

FRAMO METHANOL & ETHANOL FUEL-PUMPING SOLUTIONS

Powering the transition to cleaner shipping





Proven, innovative pump solutions

Backed by decades of maritime expertise and more than 80,000 submerged pumps in operation worldwide, Framo is driving the transition toward low and zero-carbon fuels. Since pioneering our position in the methanol dual-fuel segment in 2022, we continue to expand our portfolio to help meet future fuel demands.

The future of fuel, handled safely

The global maritime industry is undergoing one of its most significant transformations since the shift from sail to steam. Driven by stringent International Maritime Organization (IMO) mandates and an urgent collective responsibility to mitigate climate change, the transition to low and zero-carbon fuels is no longer a distant vision, it is actively reshaping global fleets today.

Navigating the complexities of alternative fuels

Among the frontrunners in this green revolution are alcohol-based alternatives, specifically methanol and ethanol. These energy-dense, liquid fuels provide a highly viable pathway toward decarbonizing deep-sea cargo shipping. However, operating with alternative fuels introduces entirely new complexities to a vessel's fuel systems. Low flashpoints, unique chemical properties, and strict safety regulations demand flawless and highly reliable engineering.

Optimized for volatile fluids

This is where Framo's legacy of engineering excellence meets the demands of tomorrow. As a pioneer in pumping technology, Framo provides submerged fuel pumps specifically optimized to handle the volatile characteristics of methanol and ethanol. By submerging the pump

directly inside the fuel tank, the system eliminates the risks associated with pressurized suction lines from MeOH fuel storage tanks and minimizes potential leakage points. The Framo layout guarantees a constant, highly reliable feed to the fuel system under all operating conditions.

Built for the long haul

Choosing Framo means investing in a future-proof solution. Our fuel pumps are built with advanced, chemically resistant materials and feature sophisticated sealing technology designed to withstand the unique demands of alcohol fuels. Backed by decades of performance in the harshest marine environments, Framo ensures that as the shipping industry embraces the fuels of tomorrow, the operational safety of your fleet remains firmly anchored.

An aerial photograph of several large cargo ships on the ocean. The ships are scattered across the frame, with some in the foreground and others further away. The water is a deep blue, and the sky is clear. A red vertical line is on the left side of the page.

Meeting tomorrow's demands today

Safe and efficient fuel handling starts with smart design. By eliminating the traditional pump room and focusing on robust engineering, Framo systems significantly reduce operational risks while boosting. Our technology is built to handle the toughest marine environments, giving you a clear competitive edge.

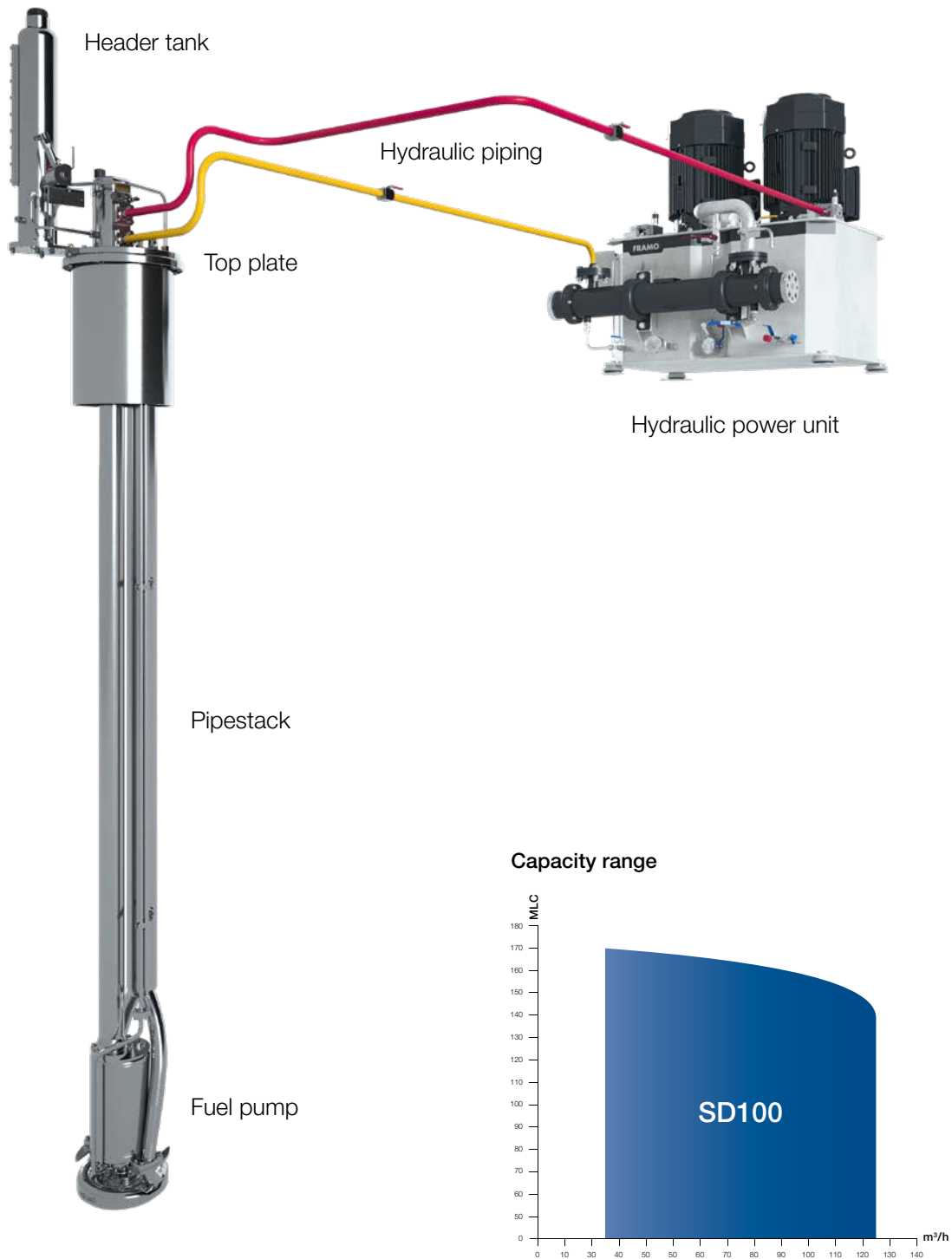
Good reasons to work with Framo:

- More than 80,000 submerged, hydraulically driven Framo pumps in operation
- Robust design with short, stiff drive shaft
- Fail-safe – all rotating parts lubricated and cooled by driving medium
- 100% redundancy plus flexibility to crossover pumps and power packs
- Double containment safety – static sealing with liquid filled cofferdam
- Hazardous pump room removed
- Pump over the top – no risk of leakage
- Built-in stripping
- 5-year in-tank condition-based service intervals
- Global service & after-sales network

Layout of the fuel transfer pump system

Engineered specifically to meet the demands of future shipping, this configuration ensures the safe, efficient – and highly reliable – transfer of low-flashpoint alcohol fuels, such as methanol and ethanol, on modern merchant vessels.

Framo can prefabricate piping systems to meet any level of complexity. The high-quality components ensure reliable, robust performance in severe marine environments.



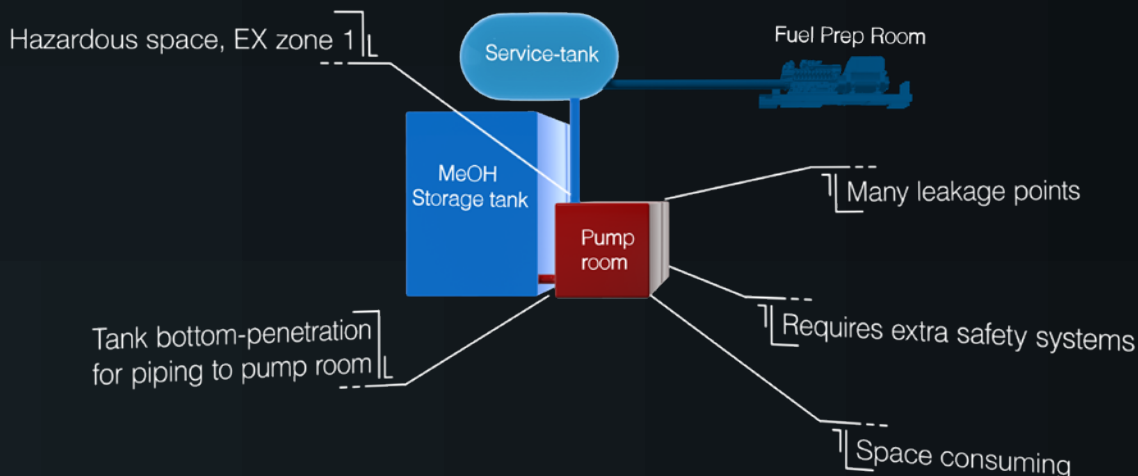
Think outside the pump room

Relying on traditional pump rooms introduces unnecessary hazards and wastes valuable vessel real estate. Embracing a submerged pumping concept allows you to design out these inherent operational risks while reclaiming critical space for cargo or fuel.

