



Framo Services AS

Contact information

service@framo.no

Quick reply – service – spare parts

autopurging@framo.no

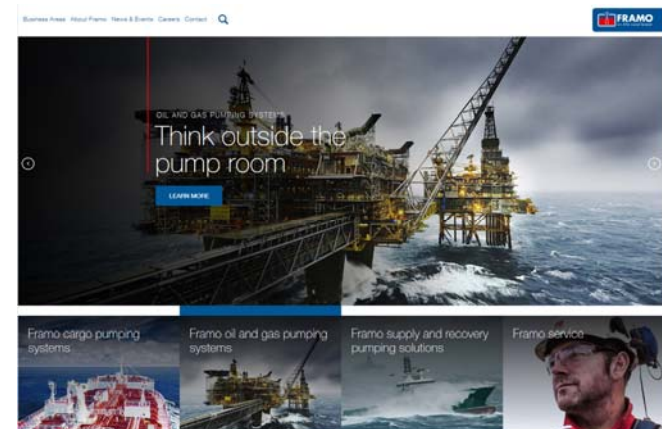
Purging reports for evaluation after ended voyage

According to service bulletin no. 47 and purging instruction 1000-0010-4



www.framo.com – Home Page

<https://www.framo.com/service/cargo-pumping-services/service-bulletins/>



“A leading manufacturer of submerged
pumping systems for the shipping
and offshore industry.”

History

- Founded by Frank Mohn in 1938
- 1960s - first company applying hydraulic drive to marine pumps
- 1970s - entered the North Sea offshore market
- Headquarters and 4 other facilities in Bergen area, Norway. 1,200 employees
- Sales support and service in Rotterdam, Houston, Singapore, Shanghai, Busan, Tokyo, Dubai and Rio de Janeiro
- Acquired by Alfa Laval in 2014

History

- The Submerged cargo pump was developed in the 1960s, in close co-operation with major chemical tanker operators
- First vessel with Framo Submerged Cargo Pump – 1969

Per September 2016:

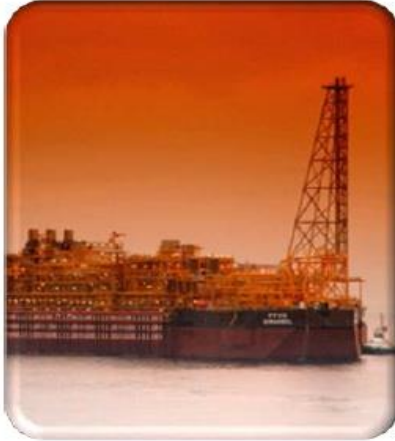
- 4.150 ships/systems delivered in total
- 3.600 “Framo” ships in operation
- More than 65.000 cargo pumps delivered
- More than 56.000 cargo pumps in operation

Key areas



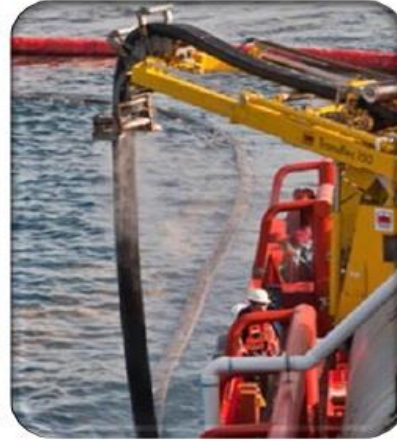
Marine
pumping

50%*



Offshore
pumping

23%*



Oil
recovery

6%*



Service

21%*



Iceland

Norwegian Sea

Faroe Islands
(Denmark)

Finland

Atlantic Ocean

Norway

Bergen

Oslo

Sweden

Estonia

Russia

North Sea

Latvia

Denmark

Lithuania

Copenhagen

Belarus

Ireland

UK

Netherlands

Poland

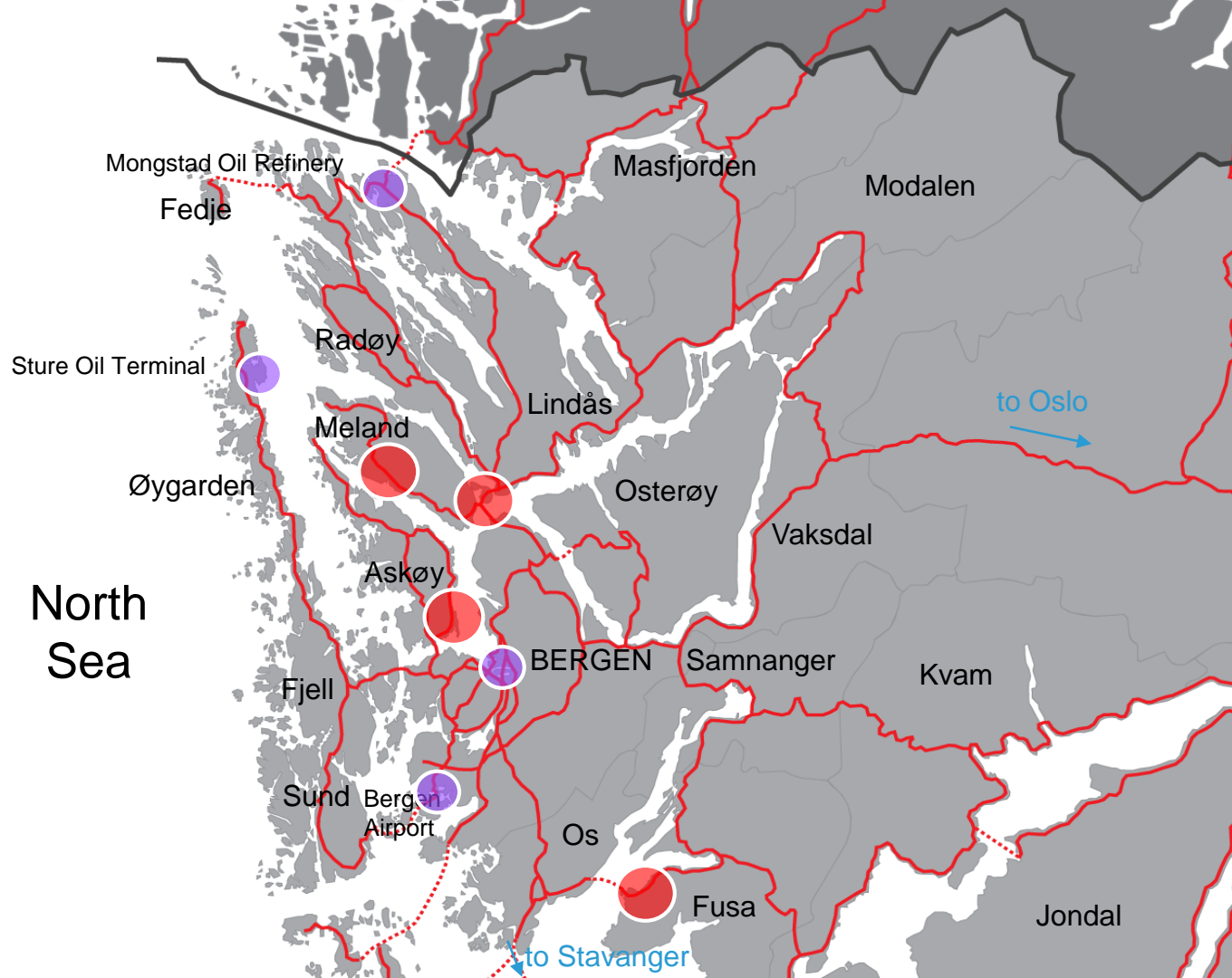
London

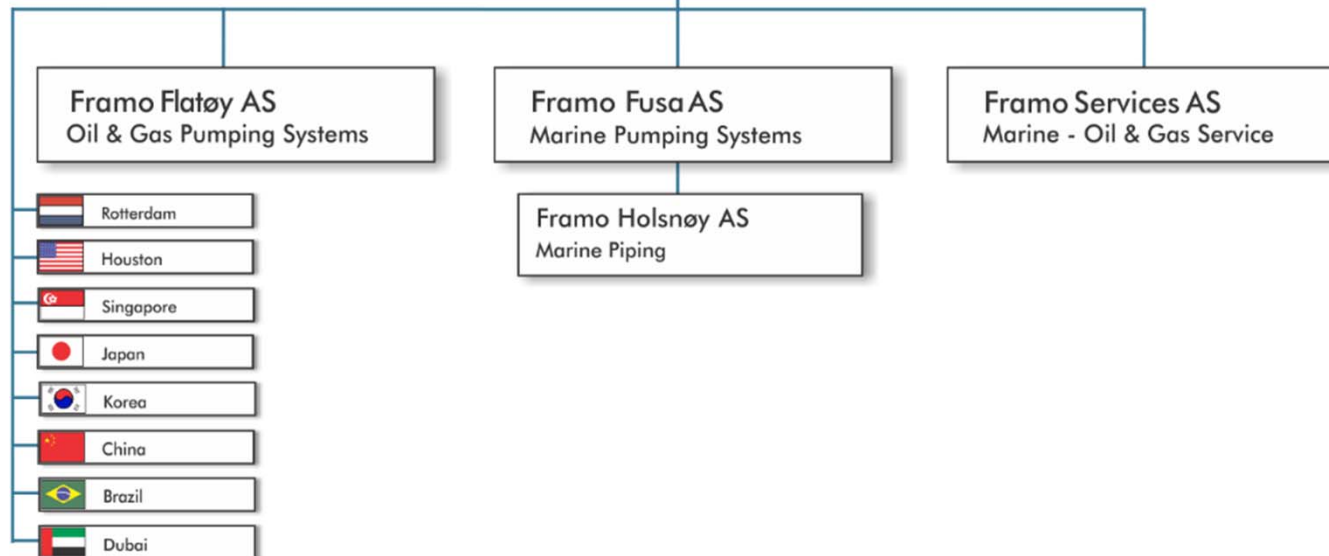
Amsterdam

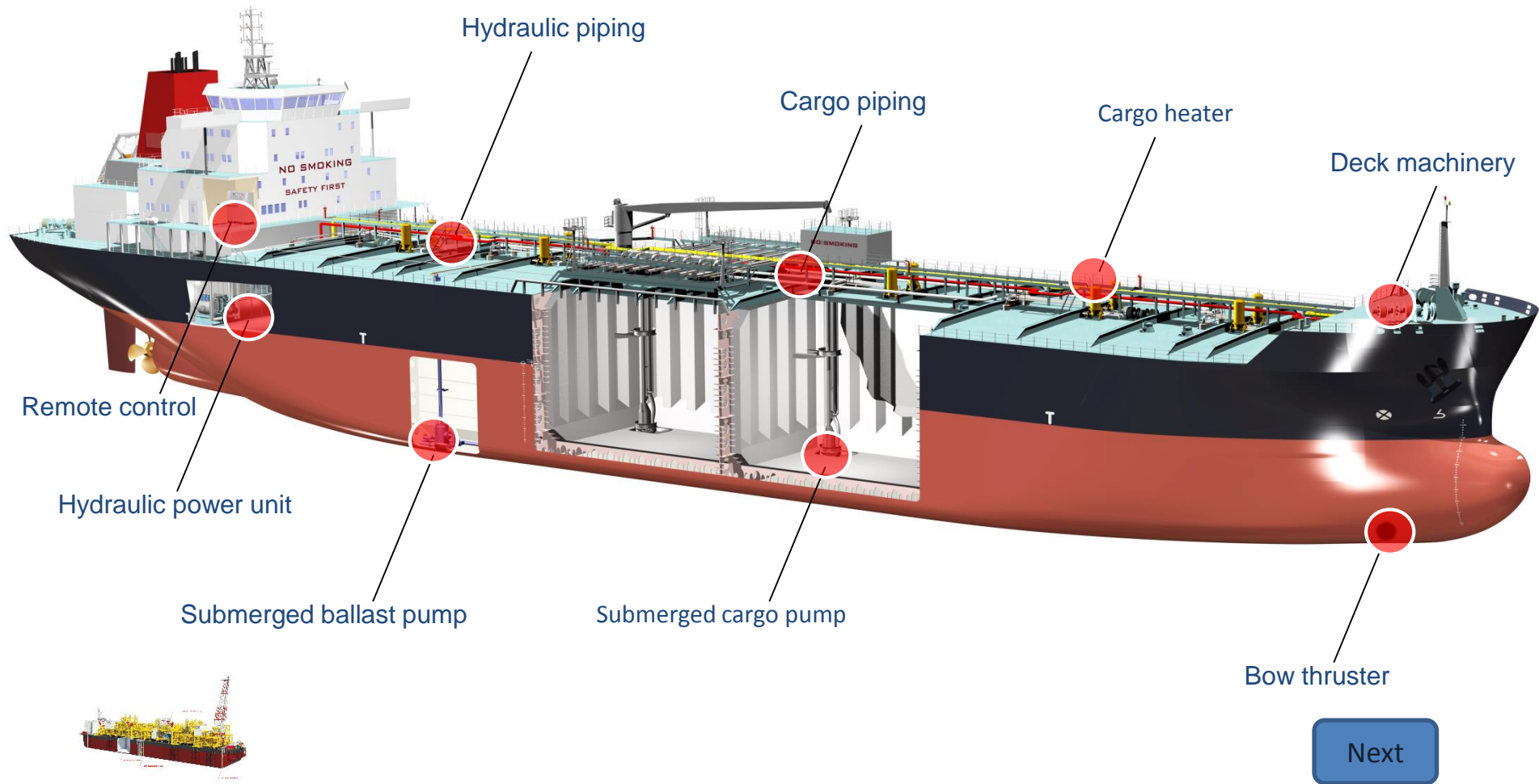
Germany

Ukraine

Belgium







Next

Chemical tankers



More than 200 individual chemicals are traded on a seaborne basis today

The Framo Pumping System is designed to handle all these types of liquids:

- Corrosive
- Heated and cooled
- Volatile and viscous
- Petro-chemicals
- Acids
- Alcohol
- Edible
- Molasses
- Petroleum products

Framo is the leading supplier to sophisticated chemical tankers

Product tanker

To improve the utilisation rate a modern double hull product tanker needs the flexibility to alternate between several different types of products.

The concept of one hydraulic driven cargo pump in each cargo tank has proven to be superior to other systems.



Advanced shipyards have adopted the Framo system into their design, enabling them to offer:
Attractive and Flexible Products at Competitive Prices.

