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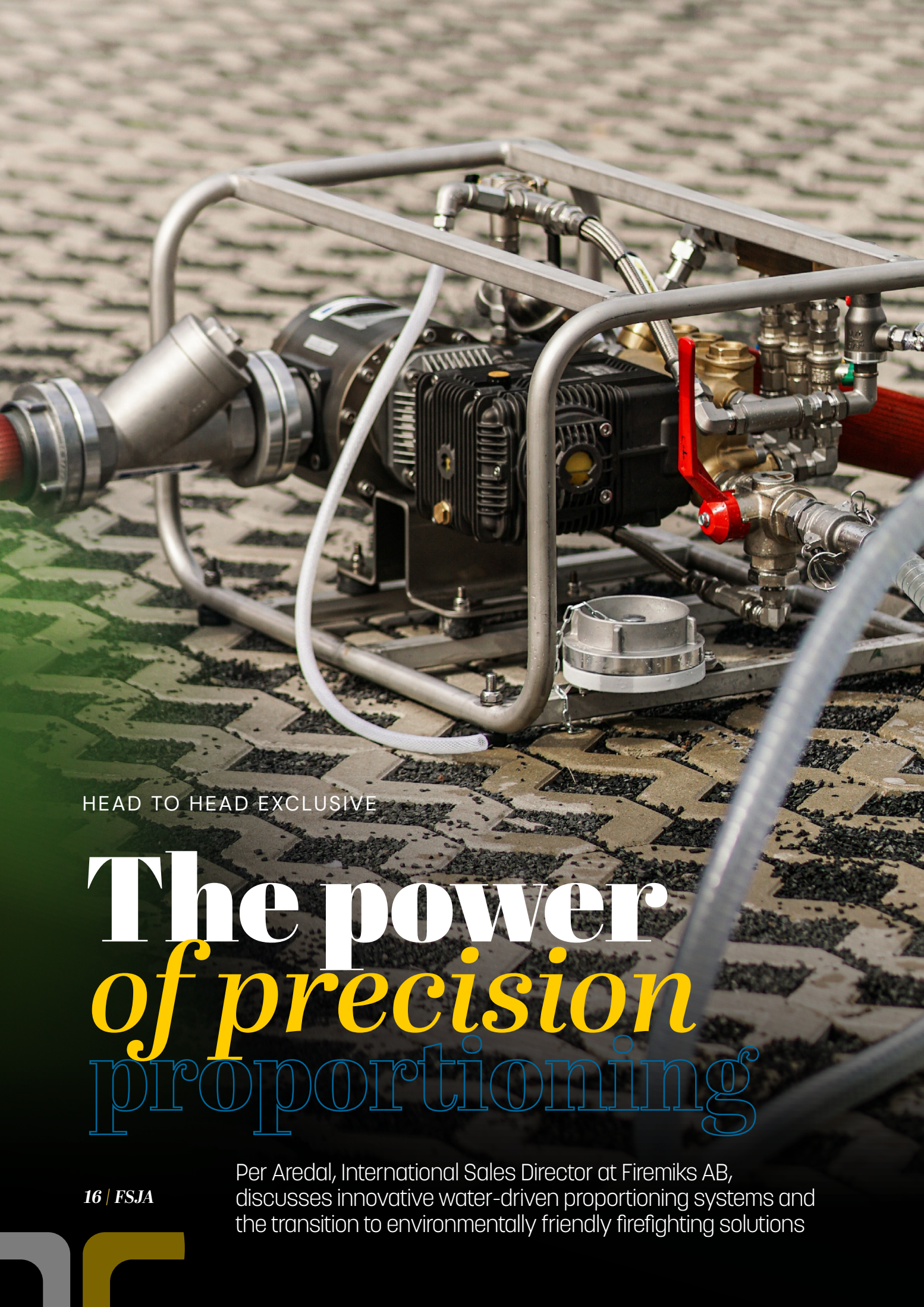


HEAD TO HEAD EXCLUSIVE

The power *of precision* proportioning

Per Aredal, International Sales Director at Firemiks AB, discusses innovative water-driven proportioning systems and the transition to environmentally friendly firefighting solutions

Originally founded in 1979 as a Swedish family-owned business, Firemiks AB is now operated by its third generation, in collaboration with strong industrial partners. Over the years, Firemiks has specialized in the development, manufacturing, and global distribution of its proprietary water-driven volumetric pump proportioning systems. The company prides itself on its ability to tailor custom solutions to meet the unique needs of each project, while also offering standardized models that comply with strict international regulations.

Per Aredal, the International Sales Director at FIREMIKS AB, brings over 35 years of experience in producing and delivering water-driven volumetric pump proportioners worldwide. His expertise is invaluable in addressing the evolving needs of firefighting systems, particularly in handling the shift from AFFF to newer synthetic fluorine-free foam (SFFF) concentrates.