Traditional pump room limitations

Traditional fuel systems rely on dry-mounted transfer pumps situated in an enclosed, low-elevation pump room. This configuration introduces significant operational risks and structural layout challenges:

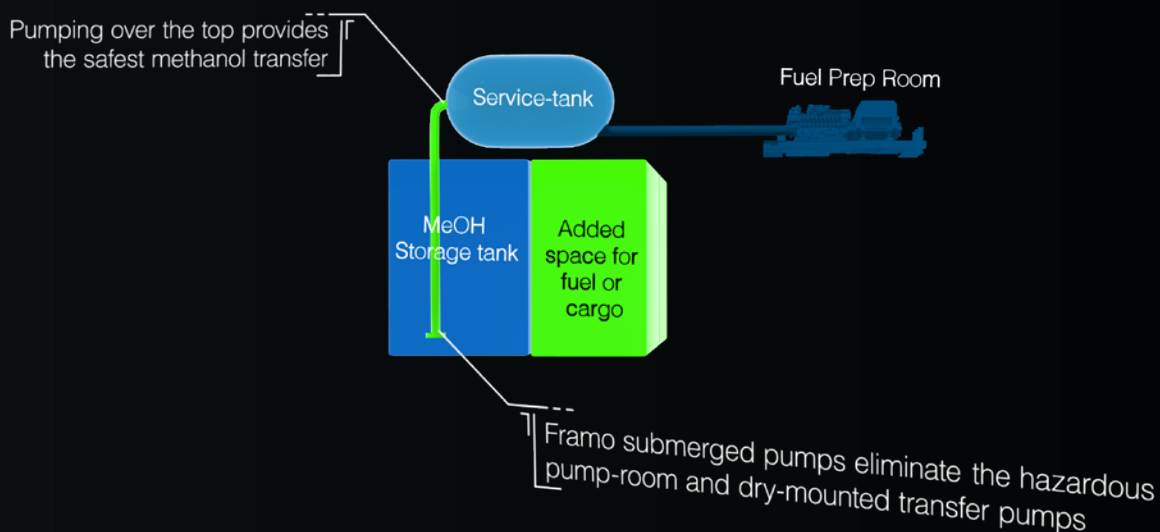
- **Hazardous EX Zone 1 Space:** Enclosing pressurized fuel machinery creates an inherently high-risk environment.
- **Many potential leakage points:** Bottom- or side-tank penetrations allow fuel to gravity-drain into ship spaces.
- **Costly safety infrastructure:** Continuous ventilation, gas detection, and secondary containment systems add immense complexity and overhead.
- **Inefficient use of space:** The footprint of a dedicated pump room consumes highly valuable space that could otherwise be used for cargo or fuel storage.



The Framo solution

Framo's submerged, hydraulically driven pump concept completely eliminates the traditional pump room. By implementing our "Pump Over the Top" principle, the system fundamentally transforms safety and space layout.

- **Eliminate EX Zone 1 Space:** No pressurized alternative fuel handling inside enclosed ship spaces.
- **Zero bottom penetrations:** No external tank penetrations on the side or bottom, entirely removing gravity leak paths.
- **Isolating risk by design:** Pressurized fuel components are securely contained within the tank, out of enclosed ship spaces. Our premium stainless-steel construction handles corrosive properties with ease.
- **Added room for cargo or storage:** Eliminating the pump room frees up valuable vessel space for extra fuel or cargo.





Proven in decades of operation

Extensive fleet experience with ethanol and methanol-fueled vessels confirms the clear operational advantages of Framo's pump concept. For fleets transitioning to low-carbon alternative fuels, this field-proven approach delivers a cleaner, safer, and fundamentally more efficient fuel handling solution.

Maximized uptime

Framo's fuel pumping solutions provide a long list of advantages:

- Minimizes operational risk: Actively lowers the likelihood of environmental spills and localized leaks during fuel transfers.
- Maximizes crew safety: Enhances safety boundaries during both routine operations and scheduled maintenance intervals.
- Fast and simple replacement of wear parts from inside the tank.
- Flexible vessel layouts: Optimizes physical space utilization onboard, whether matching in-hull tanks or deck-mounted storage configurations.
- Redundancy overrides setups: Several redundancies can be set up based on fuel supply system layout and vessel tank design.

Key operational benefits

Proven reliability

Robust hydraulic drive offers inherent, built-in protection against overload and overspeed.

Double containment safety

Liquid-filled cofferdam creates an active hydraulic barrier, while enabling automated seal integrity monitoring via a pressure transmitter in the header tank.

Fuel flexibility

Seamlessly handles a wide range of liquid properties with consistent performance.