One cargo pump in each tank

INCREASED YEARLY TRANSPORTATION VOLUME...

- **Increased cargo capacity**
No pump room – more volume for cargo
- **Increased discharge capacity**
No suction piping – no suction losses
- **Faster crude oil washing and tank cleaning**
Clean cargo tank surface – no in-tank pipes or valves
Cargo pump capacity match tank cleaning machines
- **Quicker stripping**
Built-in stripping device – no extra system required
- **Less slop**
No suction lines to be cleaned

One cargo pump in each tank

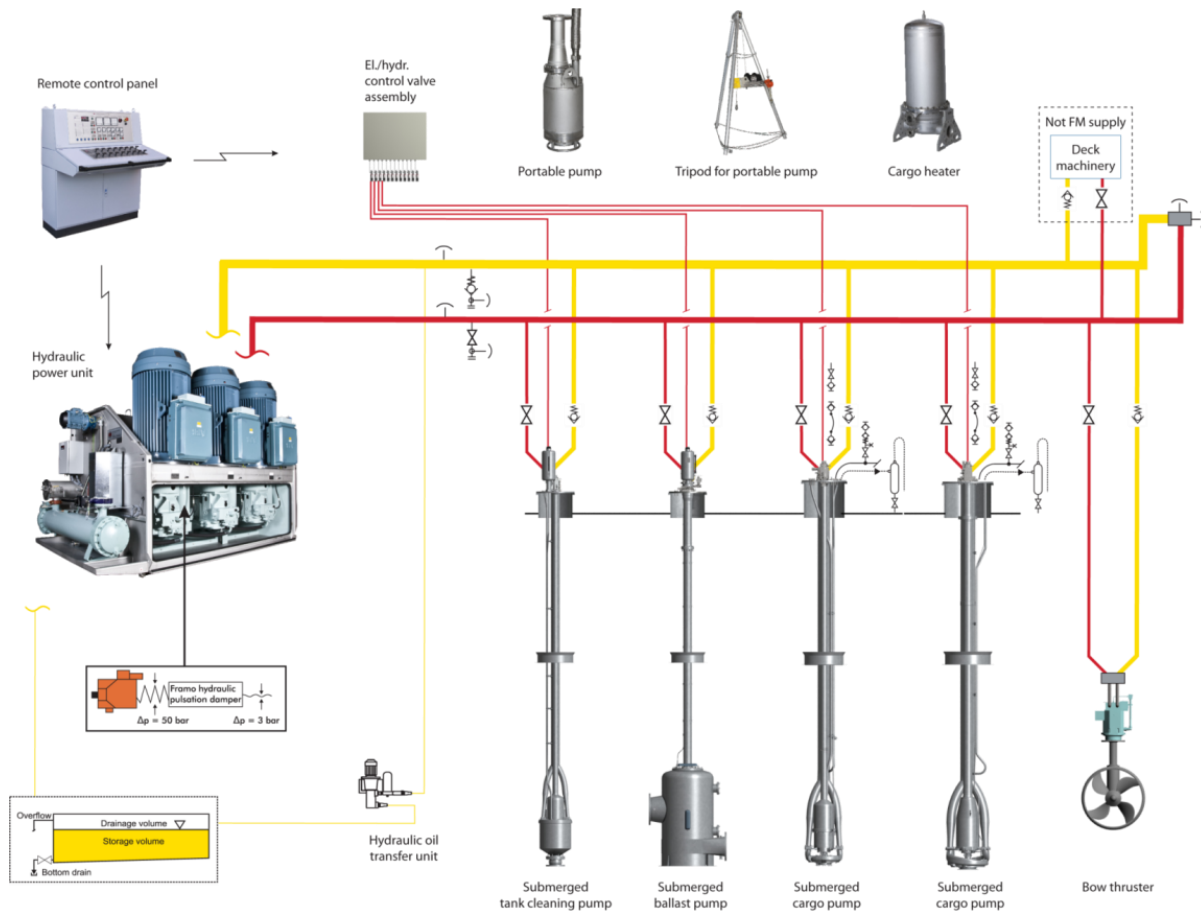
...AND AT LOWER COST

- Hydraulic drive with stepless speed control
- Energy saving with automatic load control valve
- High flexibility – total segregation

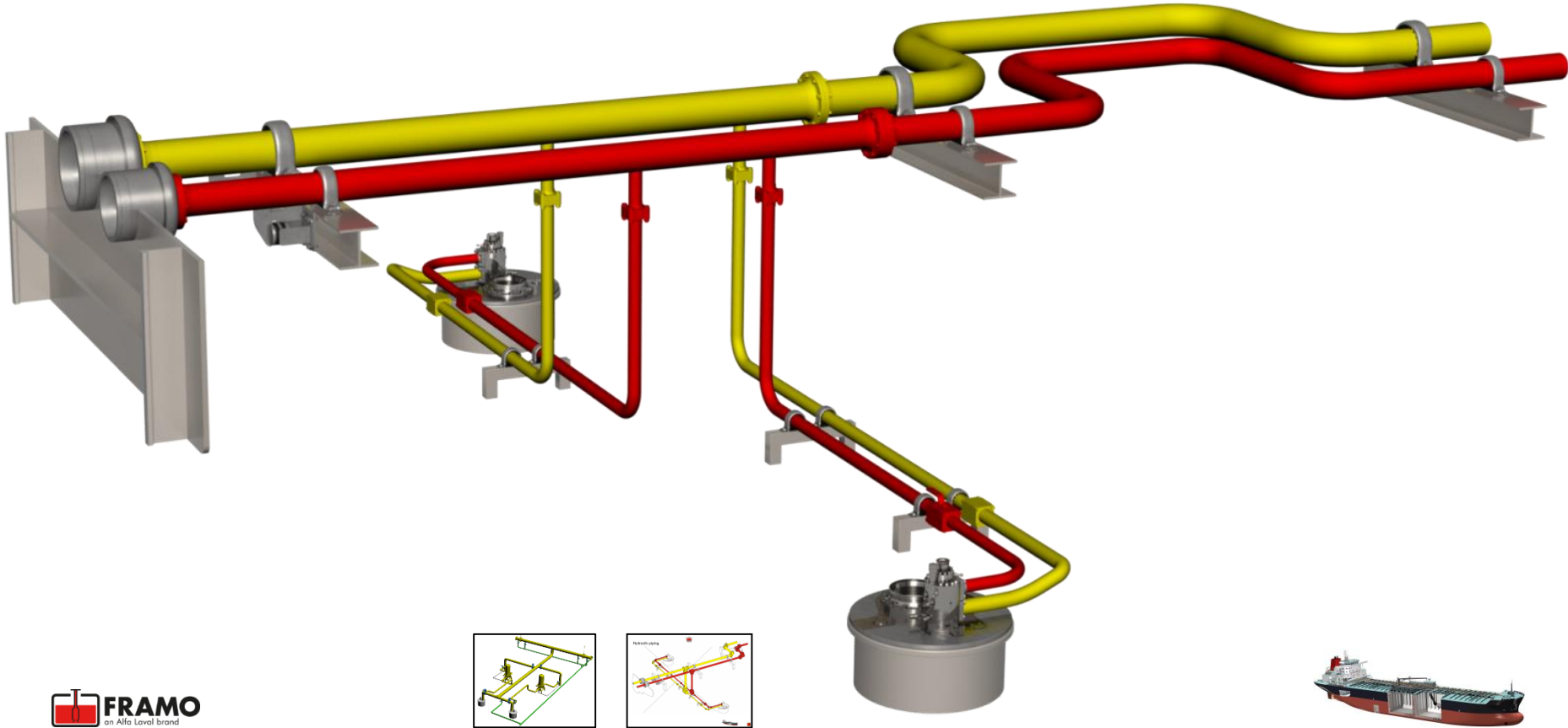
Hydraulic power transmission

1. No explosion danger
2. Stepless speed/torque control of the cargo pumps
3. High flexibility (one power station for many consumers). Hydraulic transmission for the cargo pumps can also be utilized for other purposes; bow thruster – ballast pump – tank cleaning pump, etc.
4. All moving parts lubricated
5. No ventilation - produced heat returns to the cooler
6. Small dimensions – low weight
7. Cargo pump designed for specific gravity 1,0 able to pump cargo with specific gravity 2,0

