



ENGINEERING
TOMORROW

Danfoss

APP pump now with ceramics for energy efficient SWRO and wastewater treatment



Danfoss's latest high-pressure pumps are the company's first to feature ceramics and other surface hardening technologies. By replacing stainless steel with ceramics on all major wear parts, the new APP Ceramic pumps are now not only the market's most energy-efficient high-pressure pumps for SWRO applications, they also require less pre-filtration and have even longer service intervals. And they were developed in close collaboration with SWRO customers.

According to Georg Herborg, head of innovation at Danfoss High Pressure Pumps, APP Ceramics are a good example of the advantages of customer collaboration in R&D projects. "With more than 22,000 APP pumps installed worldwide, we've had a lot of conversations with our customers over the years. These discussions are critical to us working in new product development. They give our customers a strong voice when we decide on our innovation priorities, and they let us try out new things and gain critical operational experience before we go into full-scale production. Our new APP Ceramics wouldn't be what they are without the insights our customers have shared with us."

What's the difference between 10 μ absolute and 5 μ nominal filtration? A lot, for some customers

Some of the discussions Georg Herborg has had with customers concern pre-filtration. Because APP pumps' energy efficiency relies on extremely tight tolerances for machined parts, undissolved particle size distribution and concentration levels, as typically

measured by the Silt Density Index (SDI) in the feed water after the pre-filtration step, is critically important. This can be challenging for some operators to manage precisely.

"The difference between 5 μ nominal and 10 μ absolute filtration might seem insignificant to some people," says Georg Herborg, "but for SWRO plants in remote locations with challenging water intake conditions, even such a small increase in tolerance to undissolved solids can be a gamechanger. So, when some of our customers told us that reducing APP pump's pre-filtration needs from 10 μ absolute to 5 μ nominal would enable them to expand the scope of use cases for APP pumps, we listened."

One of the customers that gave input for the new pump and later tested it is Veolia Water Technologies, a global leader in water treatment which has extensive experience with APP pumps. "We have installed Danfoss's Super Duplex stainless steel APP pumps in plants around the world for years," explains Bryan de Souza, senior process engineer at Veolia, "and continue to do so because of their unparalleled energy efficiency."

"The new ceramic versions of the APP will be a welcome option for us, especially in some plants. Pre-filtration works perfectly well when done properly, but it does have CAPEX and OPEX costs and humans do make errors. Even more important for some of our plants is the ability to deal safely with rolling blackouts and other power outages, which are common in many remote locations. Every time the power goes out, self-lubricating high-pressure pumps need to be restarted very carefully to avoid damage."

"When Georg contacted us to test a pre-production version of the new ceramic pump, his brief was simple. 'I want you to try to break it,' he said. We were happy to oblige. But after running it for over 9000 hours without service in an 18 MLD plant on Aruba, we had to admit we couldn't fulfill the brief. However, we told him that we look forward to trying in other places, too," he adds with a smile.

Market-leading energy efficiency or extreme robustness? Now we get both

Another customer that participated in pre-launch tests of the new ceramic APP pumps is TEMAK, the Greek water treatment specialist with over 10,000 installations worldwide.

Zohs Kollogios, director at TEMAK, reports that running the ceramic APP at a municipal plant in Oia on Santorini has been a positive experience. "The plant gets feedwater both directly from the sea and from wells," he explains, "so undissolved solids can be an issue. With standard filtration of 5µ nominal, the new ceramic APP pump has performed as expected, without any problem."

"The latest evolution of the APP is an important step forward," he says. "We have plants on islands all over the Aegean Sea and cannot bring pumps to Athens every time they need maintenance. The new ceramic APP pumps mean there is now no compromise between extreme robustness and market-leading energy efficiency. We believe this combination is highly relevant for many locations."

Collaboration makes innovation better, faster

Georg Herborg is convinced that collaboration with customers will continue to be part of Danfoss's innovation strategy.

"Trialing a new product of this complexity before we finalize series production has clear advantages for both us and our customers," he says. "They get influence on products they need and early access to them. We get field-proven insights, also in the form of real-time, operational data via the cloud, that enable us to validate assumptions – or not. This quickens the pace of our innovation and improves the outcomes. Both are necessary to respond to the growing need for energy-efficient SWRO."

For more information please contact:

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