

DEFENCE & FUEL

Naval Capability Plan

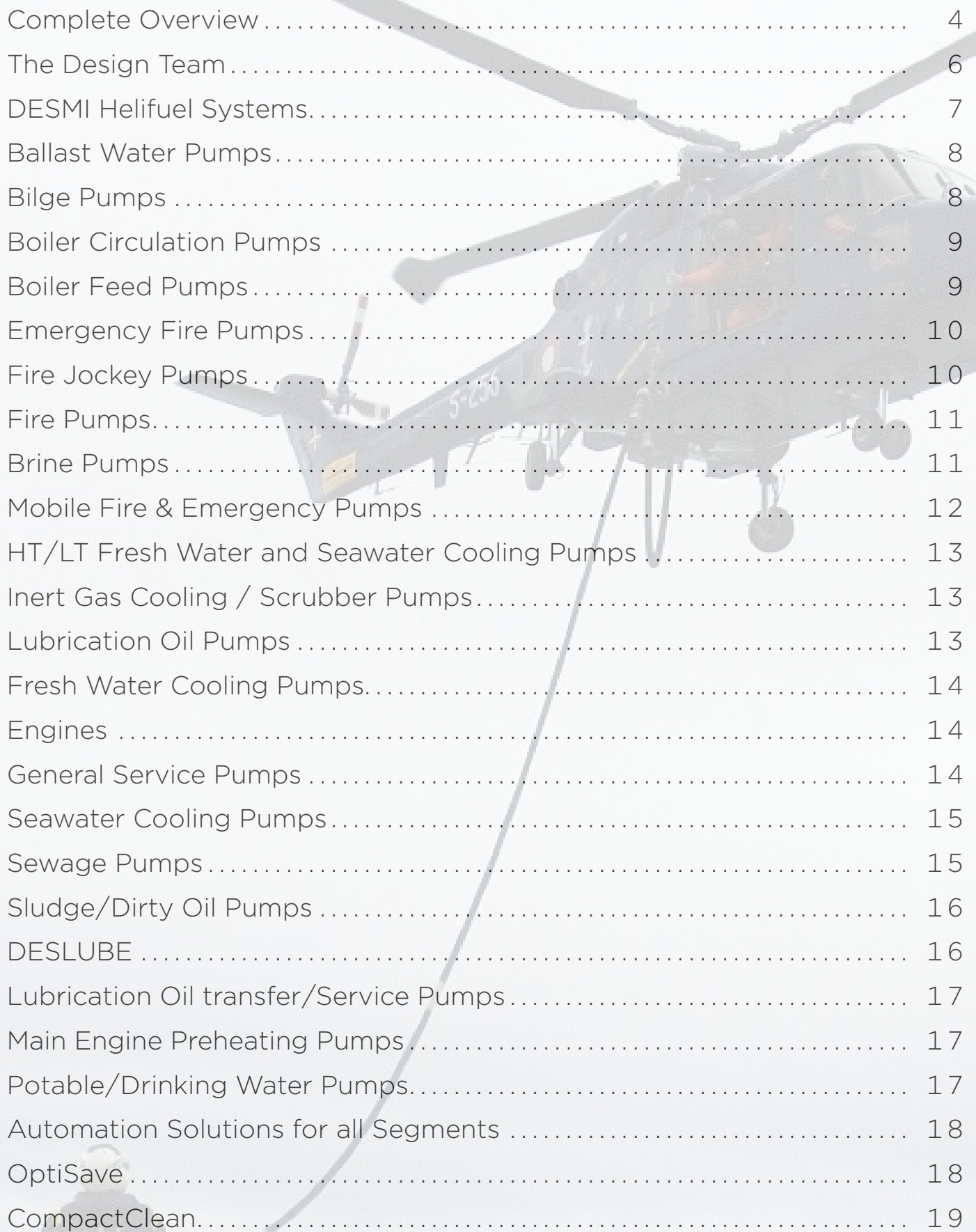
PROVEN TECHNOLOGY

