

MARINE CARGO PUMPING SYSTEMS

Framo service, support and training



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.

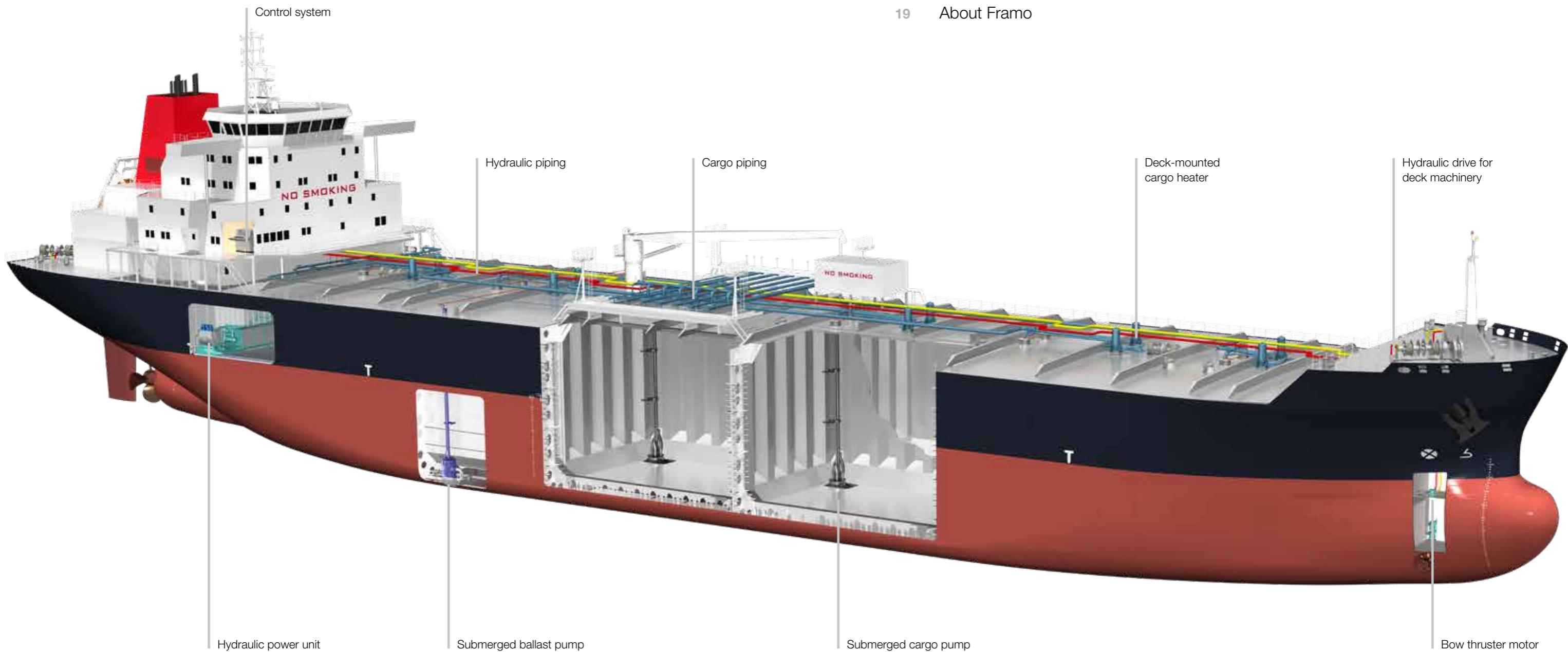


Framo will be your partner for finding the best possible solution to your pumping issues – anywhere in the world, at any time.

The heart of your operations

Pumping systems are at the very heart of your tanker's operations and are integrated throughout your vessel. The performance of the pumps therefore impacts the overall performance of your ship and, indeed, your entire operation.

To get the most from your vessel, condition knowledge of your Framo pumping systems' true condition is essential. Framo services give you the tools you need to monitor your system's condition and properly conduct maintenance in a timely manner, thereby keeping your pumping systems running.



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FRAMO SERVICE

Reliable expertise when every minute counts

Having the correct expertise available at all times is essential. The Framo service team can assist you with online troubleshooting, field and workshop service, inspections, project and docking planning. Whatever you need, whenever you need it. 24/7, around the world.

