



BY JOHNSON CONTROLS

YORK® YK-EP Centrifugal Chiller Frequently Asked Questions

COMPETITIVE DATA

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EXECUTIVE SUMMARY

The YORK YK-EP centrifugal chiller is the newest addition to the industry-leading YORK chiller product portfolio. Accordingly, many of Johnson Controls customers have been asking questions about this new technology package related to performance, product design, and competitive positioning.

The intent of this document is to assist the Johnson Control systems and service sales force in addressing these common questions.

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PERFORMANCE

1. What is the nominal capacity range of the YK-EP chiller?

Answer: The YK-EP extends the upper capacity limit of the YK centrifugal chiller platform. At AHRI standard conditions, the nominal capacity range is 2500-3200 Tons (8800-11250 kW).

2. What are the best applications for the YK-EP?

Answer: The YK-EP chiller is ideal for large tonnage applications such as district cooling, process / industrial cooling, data centers, and turbine inlet-air cooling.

3. Does the YK-EP chiller offer an improvement in full-load and part-load performance?

Answer: The YK-EP maintains Johnson Controls' reputation for developing equipment that delivers outstanding part load efficiency; with the addition of improved full load performance (upwards of 7%) as compared to typical chiller designs over this product's capacity range.

Furthermore, when YK-EP chillers are arranged in series counter flow the YK-EP provides even greater energy savings. Series counter flow reduces compressor head on each chiller, cutting system energy use by up to 10% compared to a parallel piping arrangement.

4. Johnson Controls has always promoted the energy advantages of utilizing entering condenser-water temperatures down to 55°F (12.7°C) with YORK centrifugal chillers. Is this still true with the YK-EP chiller?

Answer: Yes, the YK-EP chiller is engineered for maximum efficiency at both design and off-design conditions. By taking advantage of the colder tower-water temperatures, appreciable power savings are realized from reduced lift (head) operation. The minimum entering condenser-water temperature for full- and part-load operation is provided by the following equation:

$$\text{Min ECWT} = \text{LCHWT} - \text{C Range} + 5^\circ\text{F} + [12 * (\% \text{ Load} / 100)]$$

where:

ECWT = Entering Condenser-Water Temperature

LCHWT = Leaving Chilled-Water Temperature

C Range = Condensing-water temperature range at the given load

5. Does the YK-EP comply with LEED Energy & Atmosphere credit 4 (EAc4)?

Answer: The YK-EP chiller utilizes a low volume of high efficiency HFC-134a refrigerant. Most models will meet EAc4. You can get verification within YORKworks.

6. Is operating at real-world conditions important?

Answer: Absolutely. Chillers don't operate at design conditions more than 1% of the time. AHRI's well-known and accepted NPLV equation states this. Understanding real-world operating conditions and taking advantage of colder entering condenser-water temperatures will deliver reduced operating expenses and reduced environmental impact.

PRODUCT DESIGN

1. Is the YK-EP chiller a completely brand-new design?

Answer: Quite the opposite; the YK-EP is a compilation of proven technologies with an innovative twist! This product is comprised of the largest capacity YK platform with the addition of a mechanical compression economizer to maximize chiller capacity and efficiency.

2. How do the economizer and economizer compressor work?

Answer: The economizer draws liquid refrigerant from the condenser and partially expands it to a pressure intermediate to the evaporator and condenser. Part of this refrigerant remains a liquid and part changes phase to a gas. The liquid is sent through an expansion valve and onto the evaporator. The gas is drawn out of the economizer by the economizer compressor; which then compresses the gas and sends it back into the condenser.

The advantage of this secondary cycle is that the economizer compressor does not have to compress the gas over the full head of the chiller system, therefore simultaneously adding capacity and efficiency to the chiller.

3. Will the YK-EP chiller be utilizing the OptiSound™ Control feature?

Answer: OptiSound Control is a standard feature on both of the YK-EP chiller's drivelines. Our customers have provided consistently positive feedback regarding the sound and operational advantages this proprietary technology provides.

4. What starter options do I have with the YK-EP?

Answer: There are two drivelines on the YK-EP chiller. The economizer compressor driveline will always be started by a low voltage solid state starter. The primary driveline has the option for electro-mechanical, solid state, or variable speed starters. Variable speed starters are generally recommended for the efficiency and maintenance advantages. There are several frequency and voltage options for each starter type.

5. What is the % current Total Harmonic Distortion (THD) on the medium voltage OptiSpeed variable speed drive? Does it meet the requirements of IEEE?

Answer: The YORK OptiSpeed medium voltage drive uses high-frequency power semiconductors to shape the VSD input current into a nearly sinusoidal waveform; resulting in input current distortion less than 5% at full load. This greatly exceeds the requirements of the IEEE.

6. What is the medium voltage OptiSpeed variable speed drive's power factor?

Answer: The YORK OptiSpeed medium voltage drive delivers a power factor of 0.97 or better!

7. Does the YK-EP require multiple points for wiring?

Answer: The YK-EP chiller requires one medium voltage power source for the primary compressor, one low voltage power source for the secondary compressor motor, and one low voltage power source for chiller auxiliaries (lube system and control).

8. Can the YK-EP chiller be used as a heat pump?

Answer: The YK-EP is not well suited for heat pump applications. The maximum temperature water that this chiller can produce is approximately 110°F (43°C), which is generally too low for heat pump application needs. A YORK Compound YK chiller (CYK) is well suited for heat pump duty for high capacity applications.

9. Does the YK-EP utilize the OptiView control panel?

Answer: The YK-EP utilizes a Programmable Automation Controller (PAC) for chiller control and building system integration.

10. What shipment forms are available for the YK-EP chiller?

Answer: The YK-EP chiller is shipped knocked down into major subassemblies (evaporator, condenser, driveline, etc.). Protective coverings are furnished on the motor starter and unit mounted controls, and the water nozzles are capped with fitted plastic enclosures. This shipment form is particularly convenient for existing buildings where equipment room access does not allow rigging a factory-packaged chiller.

11. Does the secondary motor always run?

Answer: No. The secondary motor only runs as needed to meet the building's capacity requirements.

12. How are the motors cooled?

Answer: Both motors on the YK-EP are air cooled. This provides the highest reliability solution for large industrial applications.

However, for special applications alternative motor types are available for both motors. The primary motor has several enclosed motor types available, such as Totally Enclosed Water-to-Air Cooled (TEWAC), where the smaller secondary motor only has a Totally Enclosed Fan Cooled (TEFC) option. Please note that nonstandard motor types will increase chiller lead time and price.