DESMI

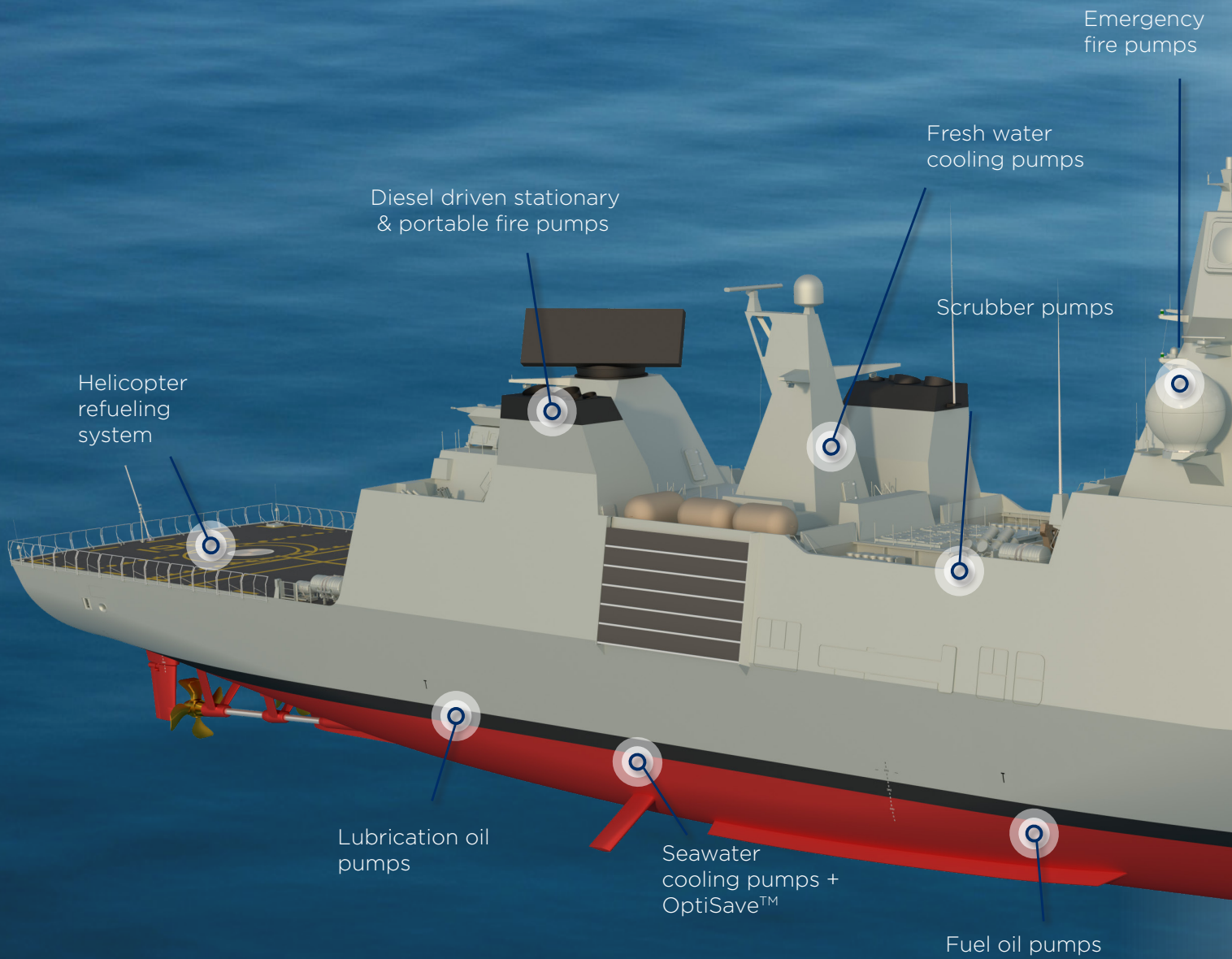
Pumping Solutions for Military Applications