Cost-free remote troubleshooting

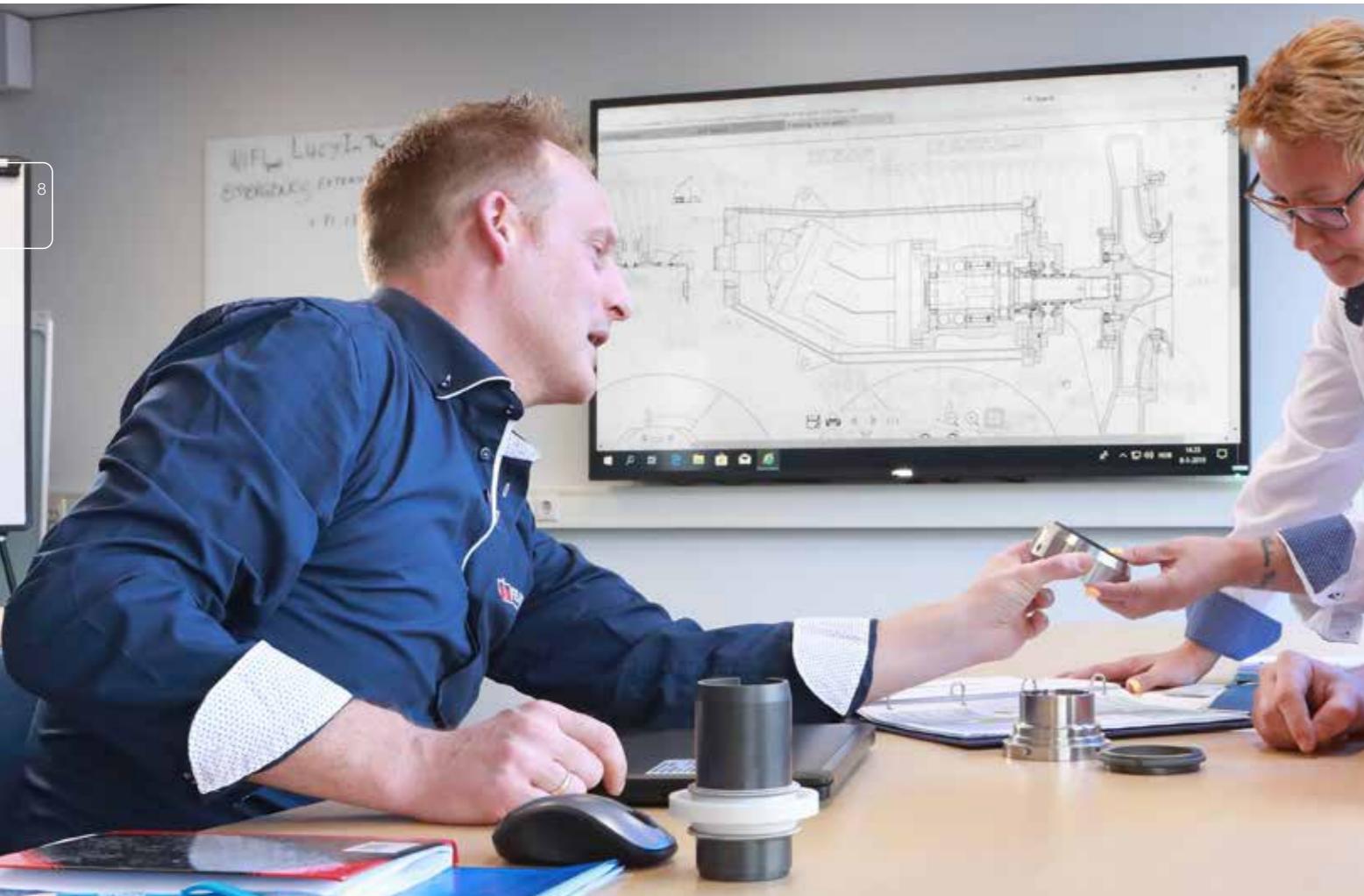
Whenever possible, we aim to help your team resolve issues on their own, so you can resume operations even faster. No matter where in the world you are, the Framo service team can provide troubleshooting for any matters via phone, e-mail or video conferencing any time of day, any day of the year. And their expert advice is always cost-free.

Keeping track of your pumps

We document all on-site work using standardized reports, which are filed in our document handling system. This ensures our service and project engineers always have easy access to the operational history of your pumping systems, and can therefore provide the best level of service, fully tailored to your vessels installation.

The experience you need

Framo has developed extensive service training programmes, based on over half a century of experience in marine cargo pumping. All Framo service engineers go through our trainings to ensure they have the competence, skills and necessary certificates to solve complicated problems in challenging offshore environments.



GENUINE SPARE PARTS

The right parts – always available for optimal performance

The cargo tanks of product and chemical tankers are incredibly inhospitable environments. When transporting dangerous cargoes, you can't afford to cut corners. Only original parts, designed, manufactured and tested by Framo, can ensure reliable performance from your cargo pumping systems.