In this interview, FSJA Editor Iain Hoey sat down with Per to discuss the technological innovations at FIREMIKS, its approach to foam proportioning across different viscosities, and the industry's shift towards environmentally friendly firefighting solutions.

Can you explain how FIREMIKS foam proportioners work, especially in terms of adjusting to different foam viscosities?

The proportioning of the FIREMIKS is based on the principle of positive displacement for both the water motor that is driven by the extinguishing water flow and the concentrate pump that is driven by the water motor and which injects the concentrate into the extinguishing water flow. In this manner, the dosing relation is established by the volumetric relation of the water motor and the concentrate pump.

This dosing relation is not affected much by viscosity, up to a limit of course as is detailed in the units' performance data. The concentrate pump is connected to an atmospheric concentrate tank with gravity feed to the dosing pump. Solely the extinguishing water is required to power the whole dosing system.

What are the technological innovations in FIREMIKS systems that accommodate the varying viscosities of firefighting foams?

The volumetric water motor design was conceived by us in the late seventies, and it is very compact for the flow it can take. On a typical 3% unit, the water motor will take roughly 30x the volume of the concentrate pump, yet it is barely bigger. Since the start we have constantly refined its design for better performance and reliability.

Like all pump design, it is all about the details and the execution. Important is also our flexibility to adapt the design and sizing, so we can quickly match the water motor up correctly with a wide variety of high-end concentrate pumps, each of which also has its specifics to take into account.

Could you give us an overview on the models that FIREMIKS offers?

We have a diverse range of models catering to various flow sizes and proportioning requirements. Our smallest model has a max flow of 180 lpm and the largest single model a capacity of 10000 lpm flow. To achieve larger flows, up to 20000 lpm, we offer parallel installed FIREMIKS, on a base skid or mounted as" double-deckers".

Our three standard dual models are: 12000 lpm (2 x 6000 lpm), 16000 lpm (2 x 8000 lpm) and 20000 lpm (2 x 10000 lpm). For fixed proportioning we offer on all units 1% and 3% as standard. We may also supply units with special dosing rates, for example 0,1%, 0,3% 0,5%, 2%, 2,75% and 6%, on customer's request. Models with selectable proportioning are available with 0,3-0,6-1% and 1-2-3% (For selected flow sizes 0,5-1-3%).

Is it difficult to ensure accurate foam proportioning across a range of different viscosities?

FM approval is nominating our system "Variable Viscosity Pump Proportioner", this means that as long as one follows the specified min and max flow of the data sheet, FIREMIKS accommodates changes in viscosity in a wide flow- and pressure ▸

range. There is no need for pressure balancing or calibration, nor is it possible without physically changing the unit.

The FM approval which we have achieved (Standard: 5130 - May 2021) for eight of our 3% models, in three flow sizes: 1800, 2400 and 4000 lpm, verifies that the FM-approved FIREMIKS units are giving correct dosing rate and handling concentrates from 1 cP up to high viscosity concentrates (6422 cP at 20 degree C and shear rate 5 1/s).

> **"SINCE THE START WE HAVE CONSTANTLY REFINED ITS DESIGN FOR BETTER PERFORMANCE AND RELIABILITY."**

What challenges does FIREMIKS, and the wider industry, face when transitioning from AFFF to SFFF in terms of viscosity handling?

Regulatory bodies are driving the shift from PFAS-containing concentrates to SFFF concentrates, prompting a reassessment of many proportioning systems for compatibility. Various manufacturers offer SFFF foams with a wide range of viscosities, including very high-viscosity concentrates.

In the past engineers have relied on being able to calculate the flow of concentrate, but with these new SFFF concentrates that are often non-Newtonian in their nature, accurately and reliably calculating the flow behavior is much harder. On devices that need calibration, the dosing might work in a specific set of circumstances, but as soon as one variable changes, it could fall out of calibration. Then it is much better to rely on a system that by design can accommodate a wide viscosity range, like FIREMIKS.

In what ways does the design of FIREMIKS proportioners, such as piston and gear pumps, cater to different foam viscosities?

FIREMIKS stands out by offering two types of dosing pumps — Piston and Gear pumps — alongside a robust multi-vane motor based on over 35 years of market experience. When working with clients, apart from considering flows and pressures, we prioritize understanding the concentrate type and viscosity, a quite complicated subject, before recommending the suitable pump type and accompanying installation advice.

As mentioned our models equipped with Piston pumps are classified as "Variable Viscosity Pump Proportioner" in FM approval terminology. They maintain precise dosing rates within approved tolerances across a broad viscosity spectrum.