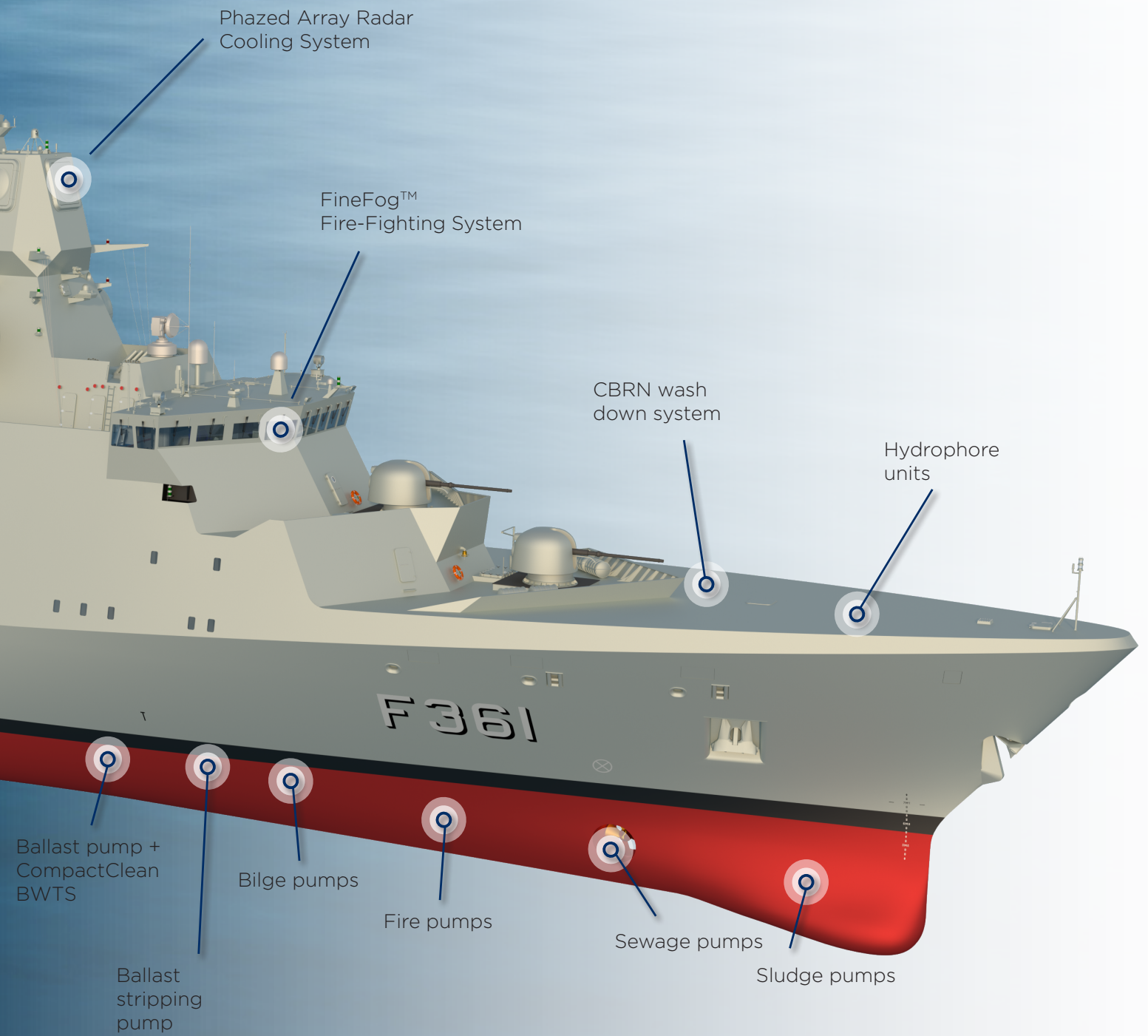
DESMI has a history going back many years of providing pumping solutions for military applications not least within the Naval sector. Client demands for equipment reliability under adverse conditions have made our solutions the choice of many Navies.

We offer more than 100 pump types within our range and do not compromise when it comes to product applications. Within our portfolio we have products to fit most client expectations.