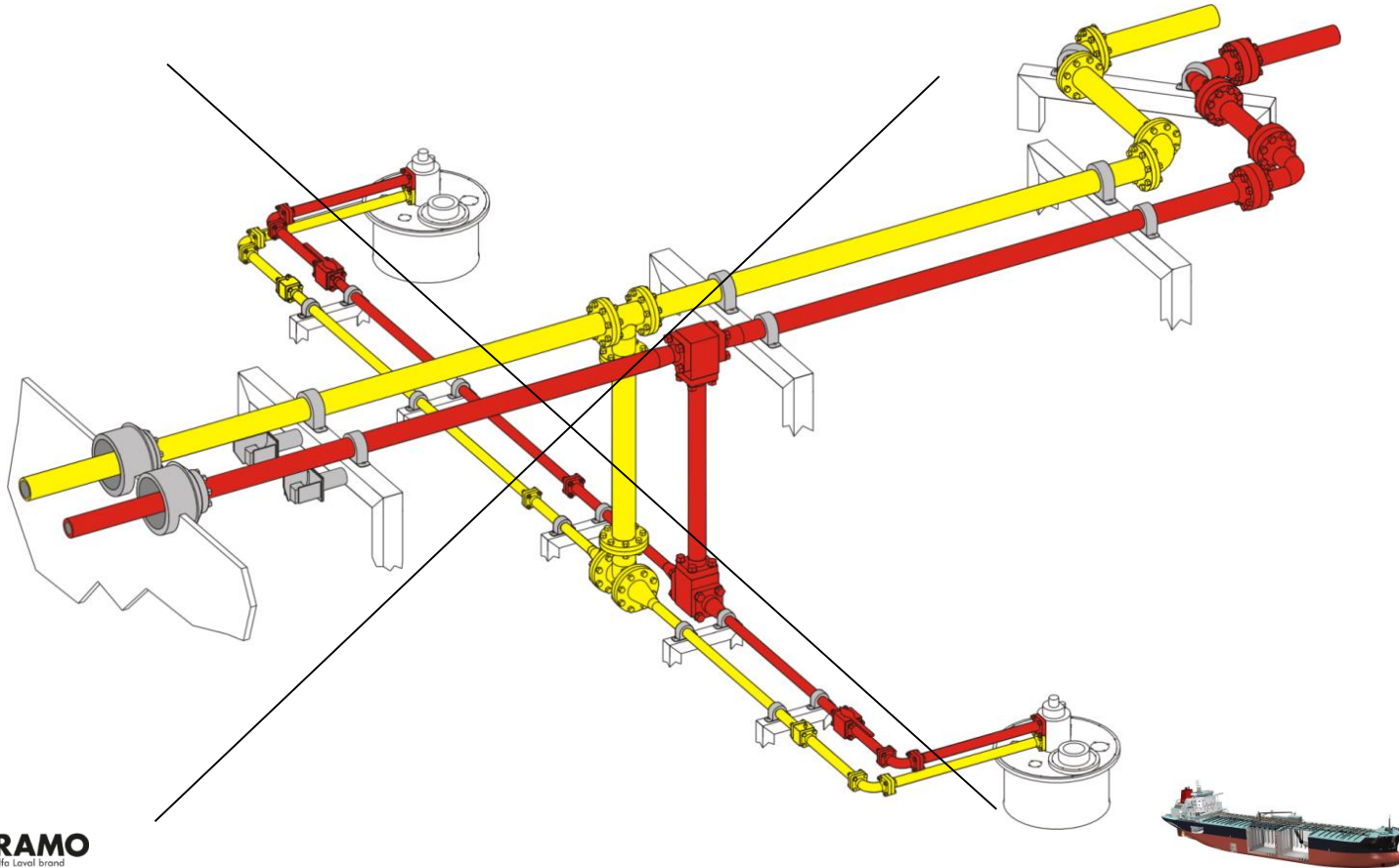
System layout



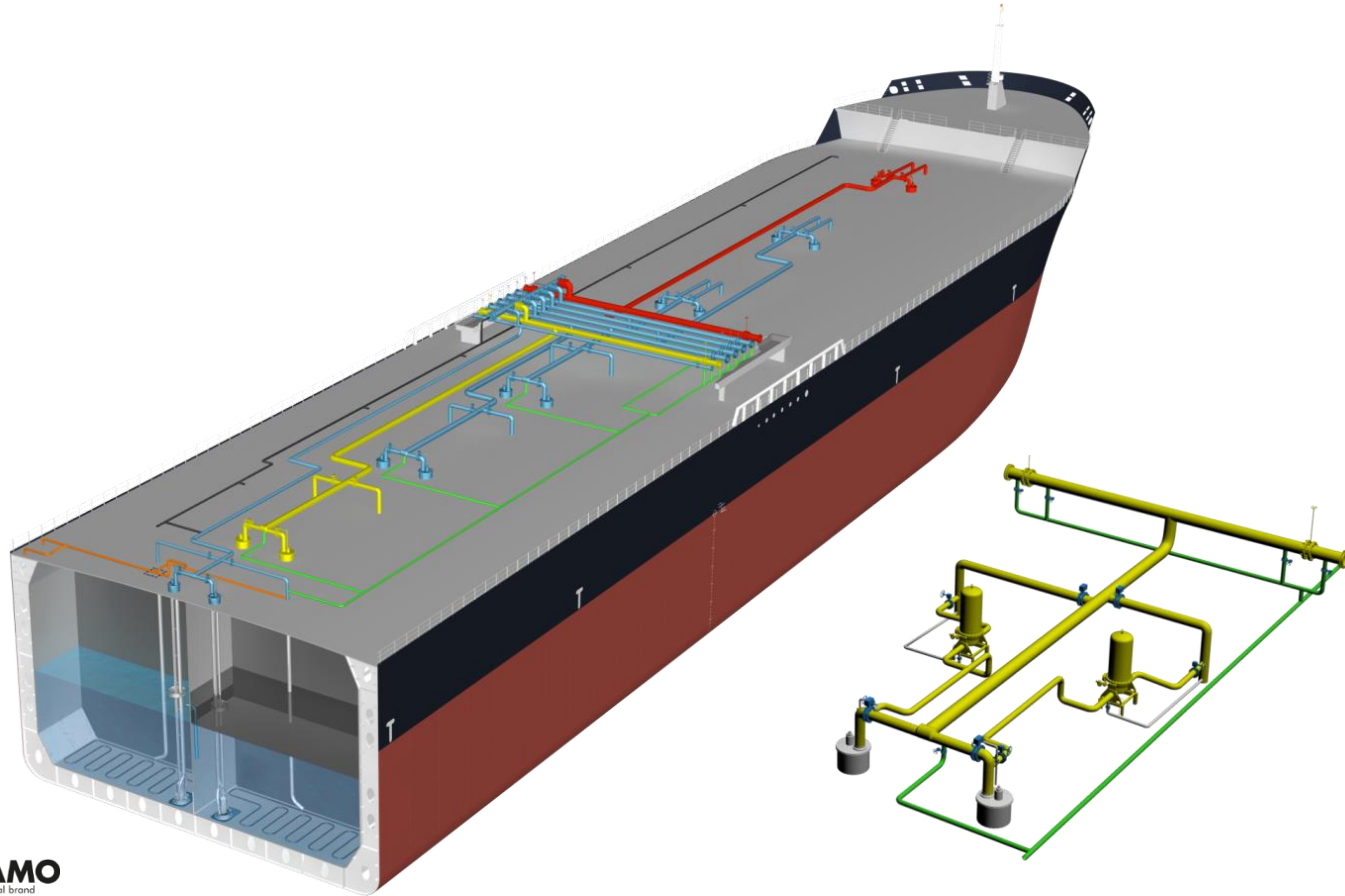
Hydraulic Piping



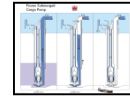
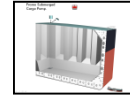
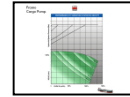
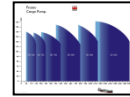
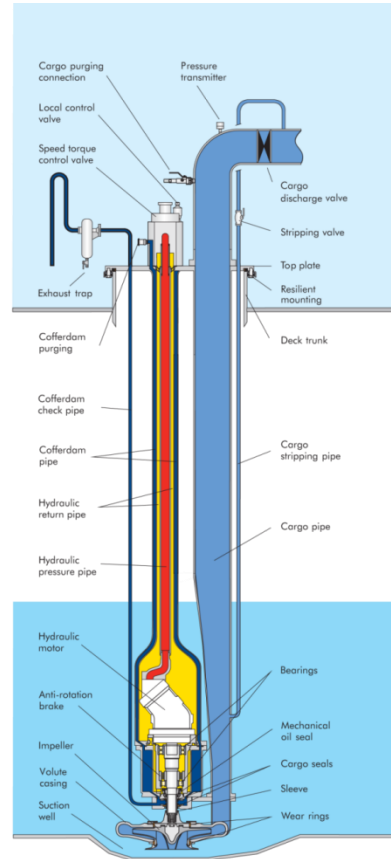
Hydraulic Piping



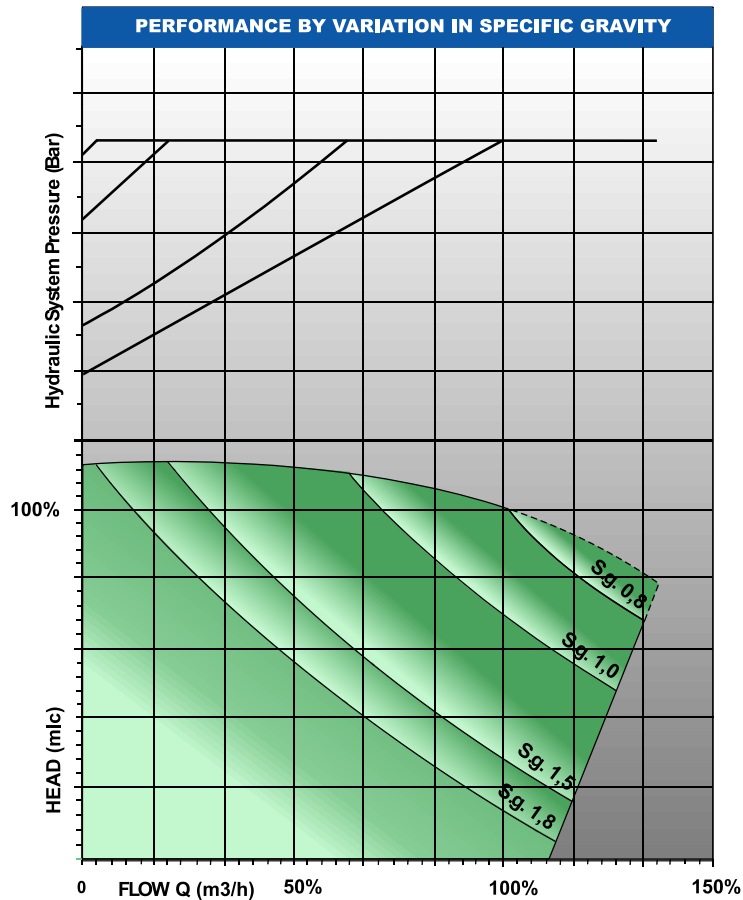
Cargo Piping



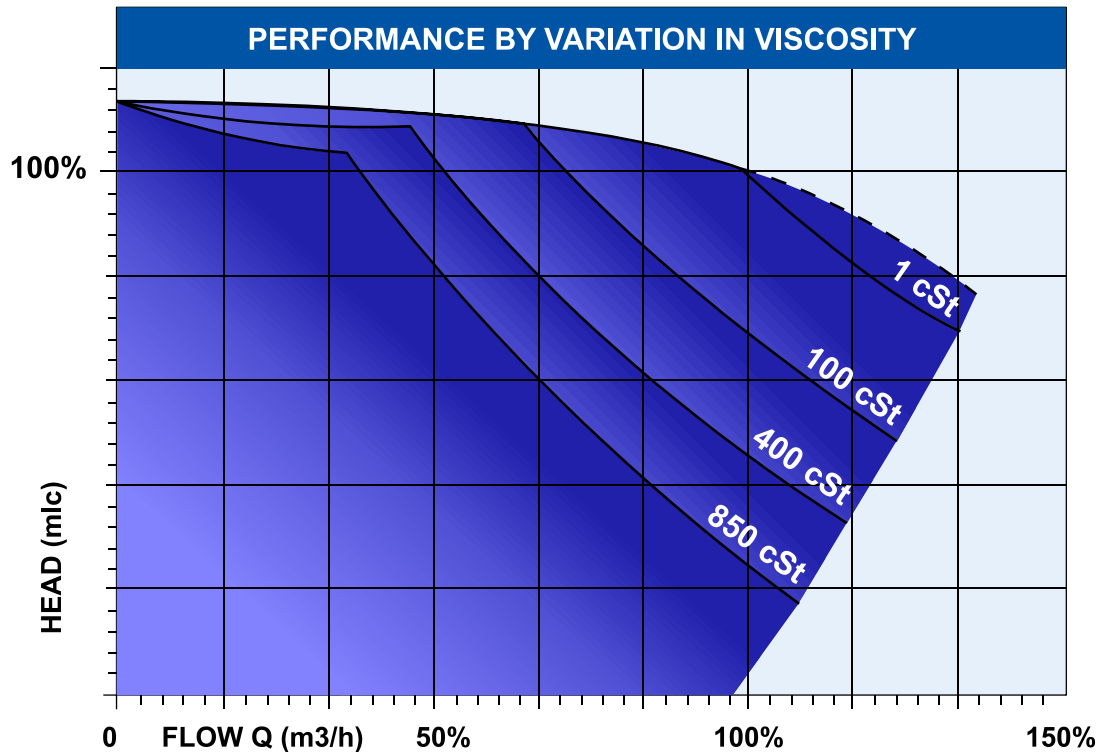
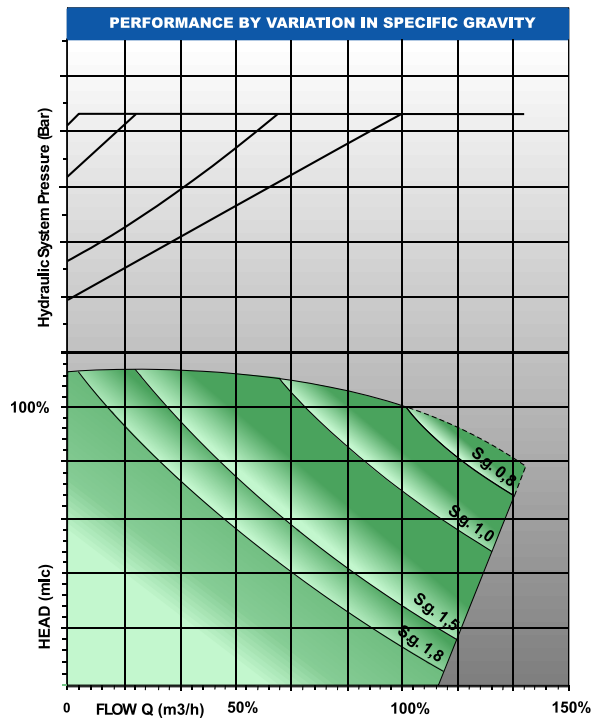
Framo Submerged Cargo Pump



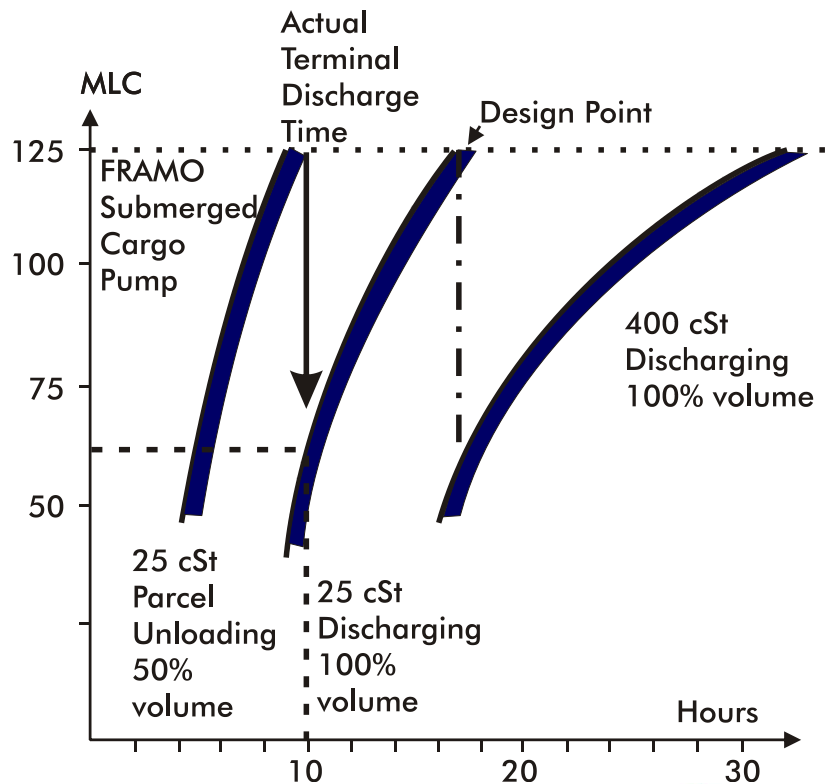
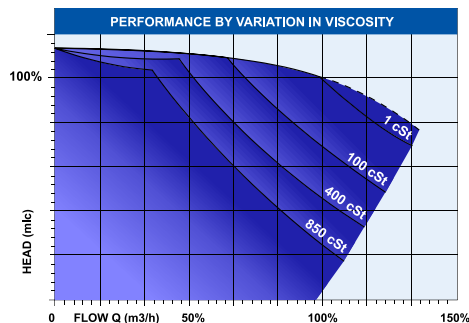
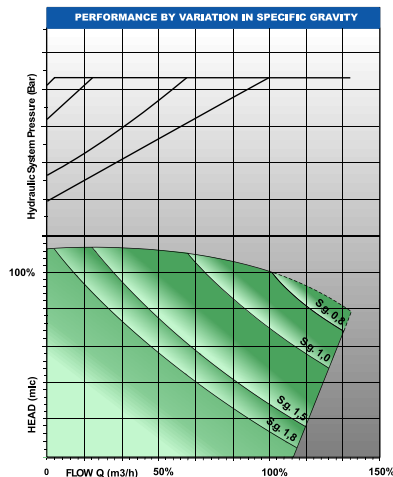
Framo Submerged Cargo Pump