Quality assurance

At Framo, quality control is paramount. Our material control department inspects manufactured parts to verify that standards are in accordance with all relevant requirements. All of our spares are developed using carefully selected materials and undergo rigorous testing to ensure that they have the correct qualities for the tasks they perform.

Because genuine Framo spare parts are specifically designed for Framo cargo pumping systems, they are the only way of maintaining optimal performance for your vessel's equipment as well as preventing damage to the system and the risk of operational hazards.

Fast, worldwide availability

Our goal is to be your vessel's "spare parts warehouse." We offer over 8000 unique spare components that are designed, manufactured and tested at our facilities in Norway. Each of these is tracked in our database to make sure you can easily get the exact part you need, when you need it.

All relevant wear and tear parts are readily available from Framo's global service centres. From our large spare parts stocks, situated in strategic locations, spare parts can be shipped out in a matter of hours. For several key items, Framo also carries an exchange stock in the same warehouses.

For critical cases in remote locations, Framo service personnel can even fly out to deliver the part in person. This ensures the part you need arrives and is properly installed as fast as possible.

Continuous dialogue

The experts at Framo service centres help your team to understand which spares are critical to stock on board, and which should be ordered as needed. To guarantee each part is stored under best conditions for the longest performance life, we work with you to make sure you only purchase the components you absolutely need.

As part of an ongoing conversation with our service team, we can also track and monitor turnover of wear parts on your vessel. If a certain part is being replaced too frequently, we work with you to identify and solve the problem. This way, you can be sure you get the longest – and most cost-effective – performance from your Framo equipment.



GLOBAL SERVICE CENTRES

Service where you sail

Framo understands that when your vessel is in need of service, you can't afford to spend days and days waiting for an engineer to arrive. We have established 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 global service centres and the following services are available in these locations:

Bergen, Norway

- Service technicians
- Training facility
- Pumping system rentals
- Original spare parts
- Workshop and oil lab

Rotterdam, The Netherlands

- Service technicians
- Training facility
- Pumping system rentals
- Original spare parts
- Workshop and oil lab

Houston, USA

- Service technicians
- Training facility
- Pumping system rentals
- Original spare parts
- Workshop and oil lab

Rio de Janeiro, Brazil

- Service technicians

Singapore

- Service technicians
- Training facility
- Pumping system rentals
- Original spare parts
- Workshop and oil lab

Tokyo, Japan

- Service technicians
- Pumping system rentals
- Original spare parts (limited selection)

Busan, Korea

- Service technicians
- Pumping system rentals
- Original spare parts (limited selection)
- Oil lab

Shanghai, China

- Service technicians
- Training facility
- Oil lab

Dubai, UAE

- Service technicians
- Pumping system rentals





OIL MONITORING AND INSPECTION PROGRAM

Expert analysis for better performance

Download
Service Bulletins at
framo.com

Framo pumps are designed and tested to ensure lifelong reliable operation. However, regularly scheduled service is critical to getting the most from your pumping system. Founded on a philosophy of condition-based maintenance, the Framo oil monitoring and inspection program (OMP) is a tool, that assists the ship's team and the responsible superintendent with maintenance recommendations. It can also be used as a manufacturer statement to various external inspectors, such as vetting, class and port authorities.

The most cost-effective pump maintenance

For members of OMP, Framo service experts provide quarterly analysis of hydraulic oil samples to diagnose the condition of your Framo cargo pumping system. In combination with yearly inspections by an attending Framo service engineer, you gain critical insights into the correct operation of your cargo pumping system. Also, when a vessel is due for docking, a more thorough pre-docking inspection replaces the annual inspection, to better prepare you for the upcoming service period.

Monitoring the condition of your vessel's pumping system this way, allows you to address matters of concern before they become critical, which in the worst case could require costly repairs. We aim to maintain reliable conditions, safe operation, and extended lifetime of your Framo cargo pumping system. You have access to our expertise, with recommendations for both dependable operating practices as well as further actions or parts replacements as needed.

A Framo hydraulic oil sampling kit is supplied, including sampling bottles and instructions. Send an oil sample to one of our laboratories according to the inspection and analysis plan, available on MyPage, your online platform, providing quick access and an overview of Framo-related services and activities.



PURGING

True insights into pump seal condition

Download
Service Bulletins at
framo.com

All Framo cargo pumping systems feature a cofferdam that creates a protective area around the pump. Purging the cofferdam on a routine basis is a simple way to monitor the condition of shaft seals and ensure that your pump is operating as intended.

The purging process

Pressurized air or nitrogen is used to purge the pump cofferdam of liquid, which is then collected and logged. The trend of logged purging result is used to plan any corrective maintenance, such as a change of the shaft seals.