The background of the page features a faded, grayscale image. The upper portion shows the tail and rotor assembly of a helicopter, with the tail boom and rotor hub visible. The lower portion shows a person in a dark uniform and a white helmet standing on a ship's deck, looking out over the ocean. The person is positioned near a metal railing with a chain-link fence. The overall scene is dimly lit, creating a professional and technical atmosphere.

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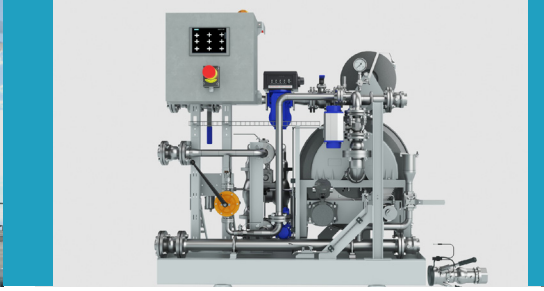


The DESMI Design Team adapts our standard range to Military Off The Shelf (MOTS) equipment, meeting client shock requirements. We 3-D model equipment to contract requirements – and our project management includes the provision of test certification and Integrated Logistic Support documentation.

Proven technology and energy efficient pumping solutions you can rely on:

Shock, Noise and Vibration Rated Pumps
Pumps for installation in a shock, noise and vibration rated environments for Navies around the world. The supply of pumps for installation in a shock rated environment is frequently demanded by Navies around the world.

DESMI, with our ‘in house’ shock team can offer pumps rated to the individual needs of our clients.



The DESMI systems are intended for use in both the military and commercial sectors. We are a preferred supplier of systems for fixed and rotary wing aircrafts as well as for ground vehicles and static equipment.

Each system is specifically designed for pumping, filtering and dispensing of fuel for military and naval use.

The ship based helicopter refueling system is used for pressure and gravity fueling of aircrafts on board Naval Vessels, and the system is also fitted with a facility to defuel the aircrafts. The refueling system comprises a pump filter module, dispenser module, and a control system.

The dispenser module consists of a mechanical meter, defuel pump, hose, hose reel, pressure refueling nozzle and gravity refueling nozzle and optional a filter water absorber.

A Helicopter In-Flight Refueling (HIFR) unit can be connected to the pressure refueling nozzle hose or a deck mounted connection on the flight deck.

The pump filter module consists of filter water separators and DESMI ROTAN® positive displacement fuel pumps. The twin pump refueling system has built-in redundancy for maximum reliability. The service and transfer pumps and filter water separator duties are fully interchangeable by use of valves.

All DESMI aviation fuel system will be adapted to specific customer needs to ensure that the best possible option is selected for the job.



Ballast Water Pumps

Ballast pumps are crucial for the operation of most vessels. They pump water in and out of the ballast water tanks during loading, off-loading and trim of the vessel. The pumps often require low NPSHr and high flow. Pressure can be increased if a Ballast Water Treatment System is installed.

For this application DESMI recommends two different alternatives dependent on the specific requirements. Both are vertical in-line pumps and a special feature is the possibility to remove the

internal parts of the pump without dismantling the pipes or even removing the electric motor.

The pumps are specially designed for marine applications and will serve the owner as a reliable and trustworthy piece of equipment for a long time. The pumps are of either the NSL or the DSL type. When combining the need of low NPSHr, high efficiency, easy maintenance, and low costs both the DSL and the NSL are the optimum choice.



Bilge Pumps

Bilge pumps play a vital role in the operation of vessels - both in the daily use and in case of emergency. After cleaning or repairwork inside the engine room, some water or other liquids will run into the bilge wells. These wells are then emptied by means of a bilge pump. As the water may contain oil it needs to be cleaned before pumping overboard. For daily use a small pump will handle the task, however, when an emergency arise it may be necessary to use an emergency bilge pump. In such cases one of the SW cooling pumps, a ballast pump, a fire pump or a general service pump can be used and thus serve a dual purpose.