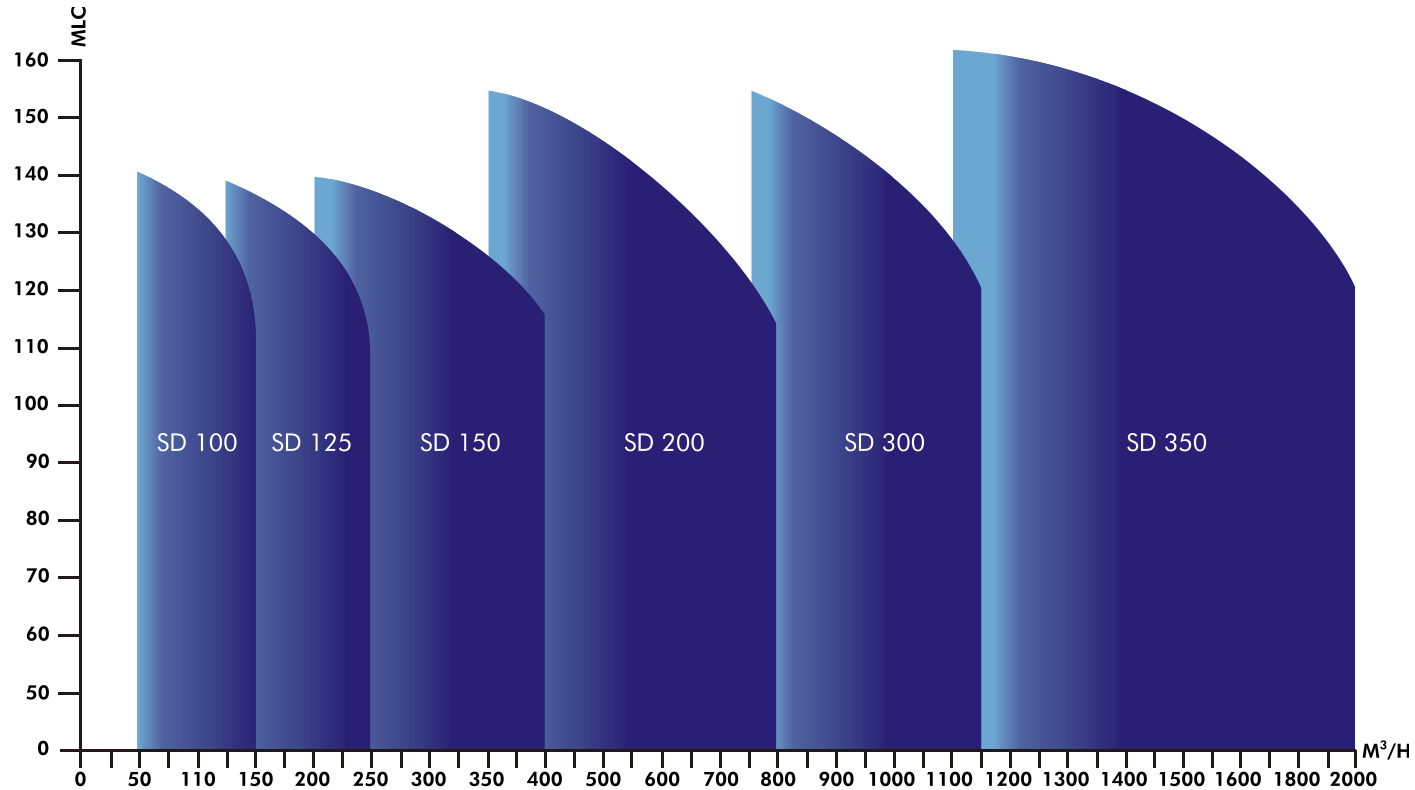
Framo Submerged Cargo Pump



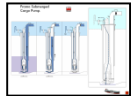
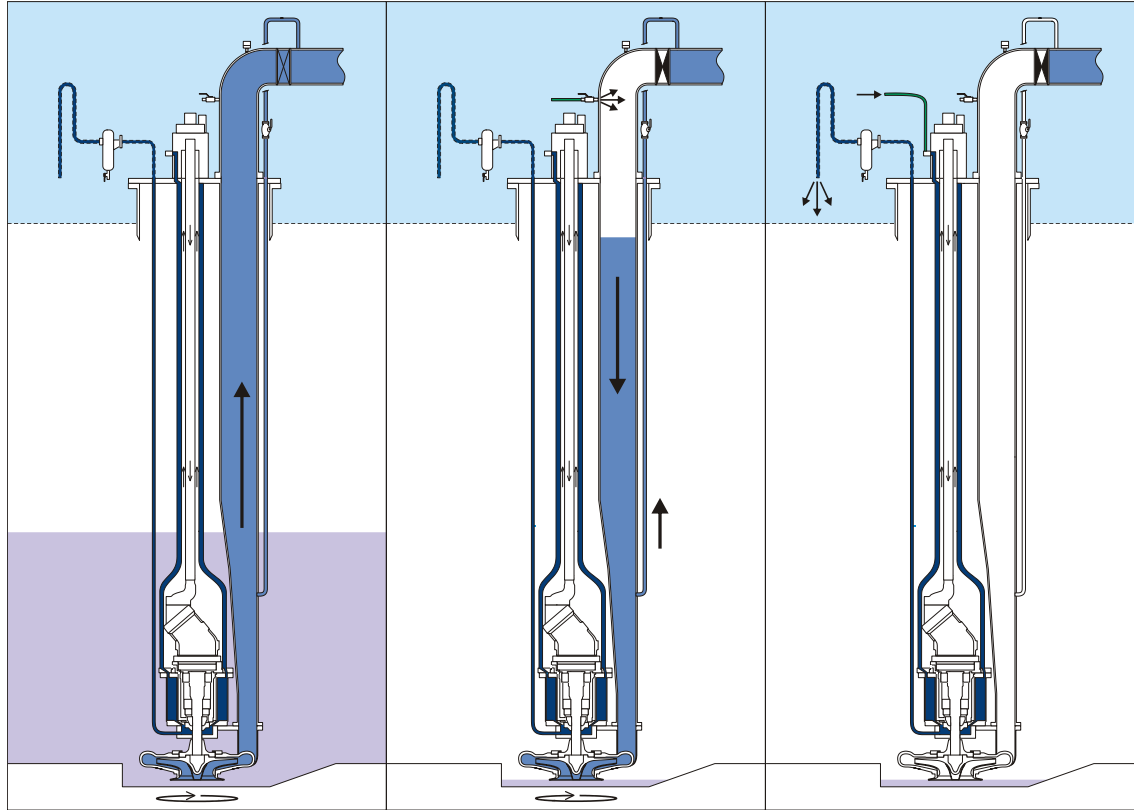
Framo Submerged Cargo Pump



