

Vapor Quality Sensor Seen as Key to Boosting Efficiency of Low-Charge Ammonia DX System

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By [Michael Garry](#), Jan 12, 2022, 16:54 GMT-5 • 3 minute reading

Ammonia DX, equipped with vapor quality control, can cut energy use 10-25% compared to a pump-circulated ammonia system, says HB Products.

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Cold storage facility using the vapor quality control technology from HB Products.

The inclusion of a vapor quality sensor is the key to improving the efficiency of a low-charge ammonia DX (direct expansion) industrial system for low- and medium-temperature applications, according to Danish manufacturer [HB Products](#).

The company, which specializes in the development and production of sensors for industrial and commercial refrigeration and heat-pump systems, outlined the advantages of both low-charge ammonia DX systems and vapor quality sensors [in a recent presentation](#).

In addition to HB Products, companies that make DX ammonia technology include U.S. evaporator manufacturer [Colmac Coil](#) and Australian system manufacturer [Scantec Refrigeration](#), one of the [early users of vapor quality control in its ammonia DX systems](#).

The first application of a DX Ammonia system with HB Products' vapor quality control took place seven years ago. That has been followed by 20 similar projects, said the company.

Lower ammonia charge is the first advantage of a DX system. For example, DX ammonia systems using hot gas for defrosting typically have less than a quarter of the charge used in pump-circulated ammonia overfeed systems, said HB Products.

Along with reduced charge, ammonia DX, equipped with vapor quality control, can cut energy consumption 10-25% compared to a pump-circulated ammonia system, said HB Products, adding that the maintenance costs are also lower for the DX system.

With vapor quality control, “you can make your system with reduced cost and reduced CO₂ output,” said Michael Elstrøm, Technical Director and Founder of HB Products, [in a video presentation](#).

Compared to an ammonia DX system that employs superheat instead of a vapor quality control, an ammonia DX system with vapor quality control consumes 40% less energy, the company added. For example, when an ammonia DX cold storage facility in Haichiu, Romania switched from superheat to a vapor-quality control system, it [reduced electricity consumption by 43%](#).

And compared to DX system using an HFC, an ammonia DX system using a vapor quality sensor reduces energy consumption by 70%, HB Products said. This enables a payback period on the premium paid for the DX ammonia system of three to five years, according to the company.

No need for superheat

A vapor quality sensor makes it possible to perform accurate and direct measurement of the liquid content of the gas leaving the evaporator, explained HB Products [on its website](#). Depending on what it finds, the sensor can then control the expansion valve in a DX system and optimize evaporator operation. This eliminates the need for superheat, thereby improving the energy performance of the system.

HB Products cautioned that DX ammonia systems present a “lot of traps” for inexperienced contractors, and urged using experienced people. In addition, DX ammonia systems are still not commonly deployed due to lack of suitable components, but “experienced suppliers are addressing this,” the company said.



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– Michael Elstrøm, HB Products

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