For daily bilge pumping the horizontal self-priming pump type S from DESMI is a cost-effective and reliable solution. It is also available in a SUPER-

PRIMER version for long suction pipes. This type S pump is able to evacuate the air trapped in the suction line without the need of any additional priming device. Just fill the pump body with water prior to the first start-up and after that the pump will be self-priming.

For bigger capacities the vertical in-line NSL pump can be used, but this requires an additional priming device.

If needed DESMI also supplies eccentric screw pumps, progressive cavity pumps, piston pumps or sliding shoe pumps on request.

Boiler Circulation Pumps

Most vessels have one or more boilers onboard for different applications - e.g. exhaust gas or oil fired boilers. If the boiler is filled with water it may be necessary to force the circulation within the boiler. For this purpose a boiler circulation pump is needed. The boiler circulation pump is in most cases part of the boiler manufacture supply as the pump is rather specialised due to the high temperature and pressure. If required DESMI is able offer a vertical multistage pump suitable for these running conditions.



If needed DESMI also supplies eccentric screw pumps, progressive cavity pumps, piston pumps or sliding shoe pumps on request.

Boiler Feed Pumps



Most vessels have one or more boilers onboard for different applications such as exhaust gas or oil fired boilers. If the boiler is filled with water it is necessary to re-fill it with water when steam is leaving the boiler. For this purpose a boiler feed water pump is needed.

This application is not so critical as is the boiler circulation, but it is still necessary to use a pump suitable for the high temperatures. A vertical in-line multistage pump is a very good solution for this application as the flow is quite small whereas the pressure is relatively high. The small multistage pumps from DESMI are very suitable for this application.

Emergency Fire Pumps

The worst thing that can happen to a vessel - besides going down - is fire. In the event of fire it is crucial that sufficient water is available at sufficient pressure in order to be able to extinguish the fire. For this purpose several fire pumps are required.



The NSL pump is the most obvious choice for this application. It is vertical to save deck space, it is reliable, and it can handle the high pressure required due to the special impeller design which takes a lot of the pressure away from the shaft seal. The NSL pump is also designed to handle the pressure of the big electric motor which is often required to operate a fire pump.

Fire Jockey Pumps

For fire jockey applications DESMI suggests a vertical multistage pump which can maintain a high pressure in the fire jockey tank and in the fire line, when water flow is not required. In this case low capacity and high pressure is needed.





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Brine Pumps



Brine pumps are used to pump cold brine in a closed circuit from the evaporator that creates the cold to the cooling surfaces where the cold is needed. This could be in a HVAC system or a fish freezing system. The brine is often filled with e.g. salt which allows the brine to be cooled down to below the normal freezing point of water. This high content of salt gives the brine a very high density which can be as much as 2.5 kg/litre.

DESMI pumps are very suitable for this application due to their sturdy design. When the density is so high it will expose the shaft to more torque as well as more wear on the rest of the components within the pump. This will eventually make a non-suitable pump break down. However, this will not happen to a DESMI pump!