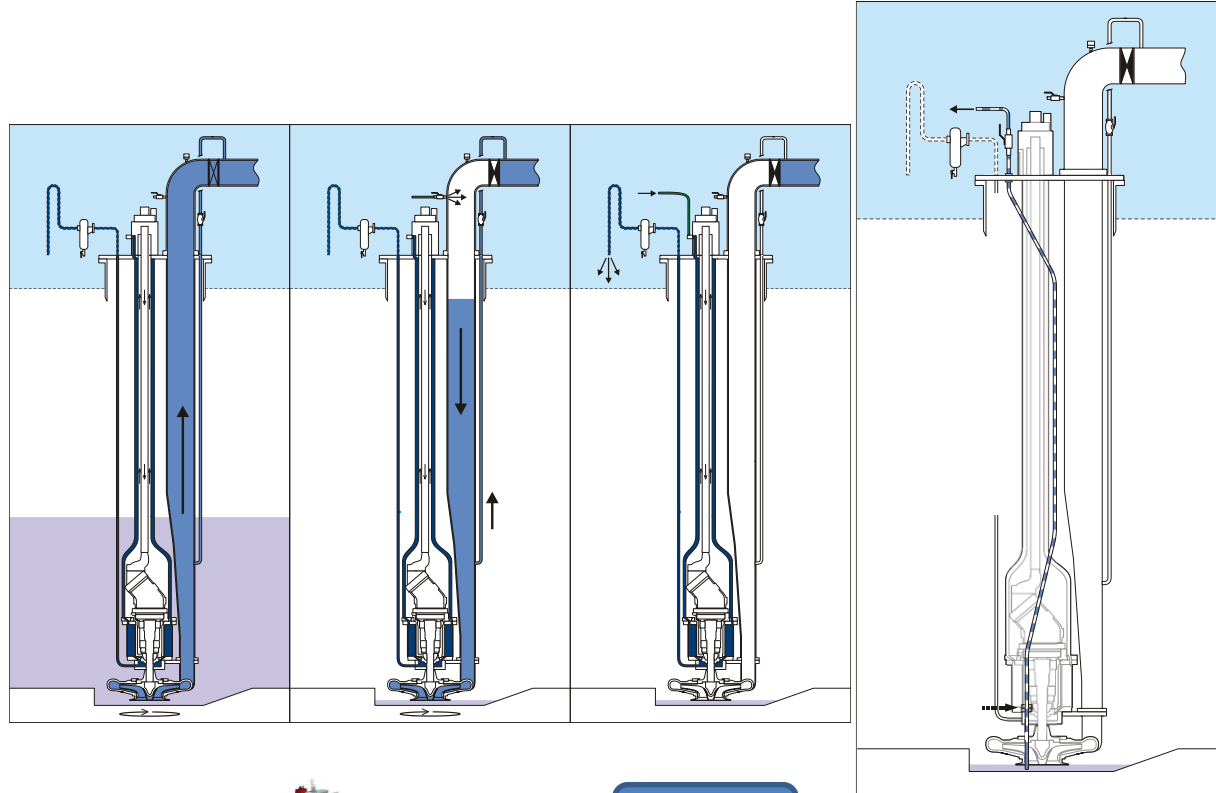
Framo Submerged Cargo Pump



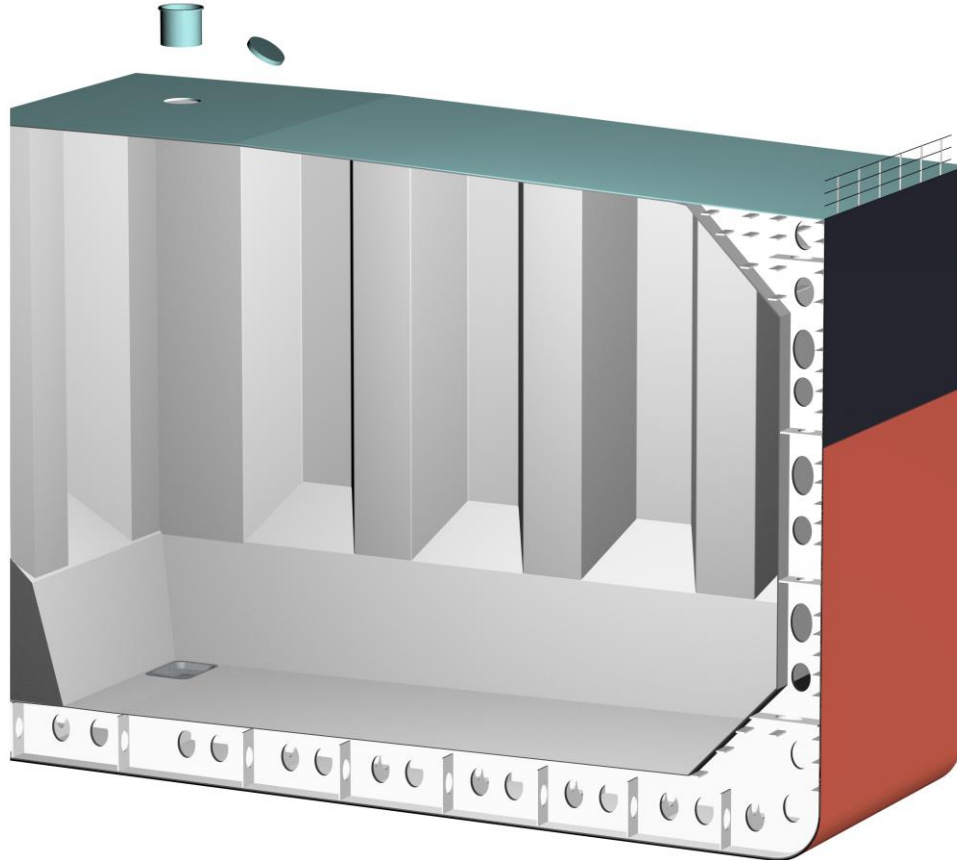
Framo Submerged Cargo Pump



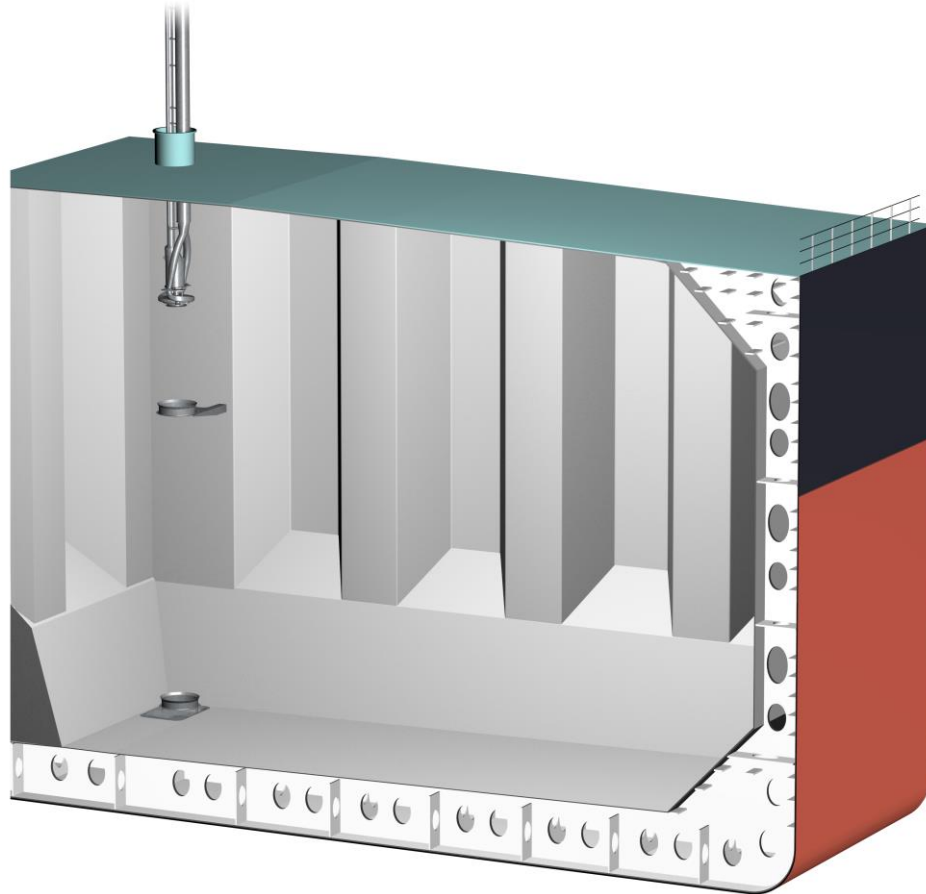
Framo Submerged Cargo Pump



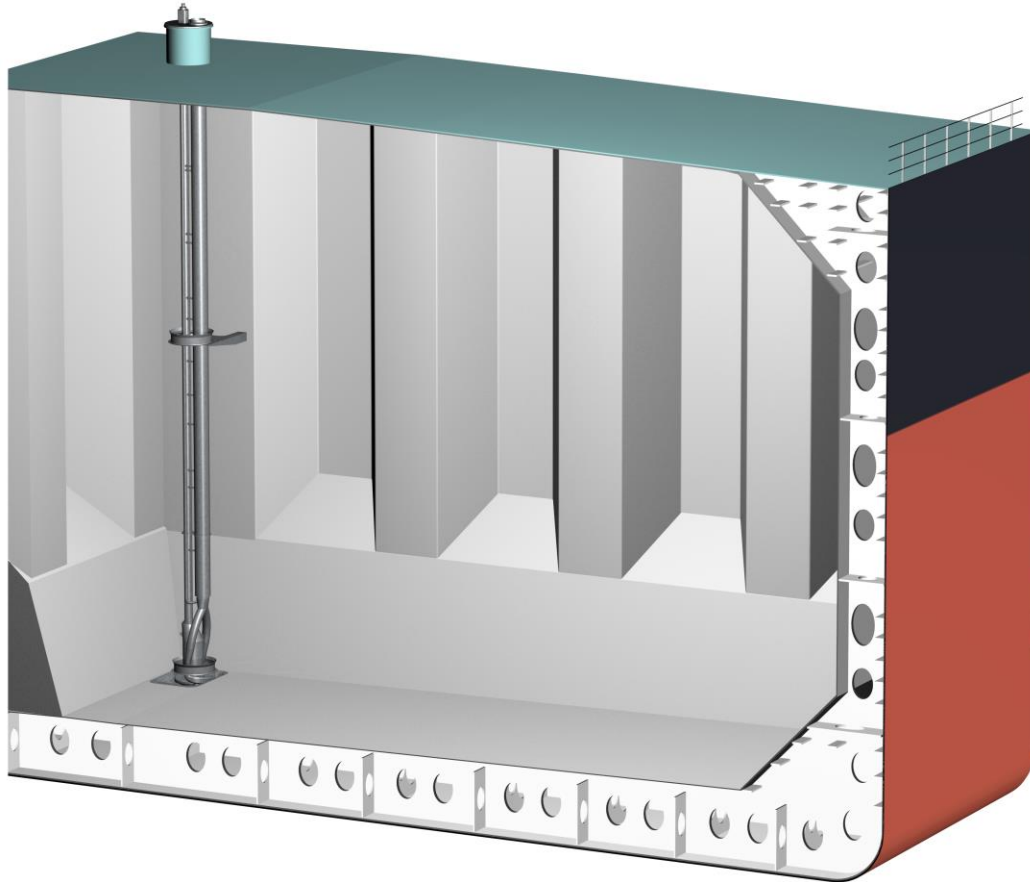
Framo Submerged Cargo Pump



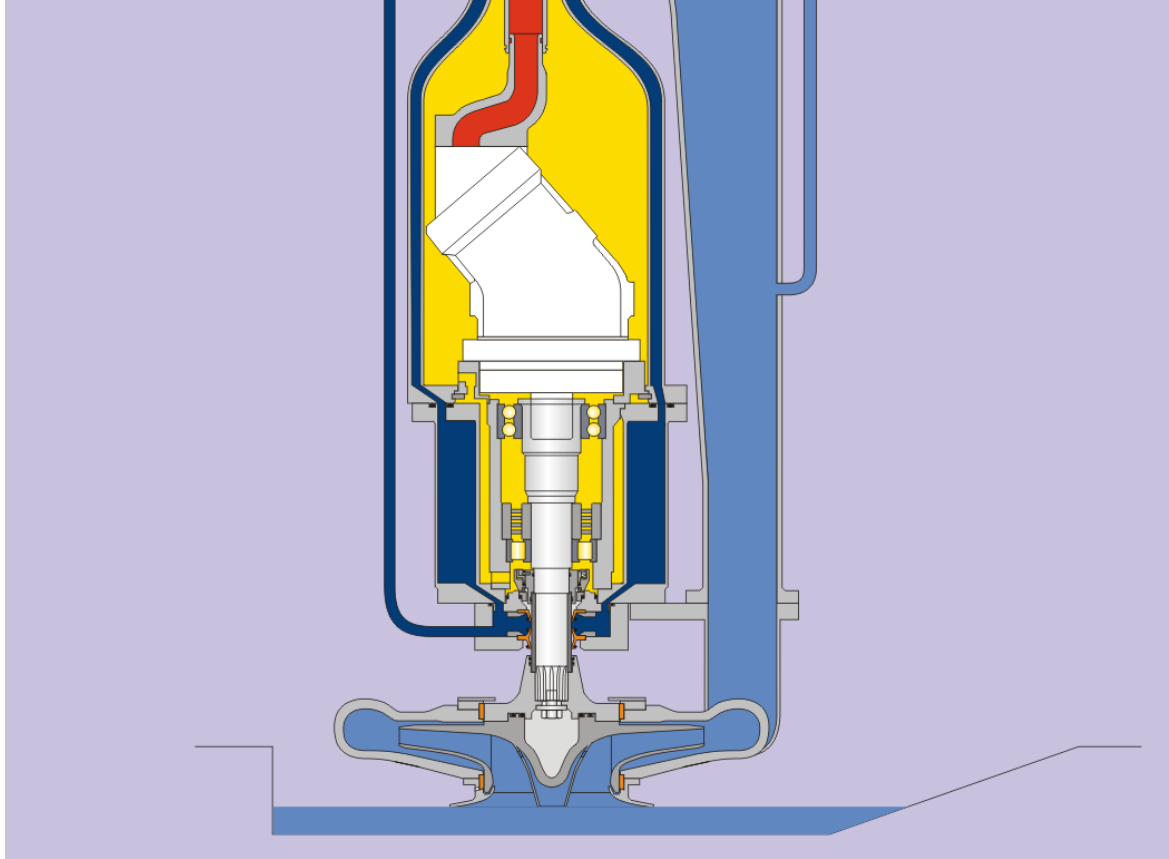
Framo Submerged Cargo Pump



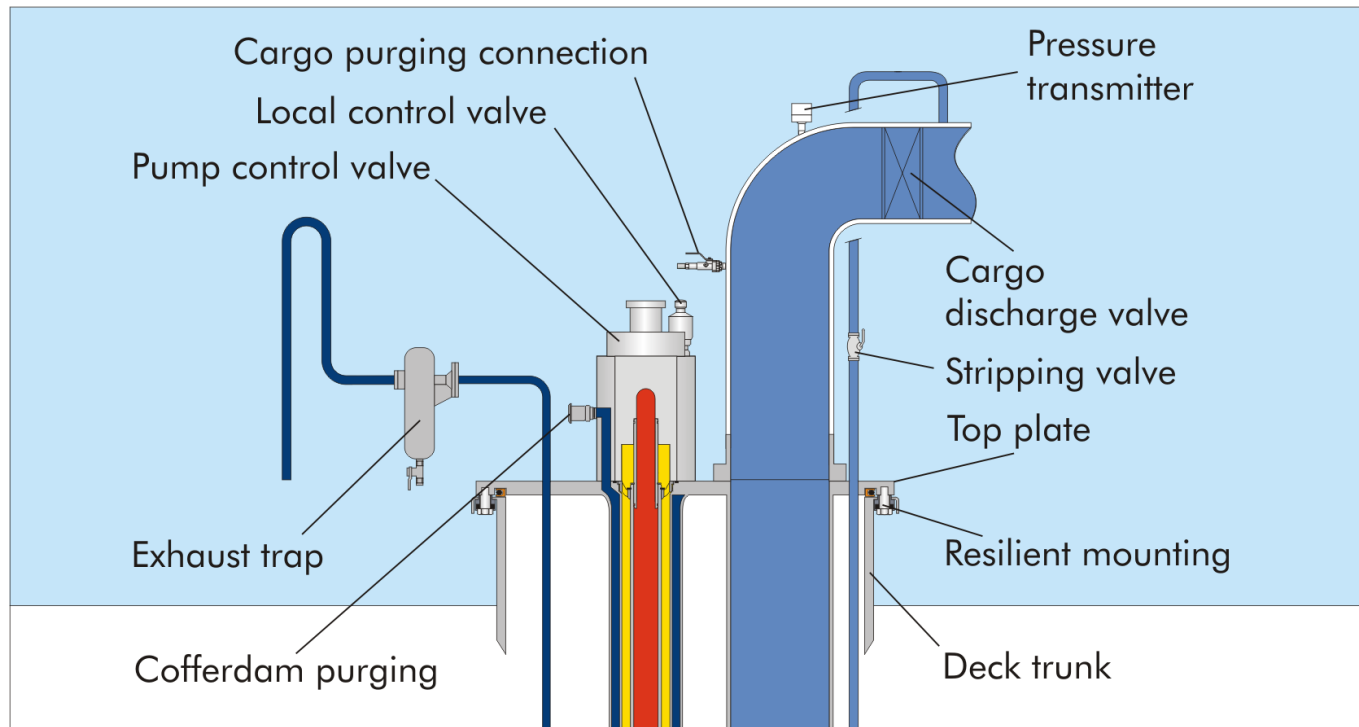
Framo Submerged Cargo Pump



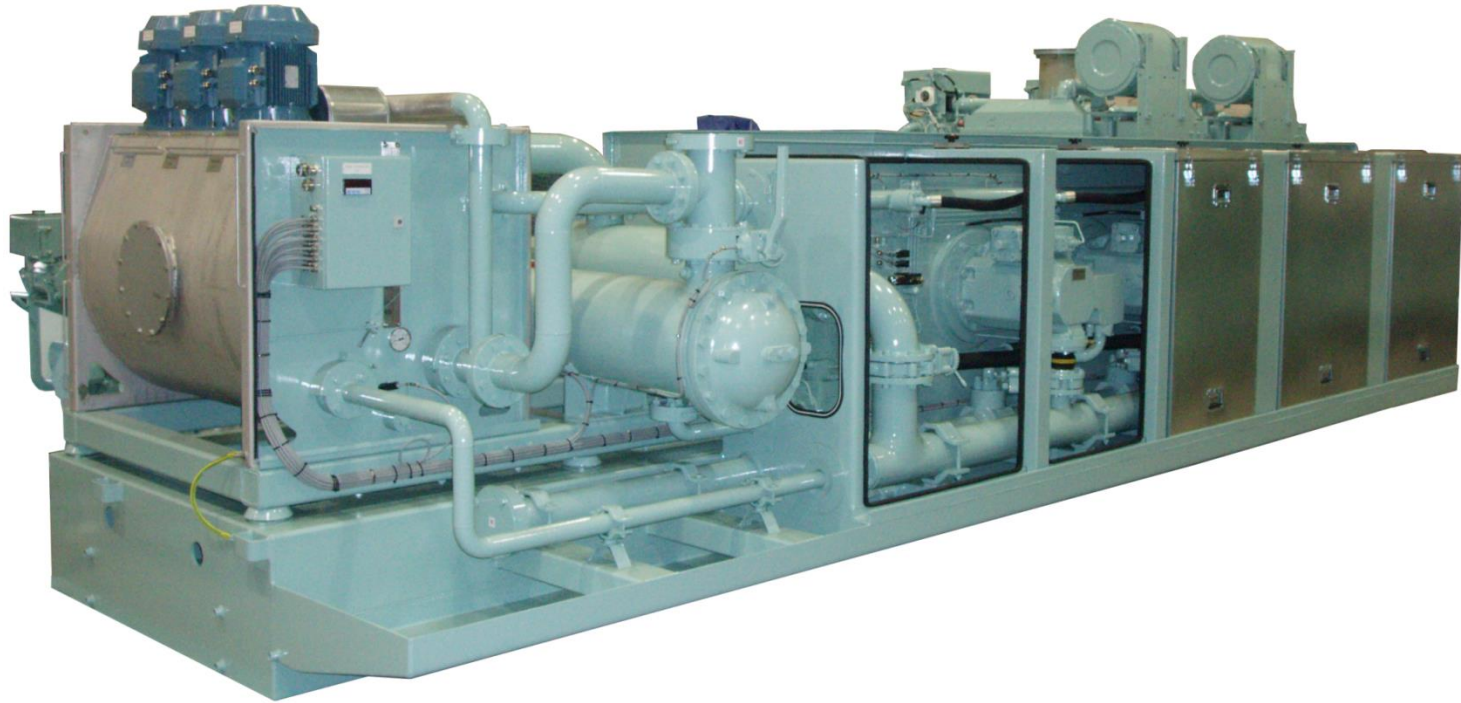
Framo Submerged Cargo Pump



Framo Submerged Cargo Pump



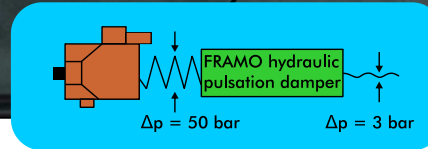
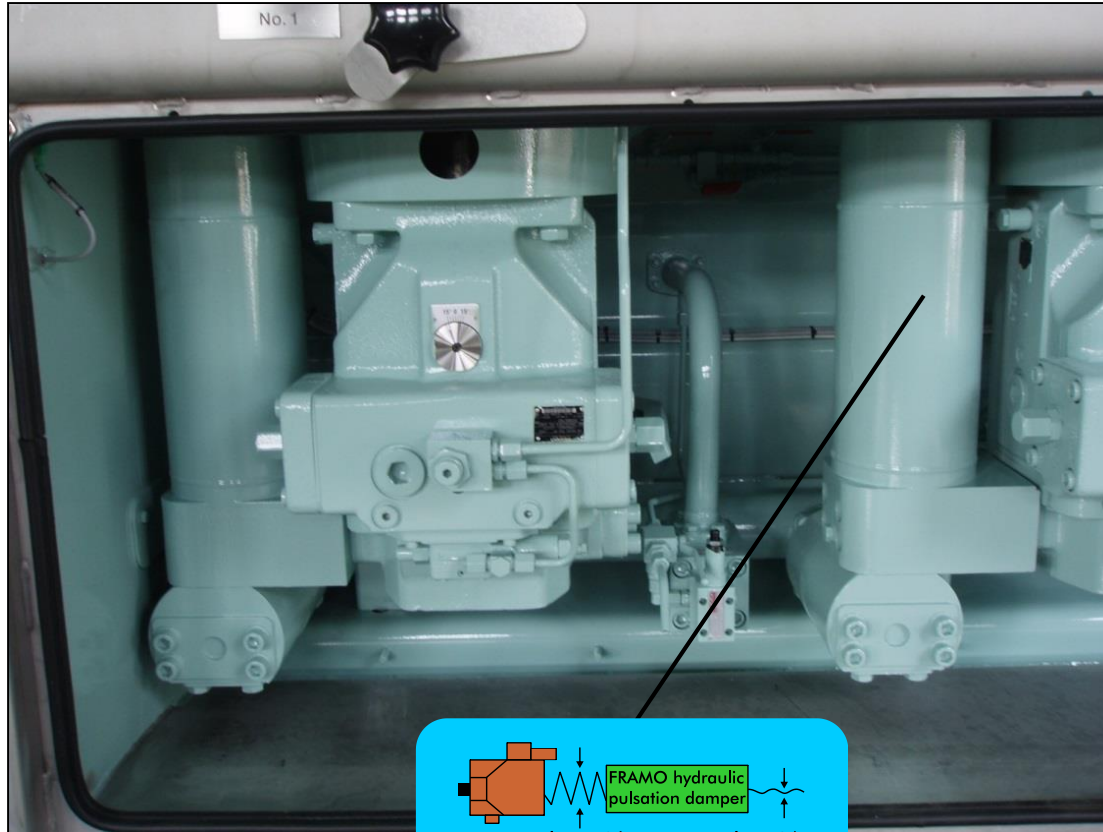
Framo Hydraulic Power Unit



