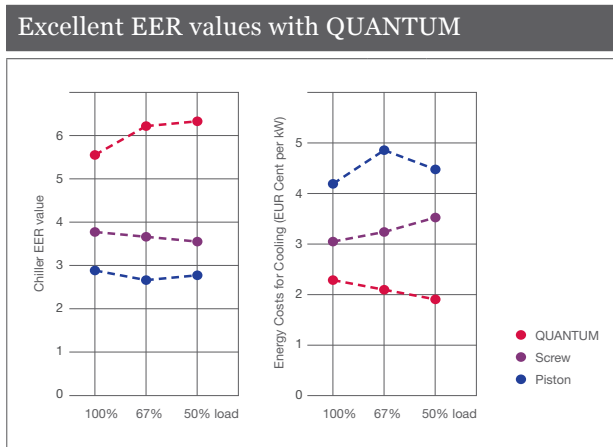


# QUANTUM. THE NEW INDUSTRIAL STANDARD FOR CHILLERS.

Made in Germany.

## 1. MAXIMUM ENERGY EFFICIENCY

- The Quantum chiller shows excellent EER (energy efficiency ratio) values. Such efficiency presents a huge potential for energy savings, especially in part-load conditions. This leads to a reduction of up to 50% in operating costs.



**Figure 1:** EER values optimised by up to 50% (left) and cooling costs reduced by 50% (right). The Data is based on a 4 months measurement of a real installation (chilled water 13/7 °C, cooling water 28/33 °C).

## 2. VARIABLE SPEED DRIVE

- Using the variable speed drive, an ideal capacity control can be reached. The individual compressors are switched on and off in interaction to optimise the EER of the complete chiller.
- A broad control range allows for smaller storage tank dimensions and reduces the number of compressor motor starts.
- Precise adherence to the chilled water set-point temperature leads to a smoothly operating consumer network.

**Figure 2:** Comparison start-up current behaviour between conventional drives and QUANTUM. QUANTUM shows no start-up current peaks during initialisation.

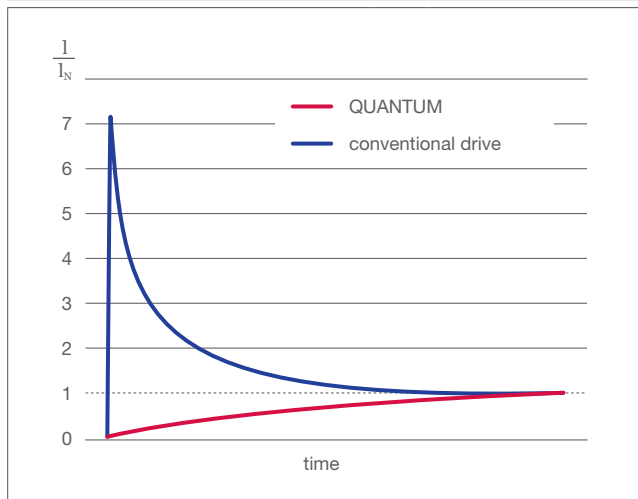
## 3. OIL-FREE COMPRESSOR AND CONTACT-FREE MAGNETIC BEARING

- There is no need for oil circulation, oil cooling or oil filtration components as the compressors operate oil-free.
- The magnetic bearing substantially increases sustainable cooling due to the absence of oil.
- There is no mechanical wear of the bearings thanks to the magnetic system. The efficiency factor of the compressor remains constantly high reducing maintenance and repair costs.

## 4. SMOOTH START UP

- The compressor start-up proceeds graduated and smoothly. The maximum start-up current is under 5 A.
- The electrical supply network remains stable as there are no voltage peaks during the activation. Moreover, the capacity control increases the electrical power input steadily and smoothly.
- This start-up behaviour allows the design of the electro-technical supply line to be based on the operating point.

## No current spikes with QUANTUM



## 5. LOW NOISE AND VIBRATION

- The low-vibration operation allows for an installation without vibration dampers.
- Due to extremely low noise levels, no additional sound-isolating measurements are required generally. Investments in silencing measurements are left out.
- Vibration-related leaks in the refrigerant circuit or damaged components caused by structure-borne sound transmissions are practically impossible.

## 6. REDUCED CO<sub>2</sub> EMISSION

- Two Quantum chillers with a cooling capacity of 1MW each produce 117 tonnes less CO<sub>2</sub> than comparable oil-based units which leads to a reduction in energy costs of 35,750 EUR per year. Depending from the Quantum type and the operation mode, even greater reductions can be achieved.
- Already in the planning phase of a project, Cofely Refrigeration can calculate simulations of different system variants using an analytical software named COOLCOMPARE. This facilitates the identification of the optimum plant system in terms of energy efficiency. The consumer operation parameters are simulated under project-specific conditions.

## 7. NO IDLE CURRENT COMPENSATION

- The QUANTUM draws hardly any idle current across the full control range due to the high power factor (0.92). No expensive idle current compensation is needed. Conventional chillers can have a power factor of under 0.5 in part-load conditions.

### CONSIDER THE INNER VALUES OF YOUR COOLING SYSTEM.

*COOLCOMPARE. Analyse, compare, optimise:  
A comprehensive analysis of your cooling system  
including the peripheral components.*

*E-mail address for an enquiry without obligation:  
refrigeration@cofely.de*

## 8. OPERATING RELIABILITY

- The availability of a chiller with several compressors is considerably higher than the one of a single-compressor unit.
- The complete chiller remains in operation with most of the capacity, even in case of a compressor break-down.
- A compressor can be replaced very easily, even during chiller operation.

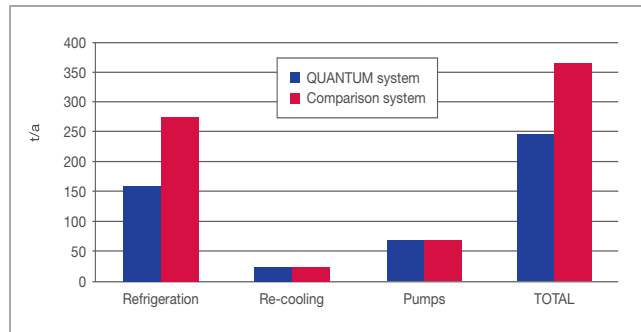
## 9. RE-COOLING CAPACITY

- The necessary re-cooling capacity is reduced as a result of higher efficiency in part-load conditions saving electricity and water, and reducing the operating costs of the re-cooling unit.

## 10. SERVICE AND MAINTENANCE

- Not only the electricity costs are low during operation, but also the maintenance costs are reduced to a minimum thanks to the simplicity of a smooth-running, oil-free system.
- The simple design leads to a reduction of components and an increase of accessibility which reduces service times and maintenance activities.

### CO<sub>2</sub> emissions



**Figure 3:** Comparison of CO<sub>2</sub> emissions between a screw chiller and a Quantum chiller including re-cooling system and chilled water/cooling water pumps.