Mobile Fire & Emergency Pumps

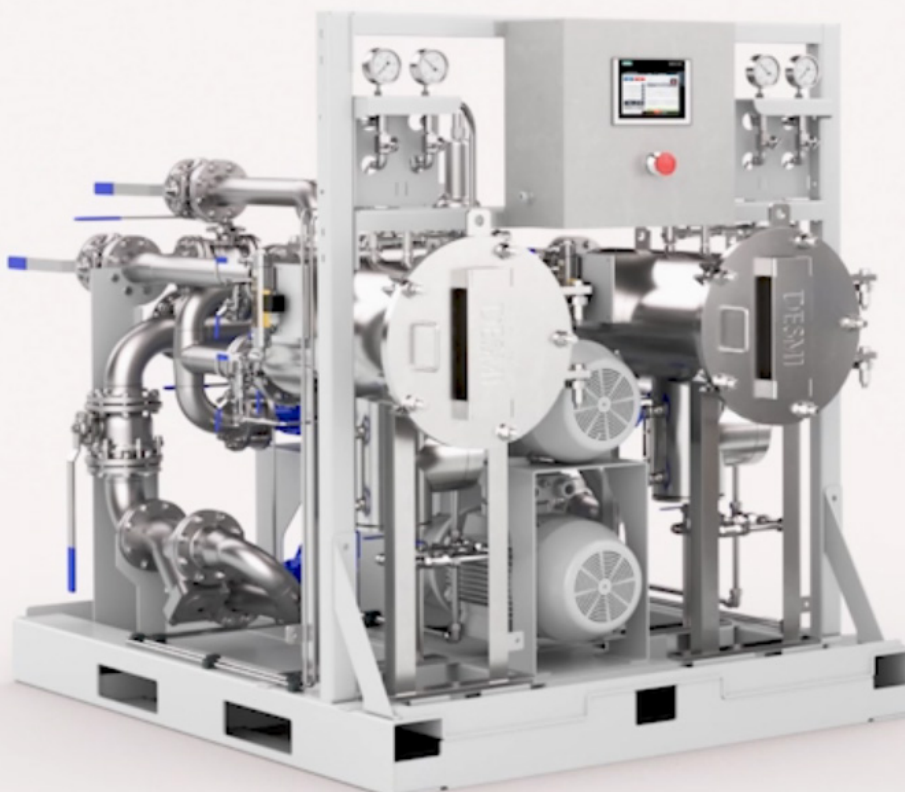
These pump units are made to comply with the demands of the marine industry as regards materials, design, and ease of handling.

All DESMI's mobile pumps are in compliance with the Danish Maritime Authority's requirements for portable emergency fire pumps in fishing and cargo vessels together with P-vessels.

SA50T is a mobile emergency fire and bilge pump which weighs as low as 50 kg. This lightweight pump is specially designed for easy handling on board vessels.

The construction is based on the well-known DESMI SA pump series. The pump casing is made of seawater resistant aluminium and the impeller of stainless steel. The pump is close coupled to a new-developed lightweight hand start Hatz diesel engine. Electric start is available as an option.

The pump unit is mounted in a stable carrying frame. The flanges of the pump are equipped with Storz C-2" couplings for quick and safe connection of the hoses. The low weight of the unit and the stable frame make it possible to move the pump around.



HT/LT Fresh Water and Seawater Cooling Pumps

Low temperature (LT) and high temperature (HT) systems are some of the large systems onboard a vessel. The purpose of these systems is to cool main engine, auxiliary engines, and other equipment in the engine room which needs to be cooled-down.

The system is always a closed system where the same water is circulated continuously. The central fresh water cooler makes sure that the temperature is kept on a suitable level.

To circulate the water a high-efficiency fresh water cooling pump is needed as it will have many running hours. DESMI manufactures highly specialised pumps for marine and offshore, and all our vertical in-line pumps are suitable for this application. Choosing one of these pumps will provide the end user with a long lasting and reliable product.

Inert Gas Cooling / Scrubber Pumps

Inert gas is used onboard tankers with flammable cargo. It is pumped into the tank to replace the atmospheric air as this contains oxygen which can make the cargo ignite. Inert gas can be nitrogen from a nitrogen generator or exhaust gas from an inert gas generator where fuel has been burned using the oxygen. However, after the burning the inert gas needs to be cooled. The vertical in-line NSL pump is one of DESMI's better alternatives for this application. The high efficiency and compact design make it ideal for this application.



Lubrication Oil Pump

The main engine needs a continuous flow of lubrication oil to lubricate all parts inside the engine and to cool the lower side of the pistons. Without these pumps the main engine cannot operate.

Two different types of pumps are normally used for this application - both of them are of course

available from DESMI. For smaller engines (4-stroke) the operation of two or three spindle screw pumps is often required as they provide a constant flow of oil. For bigger engines (2-stroke) a long-shaft submersible centrifugal pump is used.

Fresh Water Cooling Pumps

A lot of equipment onboard a vessel generates heat which needs to be removed, and a good way to do this is to cool it with water. This could be the case for thruster units, hydraulic units, cooling units and many other types of equipment. Fresh water is used to remove this surplus heat.