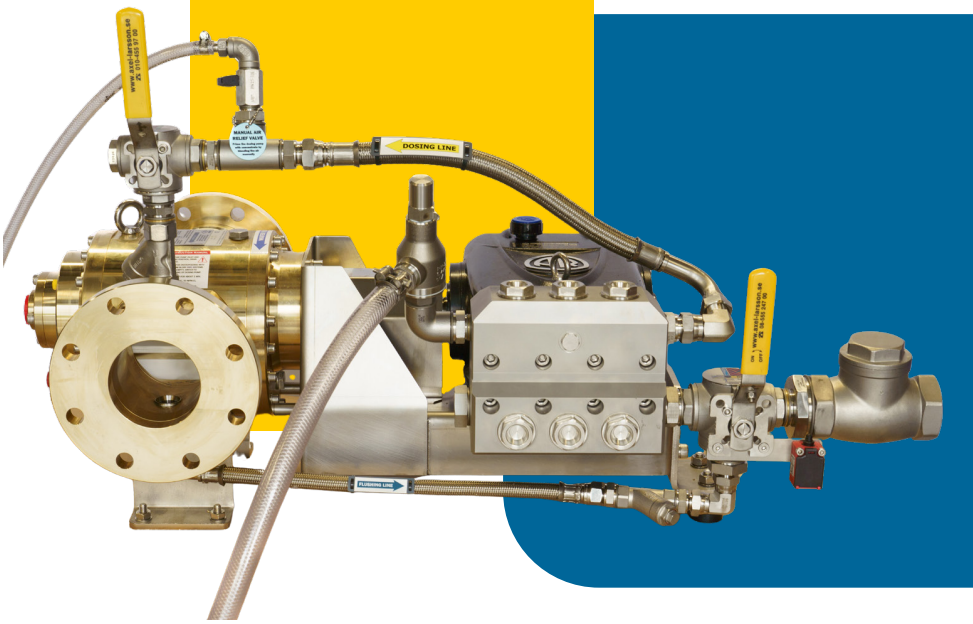
It is important to know that all Piston pumps systems on the market have a limit upwards on handling viscosity concentrates, due to the Piston pump reciprocating principle; for each revolution, the plunger sucks concentrate and then presses it out and the concentrate goes from zero to full speed twice per revolution. If the static viscosity is too high with non-Newtonian concentrates, the concentrate might not flow smoothly and therefore the correct dosing rate may not be achieved.

Typically, our Piston pump models excel in systems with low start-up flows relative to the maximum flow rate, providing versatility across a wide flow range.

Water motor-driven pump proportioners equipped with Gear

pumps are well-suited for handling high and very-high viscosity concentrates.

Gear pumps excel with high-viscosity fluids due to their counter-rotating gears that create a consistent, non-agitating flow, ensuring effective sealing with such fluids. Our Gear pump models are particularly efficient in applications operating at the higher end of the maximum flow rate, such as deluge and large fire monitor systems.



Are there any efficiency negatives in the transition to SFFF?

For all systems dealing with higher viscosity concentrates, ensuring adequate foam supply pipe diameter, good gravity feed, and minimizing concentrate line lengths are crucial. Our datasheets specify recommendations, and we're available for more tailored guidance for your project.

> **"WE ARE WELL-PREPARED TO EVOLVE OUR SYSTEM FURTHER, ENSURING WE MEET THE NEW DEMANDS OF FIREFIGHTING FOAMS IN THE FUTURE."**

How does the "Variable viscosity pump proportioner" designation by FM Approval impact the functionality and reliability of FIREMIKS systems?

The term refers to that these units are approved for a wide range of viscosities, compared to other proportioners which often are limited to a specific viscosity, Within the approved flow and pressure range specified in each models Data sheet, the dosing remains within the approved dosing tolerances stated in the standards (for example 3,0-3,9%) This gives the advantage that there is no need for recalibrating the FIREMIKS proportioner at any future changes of concentrate/viscosity, this is often needed with for example bladder tanks, creating added crucial down-time for this replacement/recalibration.

Can you explain the significance of the Dosing/Return valve (DRV)?

All units can be supplied with a Dosing/Return valve (DRV) as an option. In the Return setting the concentrate is pumped back to the tank during a test giving substantial cost saving on concentrate and also on the no need for cleaning up and destruction of dispersed foam, an important environmental and economic benefit. The respective water and concentrate flows should be measured with two independent flow meters to calculate accurate dosing rate.

How is FIREMIKS preparing for further advancements in firefighting foam technology? What trends or challenges do you see?

The current shift in the market from AFFF (Aqueous Film Forming Foam) to SFFF (Synthetic Fluorine-Free Foam) concentrates, which we expect will last for at least another 10 years, poses challenges for both existing and new foam systems. It will create a demand in upgrading many existing systems. We see also more interest in lower dosing rates as 1% and even lower for example 0,3, 0,5% etc. Also, the challenges to create good system capable of extinguishing Li-Ion batteries in an effective way is a major challenge for the whole fire-fighting industry. Firemiks AB is well-prepared in this process to further develop our system if necessary to meet different concentrates requirements. ■

Per Aredal