able to use very high entering condenser water temperature if there is a high entering evaporator temperature, meaning the YMC² is also available as a heat pump for installations that can provide an elevated heat source

IS THERE ANY ACCELEROMETER AVAILABLE IN MAGNETIC BEARING? CAN YOU PLEASE COMMENT IN THE CASE OF OIL-LUBRICATED BEARING TOO?

The accelerometer for a magnetic bearing chiller is just measuring the vibration of the motor. The magnetic bearing system is constantly monitoring the position of the shaft at very high sampling rates. In terms of accelerometers used on oil-lubricated bearings, those are used as a warning system that the vibration is increasing and there could be issues with the bearing.

IS THE COMPRESSOR MOTOR LOCATED OUTSIDE THE REFRIGERANT LOOP?

No, for the YORK YMC² chiller it is a refrigerant-cooled motor so it is inside of the chiller package – a semi-hermitic motor.

IS THERE ANY ADDITIONAL MAINTENANCE SPECIFIC TO THE MAGNETIC BEARING SYSTEM, SUCH AS CAPACITOR REPLACEMENT?

No, in fact the YMC² chiller has less maintenance requirements compared to an oil-lubricated bearing chiller. And although some manufacturers require capacitor replacement after a specified amount of time, the YMC² capacitor is designed to last the life of the chiller.

I DO NOT THINK THAT 0.1 KW/TR IS A REALISTIC VALUE FOR A CHILLER. ARE THESE RATINGS AHRI CERTIFIED?

These ratings fall within AHRI standards based on percent load values, but the application rating table for the AHRI program does not extend below 50-55˚F (10-13˚C) ECWT. AHRI does not typically test at these conditions with low entering condenser water temperature because in the past chiller technology did not allow operation at these temperatures. We stand behind all of our ratings, and would test for these points at the factory with customers present on their YMC² chiller.