To circulate the water a high efficient, fresh water cooling pump is needed due to the many running

hours required. DESMI manufactures highly specialised pumps for marine and offshore, and all our vertical in-line pumps are suitable for this application. Choosing one of these pumps will provide the end user with a long lasting and reliable product.

Engines

Diesel engines and boilers need fuel. The fuel can be both marine diesel oil (MDO) or heavy fuel oil (HFO). But more and more areas at sea are being restricted as to burning fuel containing sulphur. Fuel transfer pumps are used for pumping fuel from one tank to another. Service pumps are used for fuel supply to fuel consumers.

No matter whether the fuel contains sulphur or not or whether the viscosity is high or low, DESMI supplies the correct pump for all solutions.

If a positive displacement pump is needed DESMI ROTAN® internal gear pumps are the most obvious choice for fuel applications. The simple design and the low speed ensure that it will run when it is required. Further a minimum of maintenance will be needed. The integrated by-pass valve prevents the motor from burning off if the discharge from the pump is blocked. The pump is also available in a magnetically coupled version where shaft seals are not needed thus avoiding leaks and replacement of seals.

General Service Pumps



Many vessels are equipped with a general service pump which can be used for more applications such as e.g. bilge, ballast or fire.

DESMI offers a wide range of pumps for various combinations and dual duty point operation. It is always possible to find a suitable pump for combined applications. This can be achieved by means of a dual speed electric motor, an orifice, or simply by choosing the correct pump curve for the job.

Seawater Cooling Pumps

A seawater cooling pump takes suction from the sea chest, pumps the seawater through the central FW cooler(s) and then overboard.

The system can be designed with two or three pumps. The pumps are crucial for the operation of the vessel and they are always running.

For this application DESMI recommends two different alternatives dependent on the specific requirements. Both are vertical in-line pumps and

a special feature is the possibility to remove the internal parts of the pump without dismantling pipes or even removing the electric motor.

The pumps are specially designed for marine applications and will serve the owner as a reliable and trustworthy piece of equipment for a long time. The pumps are of either the NSL or the DSL type. When combining the need of low NPSHr, high efficiency, easy maintenance, and low costs both the DSL and the NSL are the optimum choice.



Sewage Pumps

Sewage from the accommodation is handled by a special system where the sewage pump is an important part.

DESMI supplies many different types of sewage pumps - both progressive cavity and centrifugal

pumps. Some degree of solids and particles should be expected in the sewage water so a pump with an open impeller like the SA pump from DESMI is a great alternative.

Sludge/Dirty Oil Pumps



Sludge is residue from purifiers after the lube and fuel oil have been purified. The sludge or dirty oil is stored in a tank from where it is being removed when the tank is full. The pump has a low amount of running hours.

DESMI ROTAN® internal gear pump is a good solution for this application. It is a positive displacement pump which is self priming. Alternatively a progressive cavity pump can be used.

DESLUBE

The DESLUBE series is a submerged deep well pump designed for Main Engine Lubrication oil supply for especially large two-stroke engines.

The design is based on our long time experience of manufacturing deep-well pumps as well as the design features from our in-line centrifugal series.

The pump is placed in the tank sump supported by dome flange and requires no further suspension.

The sturdy construction ensures a reliable operation with low noise and vibrations level



Lubrication Oil Transfer/Service Pumps

Lubrication oil needs to be handled and changed onboard the vessel and transferred from a tank to the different consumers. The lubrication oil transfer pump takes care of this operation.

DESMI ROTAN® internal gear pumps are the most obvious choice for minor oil applications. The simple design and low speed secure that it will run

when it is required with a minimum of maintenance. The integrated by-pass valve prevents the motor from burning off if the discharge from the pump is blocked. The pump is also available in a magnetically coupled version where shaft seals are not needed thus avoiding leaks and replacement of seals.

Main Engine Preheating Pumps

Main engine preheating pumps are only in operation when the main engine is not running. The purpose of this system is to keep a constant, high temperature in the main engine in order to avoid unnecessary heat and cold contractions and thus keep the engine ready to run at all times.

