# QUANTM™ + FluxCore

A Revolutionary Electric Pump
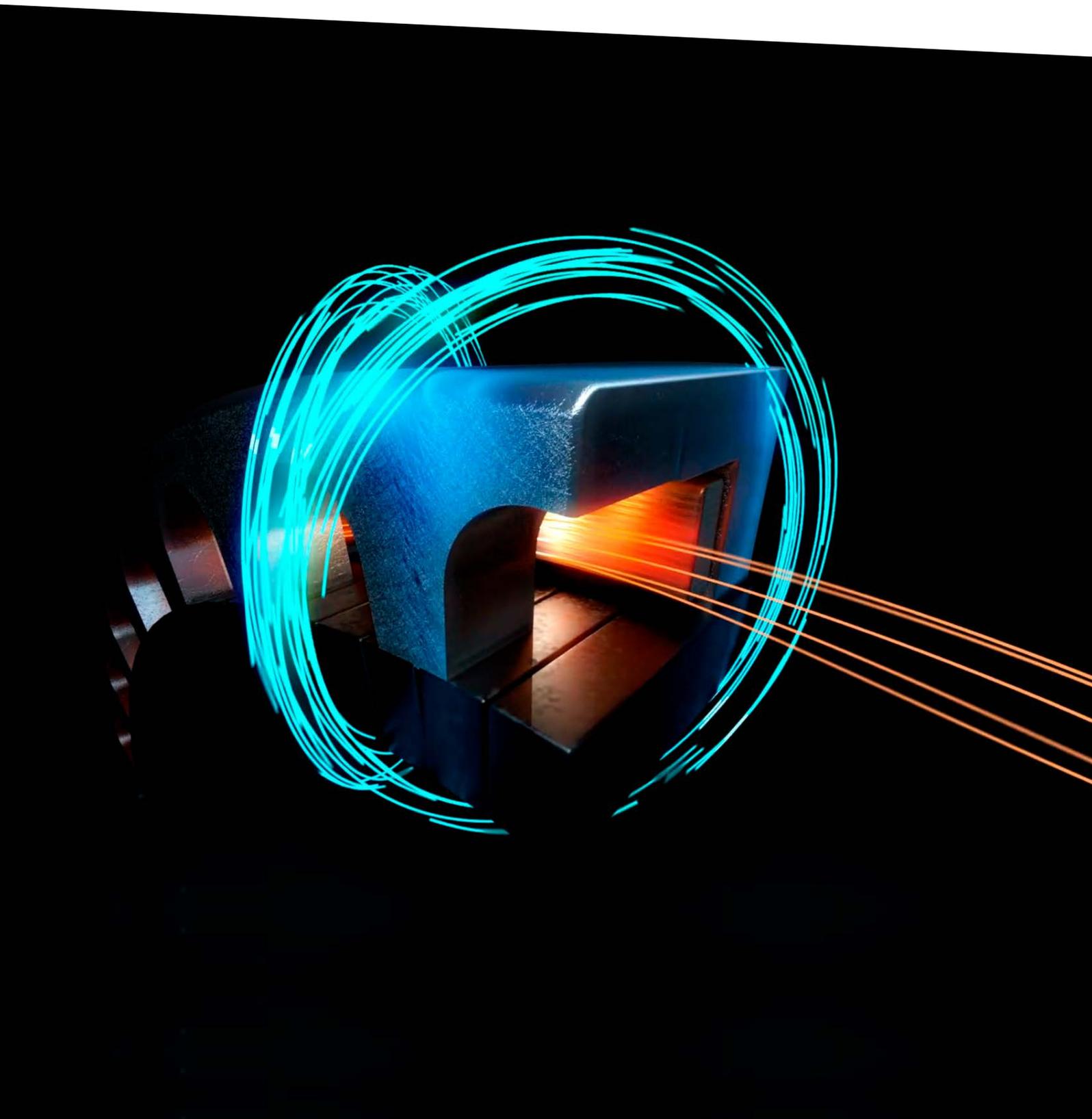
# QUANTM™ - a new, revolutionary electric pump technology

Graco's new QUANTM electric pump incorporates a revolutionary electric motor technology that delivers unmatched torque and power in a compact, efficient, gearbox-free package.