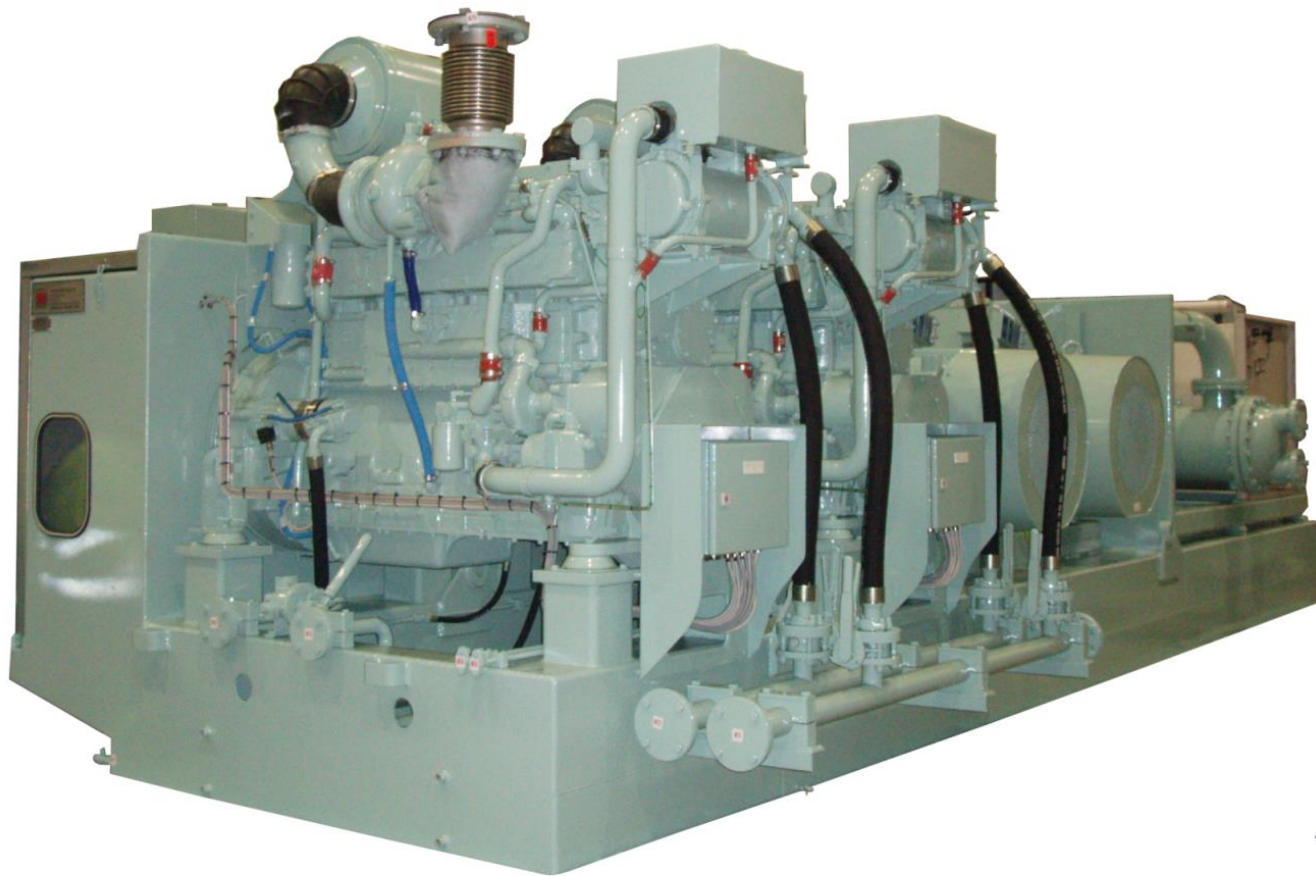
Framo Hydraulic Power Unit



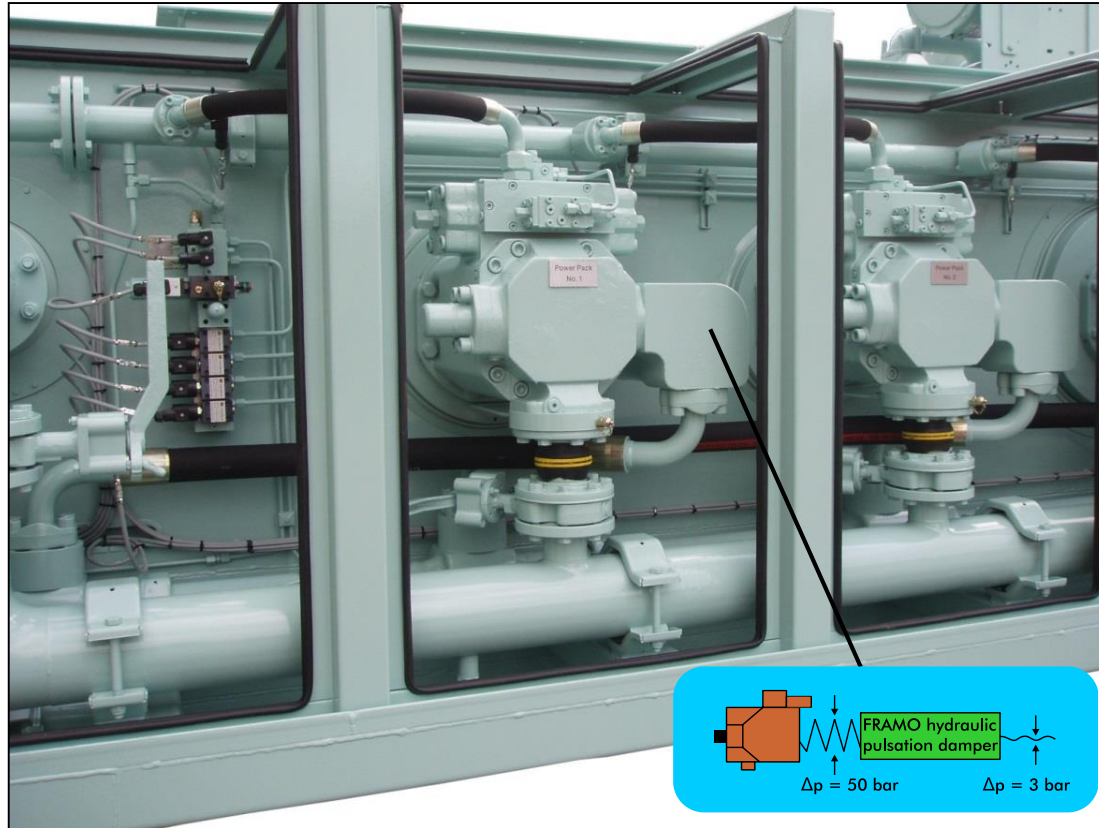
Framo Hydraulic Power Unit



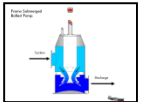
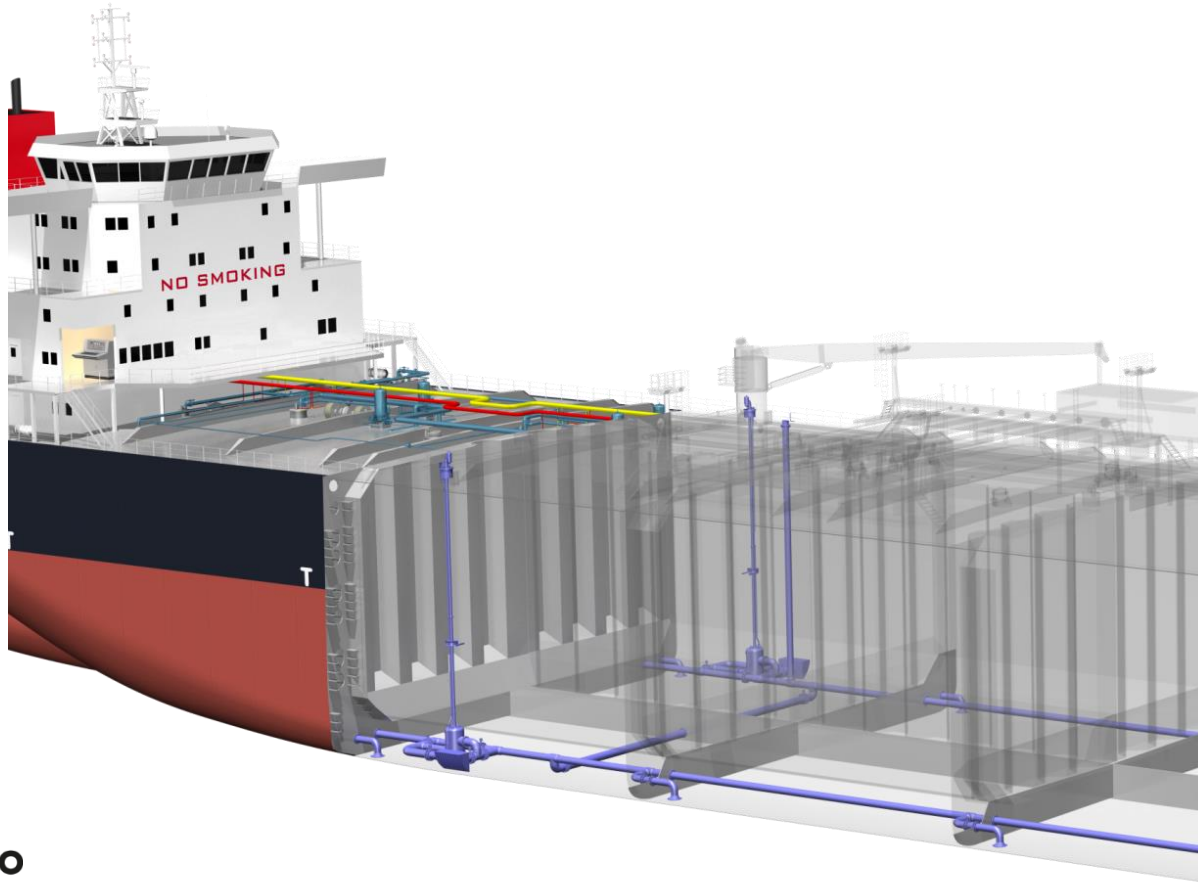
Framo Hydraulic Power Unit