DESMI supplies small vertical pumps type ESL. These pumps will be the obvious selection for this application



Potable/Drinking Water Pumps

The crew onboard vessels needs water to shower for cooking, drinking and so on. This system is supported by one or two potable water pumps.

The best solution for potable water is a vertical multistage pump in stainless steel which can generate the required pressure without contaminating the water.

Automation Solutions for all Segments

DESMI Automation offers a wide range of automation solutions developed for the Marine and Defence segments.

Our product portfolio covers solutions from simple motor starters to advanced PLC based solutions. DESMI Automation is constantly developing new product solutions, currently the following products are offered as standard products:

- Standard waste water pump automation
- Diesel-driven sprinkler pumps for naval vessels
- Frequency converter solutions
- Refuelling systems for navies and Coastguard and luxury yachts
- Heeling systems
- Electrically and diesel driven fire pumps
- Energy-saving (OptiSave™) onboard vessels (newbuilds and retrofit)

- Full by-pass or redundant system for OptiSave™
- Motor starters ranging from 0,75kW to 90kW.
- Frequency converter solutions with build-in optional Web-server facility, 0,75kW to 1MW (in various voltage range).
- Tank level control solutions.
- Pump heating control solutions.

DESMI Automation offers customized solutions for advanced pump systems.

DESMI automation handles technical clarification, design, programming, installation, commissioning and service.

Automation solutions are developed according to specified rules and regulations, UL standard, EN/IEC standard, ATEX/IECex standard and all major Marine classification societies.

OptiSave™ Energy Saving System

With DESMI OptiSave™ it is simple - save 80,000 USD by having an intelligent control of your cooling water system

The cooling water system on-board vessels is designed for operation in 32°C seawater and 100% engine load and the auxiliary equipment runs as if this condition is permanent.

However, the seawater temperatures of the oceans are not 32°C all over the world. Actually, there are only few hotspots where these conditions are present. This means that the cooling system in 95% of operation time are absorbing too much energy. Install & Save

By installing DESMI OptiSave™ energy saving system you will be able to regulate the energy consumption according to actual cooling demand and thereby save fuel for your generating sets.

You will achieve a 50% reduction in the energy consumption for your cooling water pumps already at 28°C.

The power consumption of the pump will be reduced 4 times compared to the speed reduction of the pump.



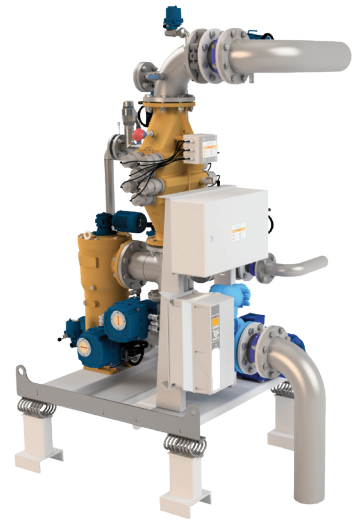
CompactClean Ballast Water Management System

DESMI manufactures Ballast Water Management Systems in a shock rated design, to withstand shock and vibrations, according to Naval standards.

The name of the system is CompactClean, and it is the most compact BWMS on the market which combines very low space with large flow rates.

Filtration and UV treatment

- No chemicals
- No risk of increased corrosion
- No hazards to crew, vessel or environment
- No salinity limitations
- No temperature limitations
- Very small footprint, just 1.2 m² for a complete 135 m³/h system



DESMI supports Navy activities in many ways

- ✓ Special Build projects for new pumping applications, upgrades and obsolescence replacement.
- ✓ Replacement pumps during docking periods for both Navy and Fleet Auxiliary Ships.
- ✓ Attendance on board to oversee installations and to commission equipment.

DESMI have a comprehensive understanding of Naval technical requirements and applications for pumps and pumping systems





Need more information or specifications? Contact us at desmi@desmi.com or read more about DESMI and DESMI's other products and solutions at www.desmi.com

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