

# AMMONIA PUMP OFFERS DATA AND CONTROL – AND MORE SUSTAINABLE REFRIGERATION



Image: With the CRNE MAGdrive ammonia field test pump from Grundfos at the Claus Sørensen A/S cold store plant in Engesvang, Denmark, “We have better control than before,” says Technical Manager Sten Vedel.

## THE SITUATION

Johnson Controls in Denmark agreed to field test a new Grundfos CR ammonia pump in the companies’ shared quest to make refrigeration more sustainable. The six-month test took place at one of Denmark’s largest cold stores and a Johnson Controls customer, Claus Sørensen A/S in Engesvang.

“We wanted to be able to offer our customers a more energy-friendly solution,” says Johnson Controls Denmark’s Head of Service, Bent Knudsen. “With our industrial customer portfolio, a major focal point is energy, as well as reliability and component supply security. Most of our industrial customers maintain a green profile and want to brand themselves with the right solutions. And I have a customer here who’s very much into energy-saving and new ideas,” he adds, referring to Claus Sørensen.

*“We have better control. I can monitor everything wherever I am. I can see the pump pressure and the pressure at the evaporator. It’s really good.”*

Sten Vedel, Technical Manager at Claus Sørensen A/S

The test pump was a Grundfos CR multistage, centrifugal, inline variant that can operate with ammonia at minus 40 degrees Celsius. Since the pump needed to be airtight to avoid the release of ammonia vapours, the company used its CRNE MAGdrive unit,



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which has a magnetic coupling, so that no axle seal will leak. “We have a relatively high humidity in Denmark, which means things freeze on the surface. We had to keep the magnetic drive free from ice,” says Peter Ørsted, Senior Application Manager, Industry, at Grundfos. “We solved that by applying a small, 100-watt heating cable to keep it frost-free. So even if the pump becomes one big lump of ice, we can keep the magnetic drive free of ice and the pump running.”

Peter Ørsted says this type of pump is not common for this application. “We had to prove to Johnson Controls that this type of pump could be used. In addition, we had to prove that the pump would provide a major energy savings. Based on calculations and operational points, we estimated that our CRNE MAGdrive could save them 40-50% energy. With savings of this magnitude, they were willing to give it a try.”

#### THE SOLUTION

The team installed the ammonia pump on one of Claus Sørensen’s quick freezer lines. Immediately, Claus Sørensen’s Technical Manager Sten Vedel noticed a difference. “We have better control than before,” he says. “I can log on to my phone and see the pump as well as the rest of the cold store. I can monitor everything wherever I am. I get a text message

in case of error. Our remote monitoring wouldn’t show the old ammonia pumps. We can see the new one because of the surveillance and a Grundfos pressure transmitter installed at the evaporator. I can see the pump pressure, and I can see the pressure at the evaporator. I can see what percentage it’s operating at. It’s really good.”

Indeed, the CRNE MAGdrive for ammonia was equipped with extra sensors that provided the users with data. All the parties could access this data via a cloud solution Grundfos is developing in cooperation with Siemens called MindSphere, says Peter Ørsted.

“With the extra pressure transmitters, we can not only monitor pressure, but we can also adjust the pump to estimate a flow – i.e. how much ammonia is circulated in the system,” he says. “This is done without extra flow gauges by using the functions in our products.”

**TOPIC:** Refrigeration with ammonia

**LOCATION:** Claus Sørensen A/S, Denmark

**COMPANY:** Johnson Controls



The four main collaborators on the ammonia pump field test were, from left, Peter Ørsted from Grundfos, Bent Knudsen from Johnson Controls, Sten Vedel from Claus Sørensen and Nikolai Steffensen from Grundfos.

In addition, the old pumps had fixed speed motors, but this Grundfos pump is frequency-controlled. “That alone saves us a lot of money,” says Sten Vedel.

#### THE OUTCOME

The Grundfos pump saved more than 50% of the energy of the previous unit, as data revealed during the six-month field test.

“Looking at a plant like this, there’s no doubt that the ammonia pump itself – in relation to the energy used on the compressors – is only a small part,” says Peter Ørsted. “But to save 10,000-15,000 kWh per year is significant. Remember that they have not one but six pumps like this at the plant. Whether we could save this much on all of them depends on how they operate. But no doubt, a lot can be saved.”

He adds that the field test has shown that collecting data with Grundfos products offers value to the customer. “I think Johnson Controls has also gained insight about the possibilities of these advancing



The field test pump: Grundfos CRNE MAGdrive for ammonia



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technologies that we’ve used at Grundfos for a long time. It gives them more insight into how their systems work.”

“For us who have been in the industry for many years, it’s good to try something new,” says Bent Knudsen. “This new product is beneficial both to us and, in particular, to our customers. This way we’re able to offer an alternative to ‘what we usually do’ – which is the common approach in this industry.”

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#### **GRUNDFOS SUPPLIED:**

Grundfos supplied a CRNE 15-3 MAGdrive for pumping ammonia at minus 40 degrees Celsius for the field test with Johnson Controls at Claus Sørensen A/S. In addition, Grundfos supplied sensors and data collection, which was cloud-shared via the Siemens’ IoT MindSphere program. [Read more](#)

See video