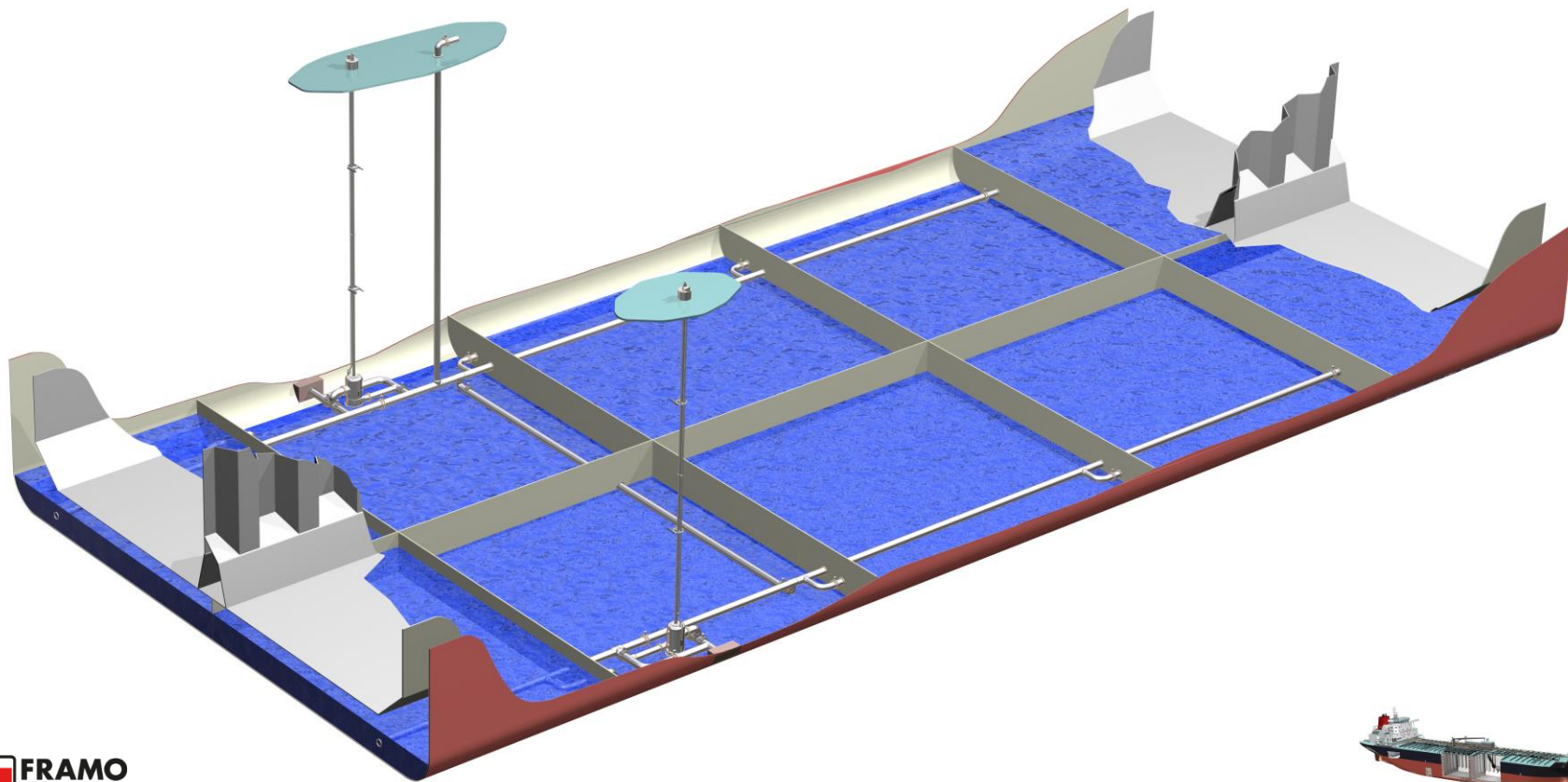
Framo Hydraulic Power Unit



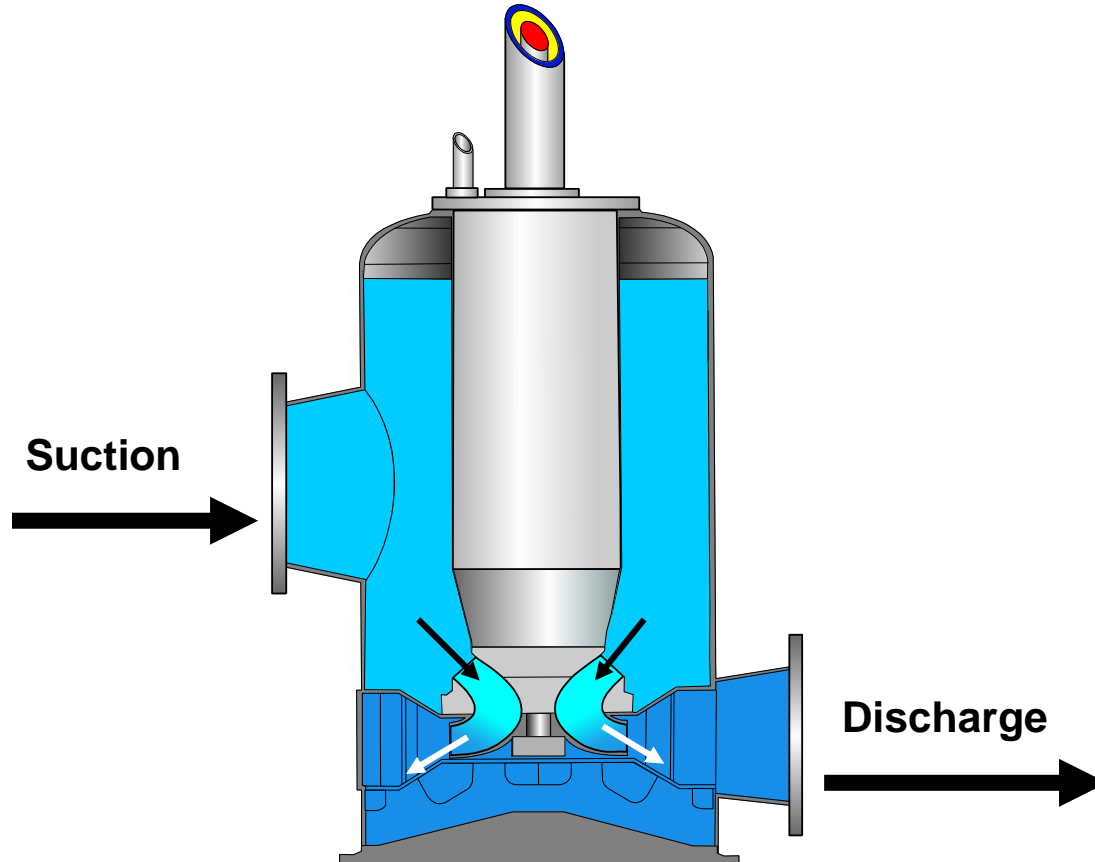
Framo Submerged Ballast Pump

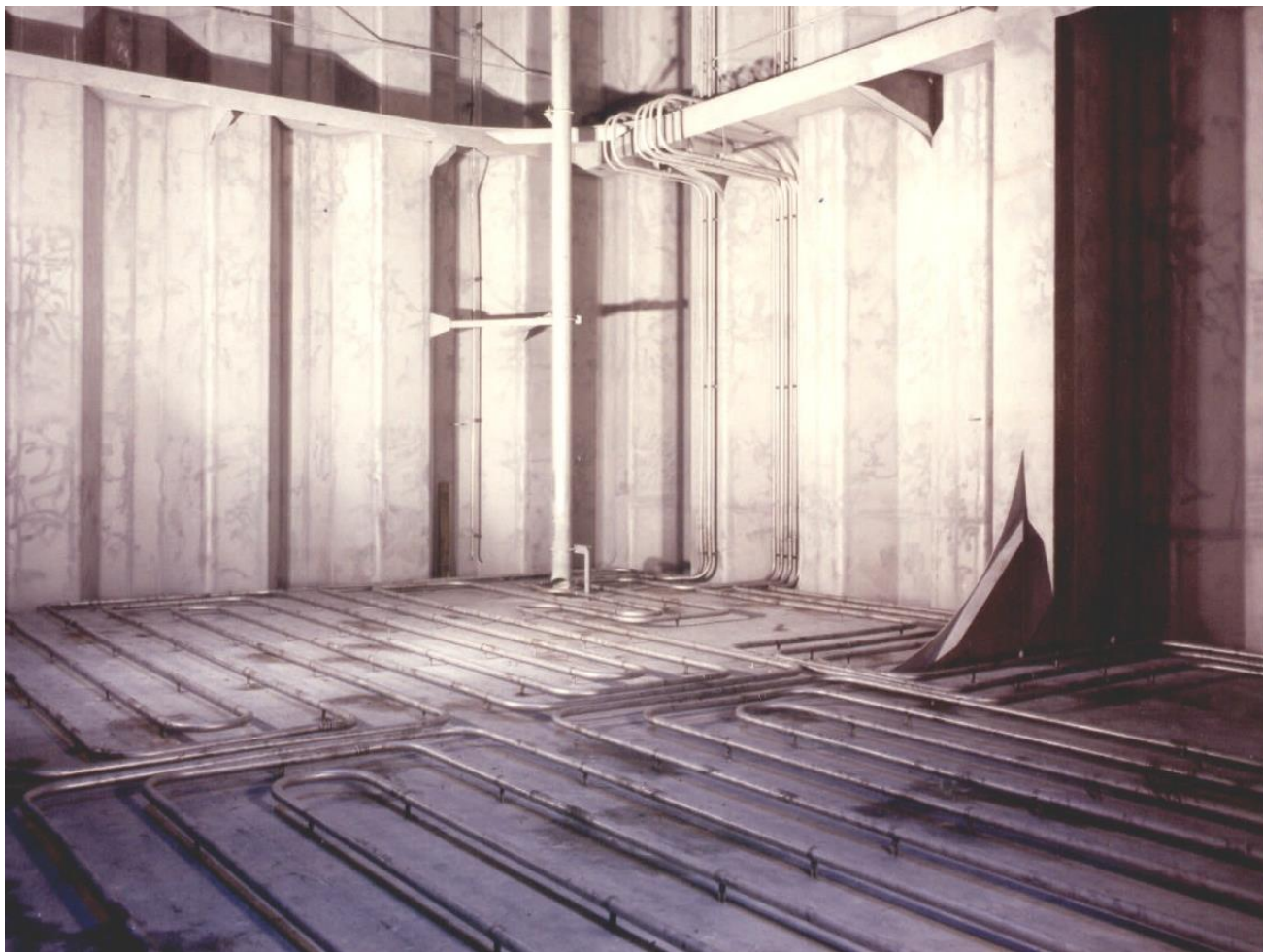


Framo Submerged Ballast Pump

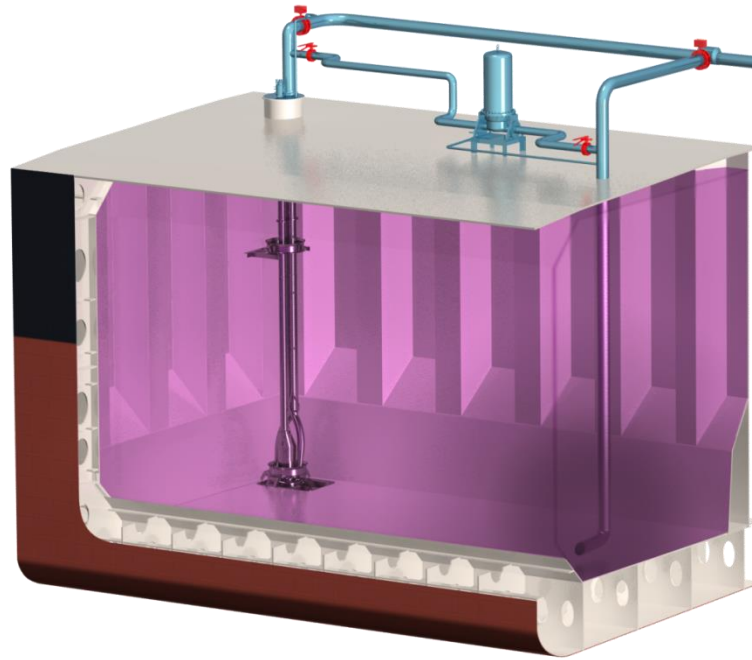


Framo Submerged Ballast Pump

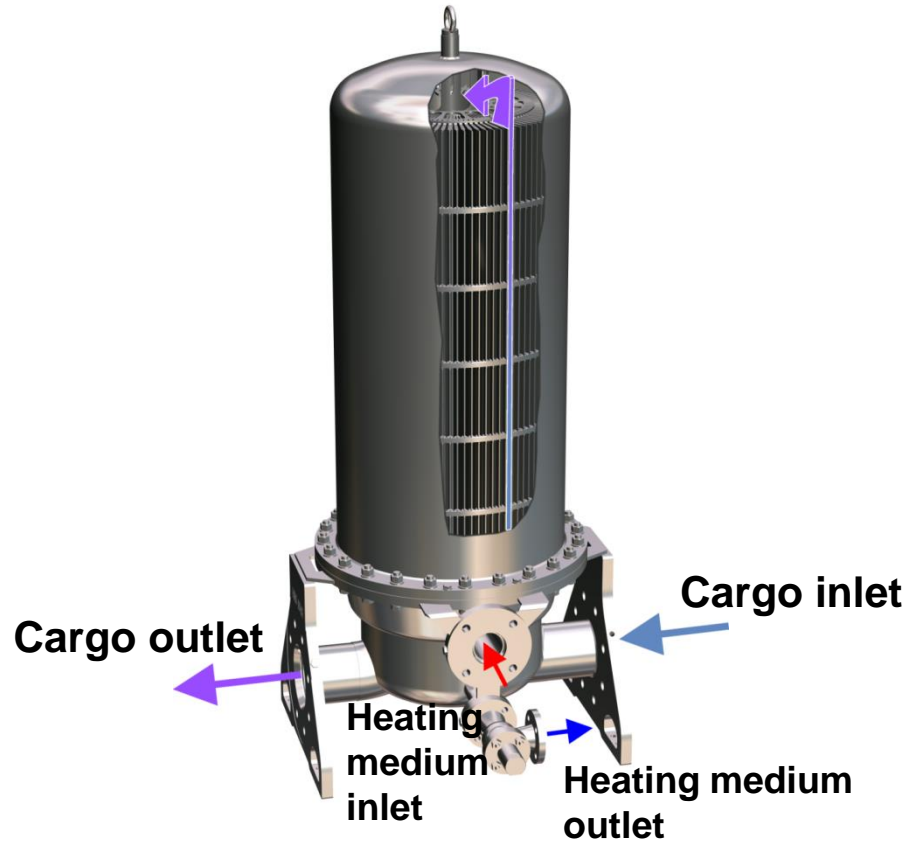




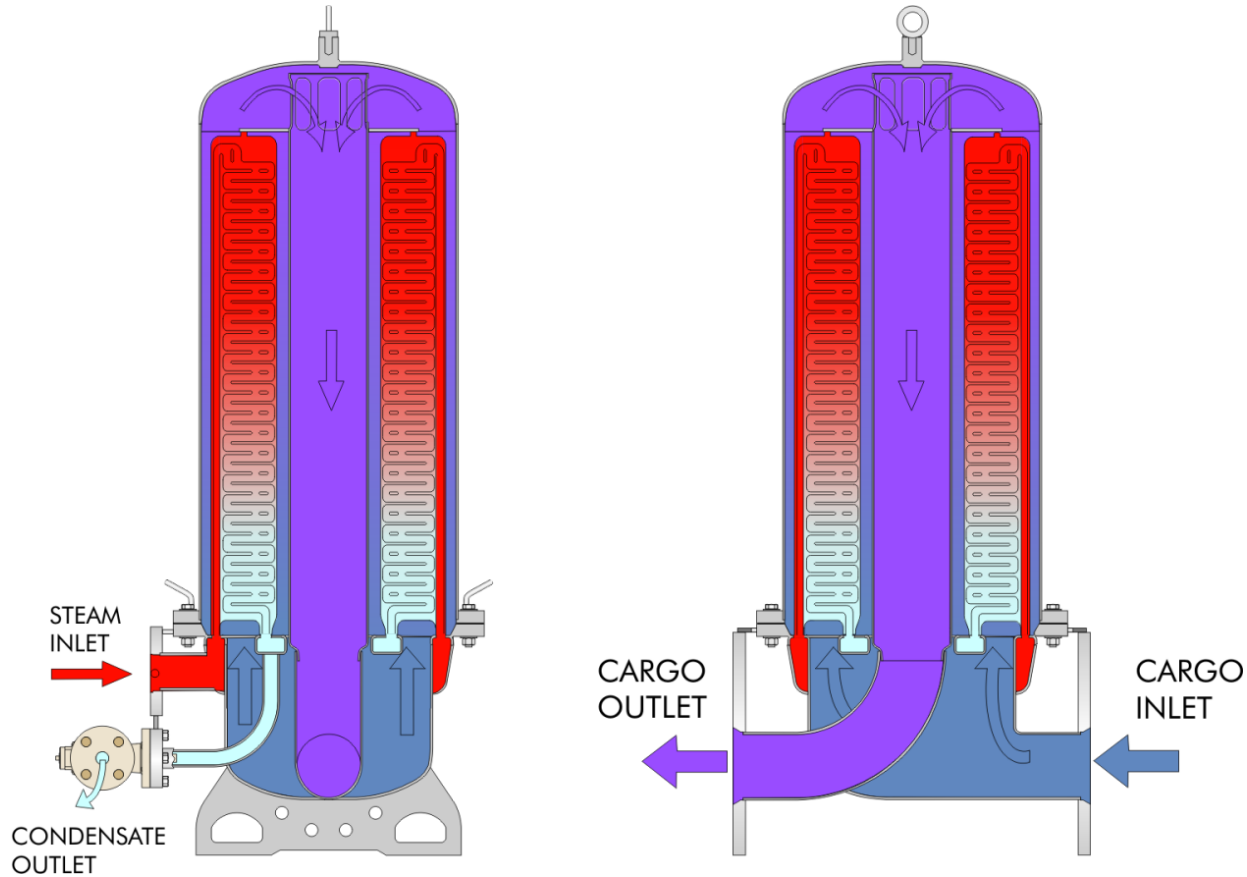
Framo Cargo Heater



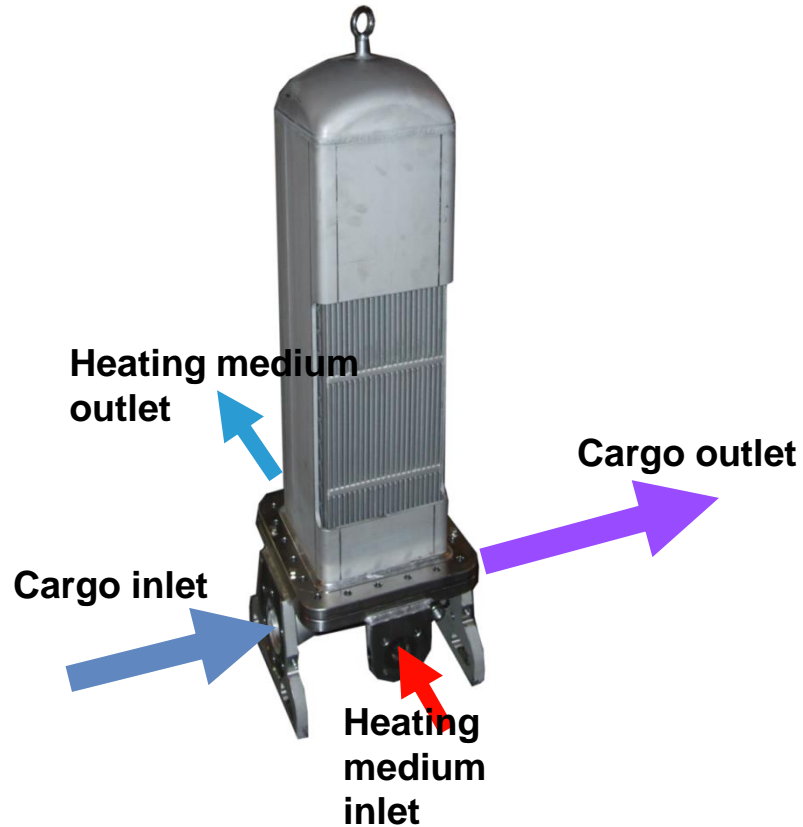
Framo Cargo Heater



Framo Cargo Heater



Framo Cargo Heater



Framo Cargo Heater



HE 225/700
→ **400 kW**