The fundamental technology behind electric motors has remained the same for decades. Even with advances like brushless technology, efficiency improvements to AC motors and brushless DC technologies, and ever improving controllers like variable frequency drives, they still don't deliver the torque and energy-efficiency needed for many applications today. To address these shortcomings, Graco has introduced a revolutionary electric pump, QUANTM. It incorporates FluxCore technology with proven double-diaphragm designs to provide a high torque, low rpm solution to the fluid transfer world.

At the heart of this innovative technology is the use of a specially designed transverse flux motor. The design uses up to ten times more electrical motor poles and drastically reduces electrical losses with low resistance coils. These low resistance coils consist of a unique inner ring of simple copper windings that replaces the "rat's nest" of wiring typically found in a conventional motor. This simple and compact winding set facilitates much more effective and efficient conversion of electrical current into mechanical torque.

Moreover, QUANTM is gearbox-free. Traditional motor technology using an AC or DC motor requires gearboxes and couplings, which introduce mechanical losses, additional maintenance and expensive control systems. QUANTM avoids all these drawbacks.

Further improving the efficiency of this design is the encapsulation of the windings within the housing instead of wrapping the coils around a core. This change means that far more electromagnetic flux lines are captured and utilized in the creation of the electromotive field in the motor. Coupling this improved electrical induction with the increased number of poles creating magnetic fields leads to the creation of a more consistent and stable overall field. This translates to a continuous torque force that is eight times higher than equivalently sized AC induction motors running at nominal speed.

This torque improvement is even greater as the motors are operated at lower speeds. It provides an excellent solution for pumps that require low cycle rates versus traditional motor technology that works in the 1800-3600 rpm range (with significant gear ratio or belt reductions).

## New application areas

QUANTM is ideal for some new applications that are currently not possible with today's AODD and EODD pumps. One example is a plant that is adding automation and control. QUANTM features remote inputs and allows for improved controllability over air pumps and other pump technologies. Another application is in a facility that is running low on air compressor volume or access to clean dry air. QUANTM is also advantageous in plants that are looking to reduce noise levels to improve the health and safety of workers.

As it is significantly lighter and smaller than comparable electric pumps, QUANTM can easily be mounted on a cart and moved from station to station. This makes it ideal for applications that are remotely located or mobile in nature. For example, these pumps can be easily taken into a Clean-in-place (CIP) or Clean-out-of-place (COP) room or any other area that has electrical power, where it can simply be plugged in and run. Operating the QUANTM in a CIP/COP space is a major advantage as it avoids the potential contamination risk of dirty air and dirty exhaust air.

QUANTM can also easily be mounted in confined or traditionally difficult-to-reach areas of a facility. And given the correct 12V battery and inverter, QUANTM is the ideal solution for remote areas where access to the electrical grid is limited and solar is required. The pump can easily be run off a truck, which opens up more mobile tank transfer applications.

## Extensive benefits

The Graco QUANTM electric pump offers a range of exceptional benefits:

**Lighter, compact and quieter:**
By eliminating the need for a gearbox, weight can be reduced seriously and the overall length of the powertrain can be shortened significantly.

**ROI for end-users:**
- **Increased efficiency:** When compressor efficiency, line losses and leaks are considered, the energy efficiency of AODD pumps is generally calculated to be around 10-15% while most EODD and other electrically driven pumps come in at about 60%. The energy efficiency of QUANTM is around 85%. This is due to reduced mechanical and electrical losses, lower cost of power conversion, etc.

- **Reduced power consumption:** Compared to an equivalent AC geared system, QUANTM can cut power consumption significantly.

**Increased operating range:**

The integrated controller and direct drive of the motor leads to high torque at far lower RPM, so the effective continuous operating range is higher, so the effective continuous load is higher.

**Reduced heat generation:**

At low speeds, QUANTM does not have the same heat issues that are seen with AC motors being run at lower frequencies (using a VFD) to control the speed, which means a longer overall lifetime of the motor.

**Improved reliability and reduced maintenance:**

QUANTM has a single moving part, the motor rotor, which translates into greater reliability, reduced maintenance and reduced noise.

**Performs the same way as an air-operated pump.**

QUANTM stalls under pressure, is self-priming, runs dry, and has a seal-less design.

Initially, QUANTM will be available in 1-inch, 1½-inch and 2-inch models.

**Sustainability**

**Operational Resilience**

**Cost Savings**

**Simplified Maintenance**

## More information

Intrigued to discover more about Graco's QUANTM electric-operated double-diaphragm pump? Would you like to see a product demonstration? Do you have an application that you think would be ideal for this new electric pump? Contact us and we will be delighted to discuss your specific requirements.