Framo recommends purging the pump cofferdam shortly before and after every loading and discharge operation, as well as every two weeks during longer voyages.

Expert insights and advice

For a cost-free analysis after each voyage, we strongly recommend you submit the purging data you collect to Framo. Please instruct your team to use our purging form and send this information to autopurging@framo.no with the ship's superintendent included in the email. This information will automatically be screened, and if the test results are within acceptable limits, your team and superintendent will receive an "OK" response within minutes.

If the results are outside the recommended limits, they will be reviewed by one of our experienced service technicians. If necessary, the technicians will provide recommendations for service. We can also walk your team through certain troubleshooting procedures.



FRAMO TRAINING SEMINARS

Framo training: A good investment

Download
Service Bulletins at
framo.com

Framo training provides your team with correct skills for maintaining and operating Framo cargo pumping systems. This results in reduced maintenance and effective operation performance.

Customized training for your operations

Every year, Framo's training department leads over 130 courses with more than 1200 participants. Your team receives a combination of theoretical and practical training, using the system installed onboard your vessel or similar equipment at one of our global training centres.

Framo training options include:

- **The superintendent seminar** – A three-day seminar especially intended for superintendents and other technical operators. The main subjects will be pre-docking, annual inspections and evaluation of used spare parts.
- A tailor-made course can be arranged at our training centres at any time of the year, based on your specific systems and needs.
- **Onboard training** – Training specific to your Framo system, which can be arranged when sailing between ports. These courses can also be combined with a pre-docking technical inspection and report.
- Diplomas are issued to all training course participants, and a Framo training certificate can be issued after an exam. This has proven to be very useful for vessels and teams for proving experience both for vessels qualifications and vetting inspections.

Find courses on www.framo.com/training



PARTS RECONDITIONING

Cost-effective exchange that ensures uptime

Download
Service Bulletins at
framo.com

All rotating equipment is sensitive to wear and tear after extended operation. Frama offers reconditioning of parts to extend the lifetime of certain pumping system components. The possibility of reconditioning for key parts saves you money on spares and replacements, while still ensuring optimal performance from your pumps.

Reconditioning services are offered for:

- Impellers and impeller hubs
- Hydraulic pumps (exchange or repair)
- Mechanical seals
- Cargo pump body parts, including housings and pipestacks
- Various types of hydraulic valves and controls

Further refurbishment services are offered for:

- Ceramic sleeves

Exchange programme

With Frama's reconditioning exchange programme, your team can quickly receive a new part for time-sensitive maintenance issues. Once a replacement becomes necessary, our service team will swap out your existing part with a reconditioned equivalent from one of our global service centres. In this way, system downtime is kept to a minimum.

Following the installation of the replacement, your original part is taken back to Frama's service facilities, where it is reconditioned for later exchange.