Maximized uptime

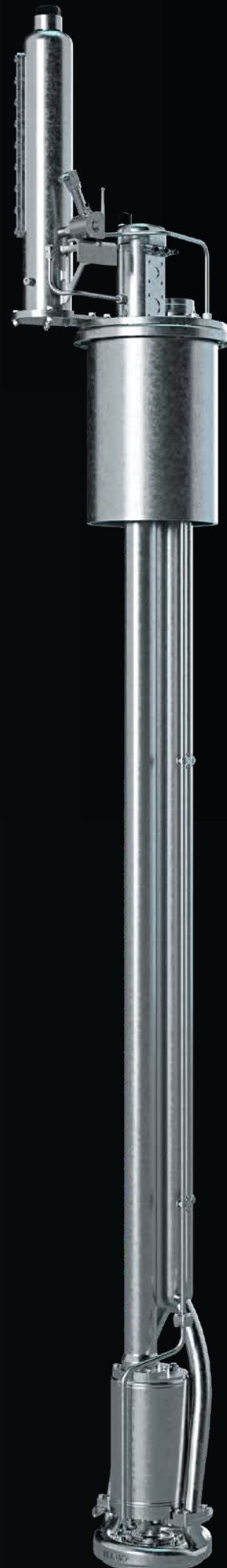
Efficient stripping, low-level operation, and continuous seal monitoring keep operations running.

Simplified maintenance

Quick, simple maintenance from inside the tank enables an easy 5-year condition-based service.



Scan to see full demonstration





GLOBAL SERVICE CENTRES

Service with the customer in focus

The marine industry is a 24/7 business. Your bottom line is dependent on every one of your vessel's systems performing as expected all day, every day. That means when a challenge does occur, you need it fixed and you need it fast.

Framo service and support is set up with the customer in focus. If you encounter an issue with your Framo pumps, we are there to help. We find a solution. Whether that is helping by remote assistance or sending a replacement part with one of our specialist service engineers; we fix it! For over four decades, our philosophy has been to solve the challenge first.

We commit to give you support, service and spares you can depend on throughout the life of your vessel – backed by unmatched experience of pumping systems. You have peace of mind knowing your pumps are always up and running.

With our focus on you, you can focus on your business.



We have service centres in strategic locations around the world to ensure that we can reach your vessel quickly whenever you need our support and expertise. No matter where you sail, we're never too far away.



framo.com

Head office FRAMO AS

P.O. Box 23, NO-5329 Florvåg, Norway
Phone: +47 55 99 90 00
E-mail: marine@framo.no

FRAMO Nederland

Edisonweg 18
P.O. Box 305
NL-3200 AH Spijkenisse
The Netherlands
Phone: +31 181 619311
nederland@framo.no

FRAMO Houston

3002 East 13th Street
La Porte, Texas 77571, USA
Phone: +1 281 884 4800
houston@framo.no

FRAMO Singapore

17 Tuas View Circuit
Singapore 637575
Republic of Singapore
Phone: +65 6210 2400
singapore@framo.no

FRAMO Nippon

Kotsu Building 5F, 15-5
Shinbashi, 5-chome
Minato-ku
Tokyo 105-0004, Japan
Phone: +81 3 5776 2405
tokyo@framo.no

FRAMO Korea

Rm 608, Centum Sh Valley
35, Centum Dong – Ro
Haeundae – Gu, Busan
Korea, 612-020
Phone: +82 51 743 6942/3
busan@framo.no

FRAMO Shanghai

Building No.5, 123
Lane 1165, Jin Du Road
Min Hang District, Shanghai
China 201108
Phone: +86 21 6115 5000
shanghai@framo.no

FRAMO do Brasil

Av. Presidente Vargas, 463
/19º andar, Rio de Janeiro
CEP 20071-003, Brazil
Phone: +55 21 2507 7898
brasil@framo.no

FRAMO Middle East

Al Quoz Industrial Area
P.O. Box 21467
Dubai, United Arab Emirates
Phone: +971 4 346 9143
dubai@framo.no

FRAMO Service

P.O. Box 44
NO-5329 Florvåg, Norway
Phone: +47 55 99 92 00
service@framo.no

FRAMO Fusa

Venjanaset
NO-5641 Fusa, Norway
Phone: +47 55 99 96 00
marine@framo.no

FRAMO Holsnøy

Rosslandsvegen 933
NO-5918 Frekhaug, Norway
Phone: +47 55 99 75 00
piping.marine@framo.no

FRAMO Flatøy

Flatøyvegen 24
NO-5918 Frekhaug, Norway
Phone: +47 55 99 94 00
oil&gas@framo.no