

Case story | NorStar Corporation

NorStar specifies **reliable Danfoss pumps** to power innovative aeroponic irrigation system

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service secures
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Growing potatoes **without soil**

NorStar Corporation has produced standard aeroponic irrigation systems since 2010. In 2017, the U.S.-based company embarked on the development of its proprietary high-pressure aeroponic, or “fogoponic” irrigation system for commercial use. While the company’s standard aeroponic systems had already produced record yields, its latest fogoponic innovation has increased these by twofold – all while dramatically reducing the propagation cycle, thus revolutionizing how potato seeds are produced. Danfoss PAH pumps provide the reliably clean pressure.

NorStar Corporation (NSC) and its subsidiary Vital Seeds have revolutionized the production of potato seeds with its latest fogoponic irrigation system. Plants cultivated in NSC’s innovative solution yield significantly more potato seeds than any other method – by far. To do this, NSC’s proprietary system must deliver a supply of nutrient-rich fog at a working pressure of 50-70 bars with absolute dependability, precision, and cleanliness.

**ZERO**
contaminationThe pump is
lubricated with the
pumped medium

A standard aeroponic irrigation system is a cultivation technique in which the plant’s roots are suspended in the air, without the use of soil, while a nutrient solution is delivered to them in the form of a fine mist.

The challenge:

Provide high-pressure with the **highest possible reliability** and purity

NSC's engineers' most important demand for the high-pressure pumps for its potato seed production facility in Israel was reliability: Any prolonged failure to keep the growing plants' roots surrounded by nutrient-rich aerosols would kill off the time-consuming, high-value crop. The complex arrangement of nozzles, sensors, algorithms, and apps would do their part to maintain exact pH and electrical conductivity levels for the nutrients, but the pumps must also do theirs around the clock.

But equally important to NSC was cleanliness. Just as no diseases could be tolerated in the greenhouse environment, contamination of any kind from the facility's high-pressure pumps was a no-go.

The solution:

Reliably clean Danfoss PAH pumps

According to Talal Daas, NSC's CEO, the search for the right high-pressure pump quickly led to the Danfoss PAH high-pressure positive displacement pumps – the only pumps on the market to meet all of their demands.

"We have previously used Danfoss PAH pumps, so we were familiar with their specifications and benefits," he says. "For this important pilot installation of our newest production technology, there was no doubt. We needed Danfoss's unrivaled pump reliability to ensure failsafe operations 24/7. The fact that the pumps use no oil for lubrication sealed the deal – we must be 100% certain that the pumps could never spread any contamination that could put this high-value production at risk."

The high-pressure aeroponic system that NSC deployed in Israel contains three Danfoss PAH 6.3 pumps. Like all of NSC facilities, redundancy is built into system design. Even though all three pumps are dedicated to specific tasks, each of them can automatically take over the task of any of the two other pumps in the event of failure.

The results:

Perfect pump performance does its part to ensure revolutionary growing method

Over the six-month growing cycle necessary to propagate the potato crop, the Danfoss pumps performed flawlessly, and NSC's prototype facility produced amazing results that far surpassed even their most optimistic hopes.

"On the way to these breakthrough results, we faced a number of other challenges," recalls Daas, "but the Danfoss pumps were never one of them. Despite constant use for six months, no maintenance was ever needed, and they required no attention at all as they simply did their job. We were surprised by one thing, however – how quiet the installation's little machine room was. Normally, being so close to high-pressure pumps makes conversation practically impossible, but the Danfoss PAH pumps were far quieter than expected."

With strong market appeal to potato growers worldwide, NSC has high hopes for the future of their innovative new technology. "We are already in negotiations with a number of international customers," reveals Daas, "and we are convinced that the Danfoss PAH pumps will be standard in all our coming installations. In addition to being available without much lead time, they are small and light enough to transport easily – and they have already proven their role in our results."

**About NorStar Corporation :**

NorStar Corporation (NSC) is a technology company based in the Chicago area with activities in the U.S. and internationally. From its roots as a consultancy within hardware and software development, information technology, and manufacturing design, it has grown to develop a range of new technological products which have been awarded numerous patents. NSC is a founding partner of its affiliated companies dedicated to hydroponic, aeroponic and fogoponic agricultural production, Vital Farms B.V. and Vital Seeds, Inc.

For more information, visit www.norstarcorporation.com.

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