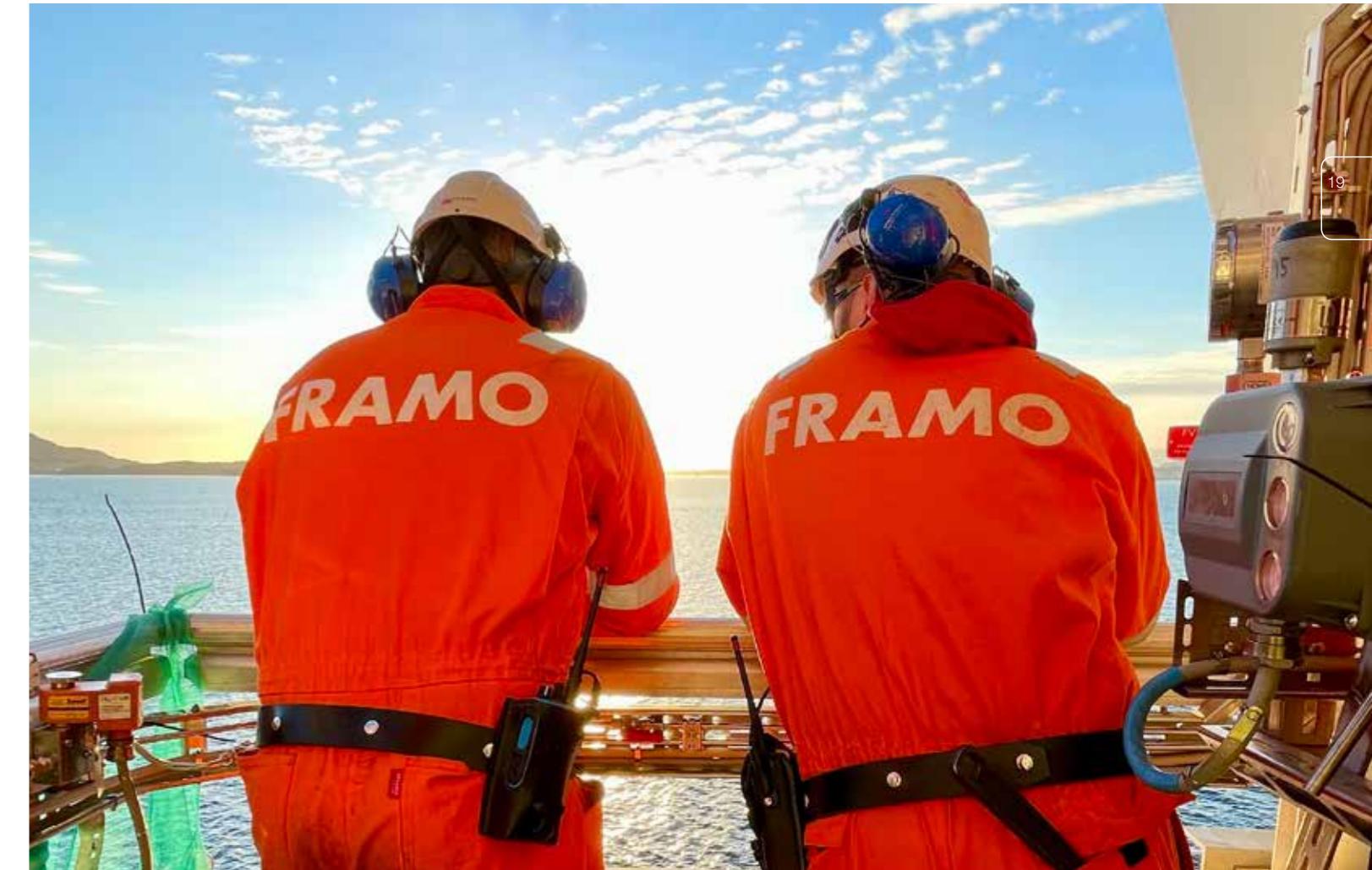
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Hydraulic piping aboard a vessel is exposed to some of the harshest environments on the planet. Proper maintenance is necessary to ensure a long lifetime for hydraulic pipes. Frama has developed a unique service for safely installing new pipes when required, while simultaneously minimizing downtime.

Plug-and-play piping

With Frama's prefabricated, high-quality, precision piping solutions, our expert engineers visit your vessel to inspect and measure pipe sections, free of charge. Based on the measurements, Frama produces drawings for fabricating replacement pipes. The new pipes are produced in our workshops and factories, and they are delivered as replicas for a quick and easy installation. No hotwork required for pipe manufacturing onboard.

The process is not only safer than traditional pipe work, it is also faster. Once Frama has taken the measurements, we will supply layout drawings of the hydraulic piping, making it as easy to order new pipes as it is to order normal spare parts.



PUMPING SYSTEM RENTALS

Rent an expert

Download
Service Bulletins at
framocom

Founded on our own range of portable pumps, Frama has established a worldwide rental network of pumps, equipment and personnel.

The combination of self-developed systems, engineered planning capability, global availability and 40 years of daily experience is why we say that you can “rent an expert.”

Equipment and solutions for you

Frama strategically stores a wide range of portable pumps, hydraulic power packs and auxiliary equipment at our service stations around the world. All equipment is ready to be mobilized on shortest notice, for local or remote jobs.

Frama pumps can be used for pumping any type of liquid. Examples of rental applications include:

- Molasses stripping/assistance
- Difficult cargo assistance
- Booster pumping

- Vessel off-spec fuel de-bunkering
- Ballasting/deballasting
- Tank cleaning and sludge pumping
- Frozen liquid tank heating
- Salvage offloading and emergency offloading
- Inclination testing by ballasting
- Terminal/refinery storage tank assistance
- Shore basin pumping
- Dry dock pumping assistance

ABOUT FRAMO

A partner to rely on

With a history stretching all the way back to 1938, Frama takes the long view when it comes to our relationships with customers. We believe in creating an active partnership with you and your team, built on reliable experience and competence.

Feedback from our customers is the best way to improve our products and service, and we strive to make annual visits to all customers with Frama equipment onboard a vessel in their fleet. The exchange of knowhow, experience and expertise helps us to help you improve your business.

Our 24/7 service organization has always been an integrated part of the Frama philosophy. For more than four decades, we've ensured that Frama experts are there locally in the harbours where you need them, when you need them. That's what you can expect when you choose Frama.

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