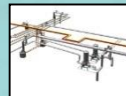
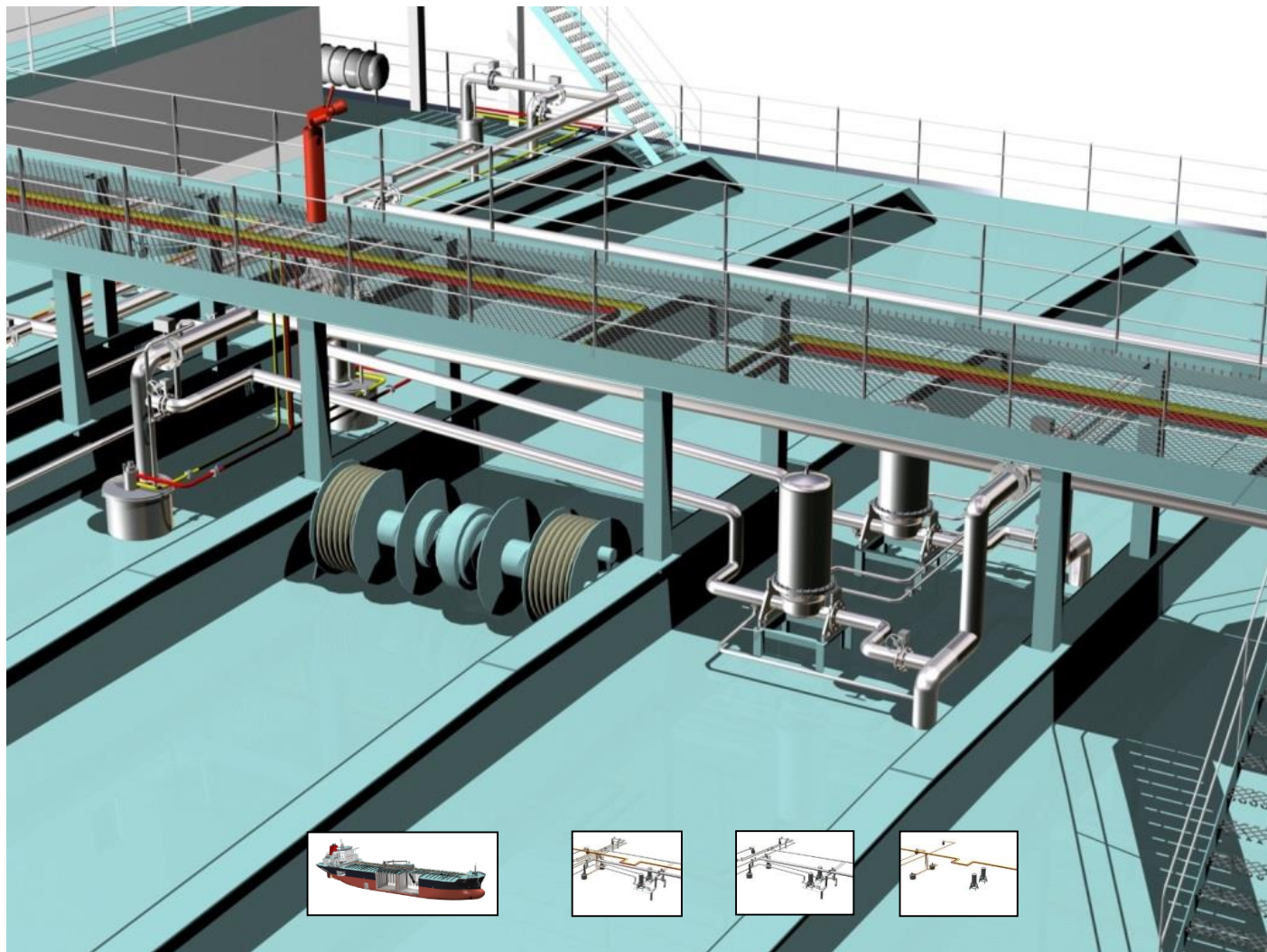
HE 400/1000
→ **800 kW**



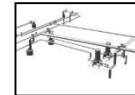
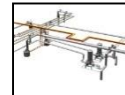
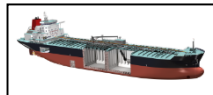
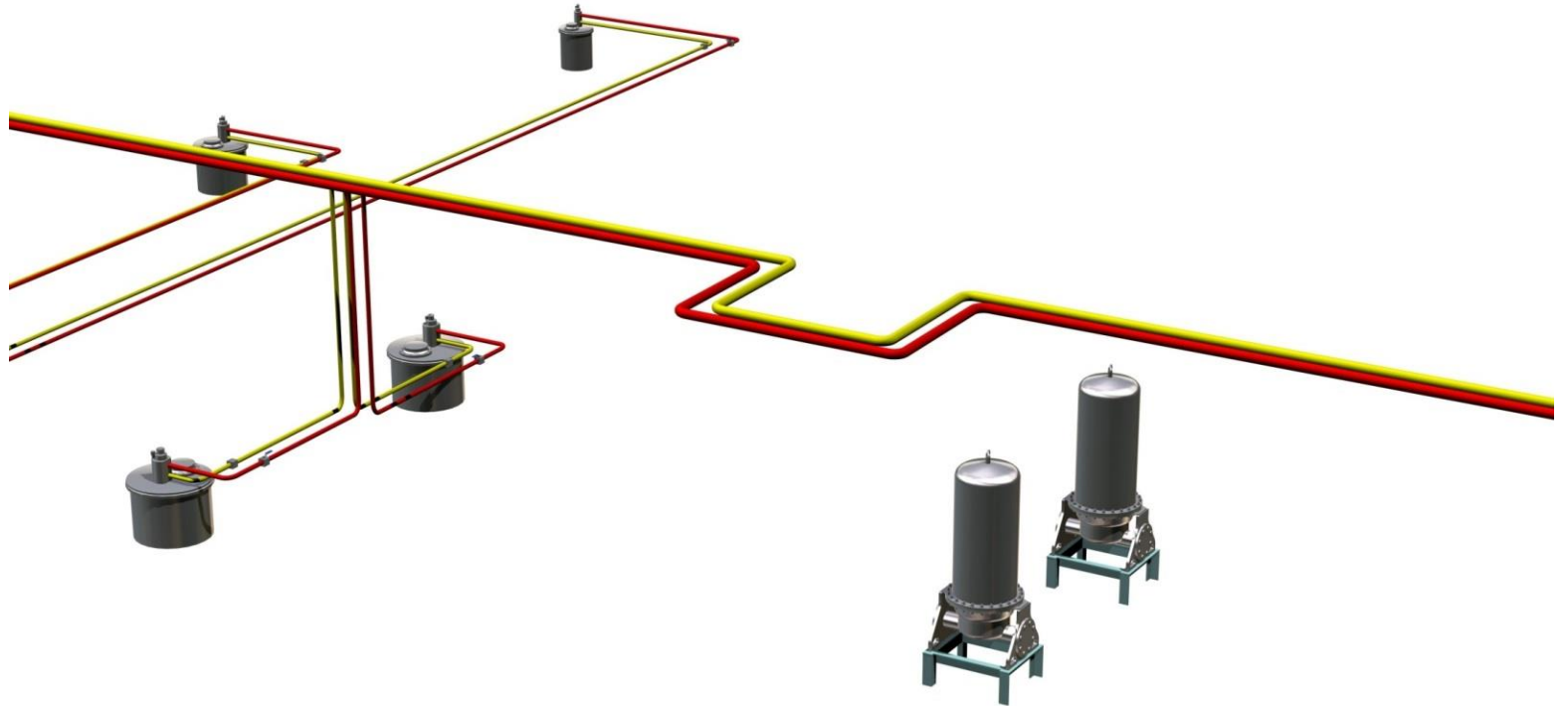
HE 500/1000
→ **1600 kW**



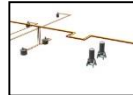




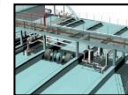
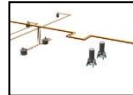
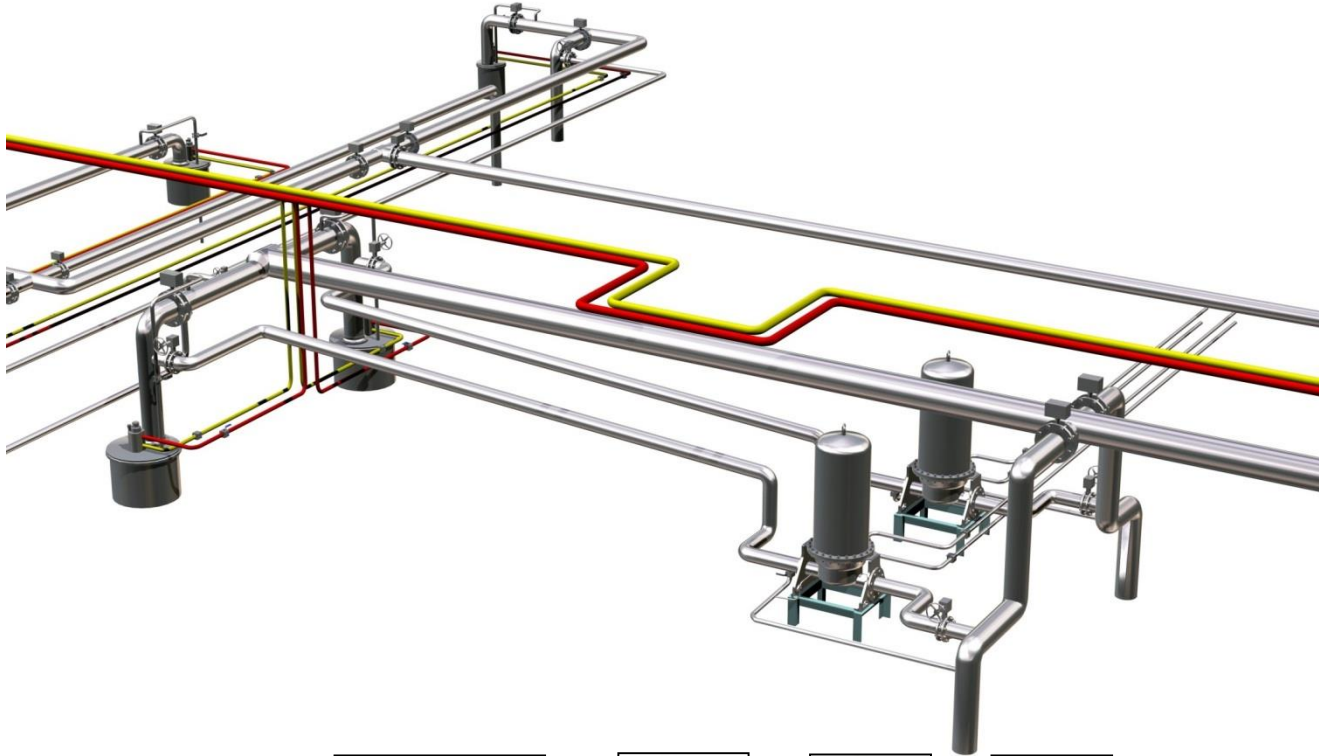
Pump Segment 6 – Hydraulic Piping



Pump Segment 6 – Cargo Piping



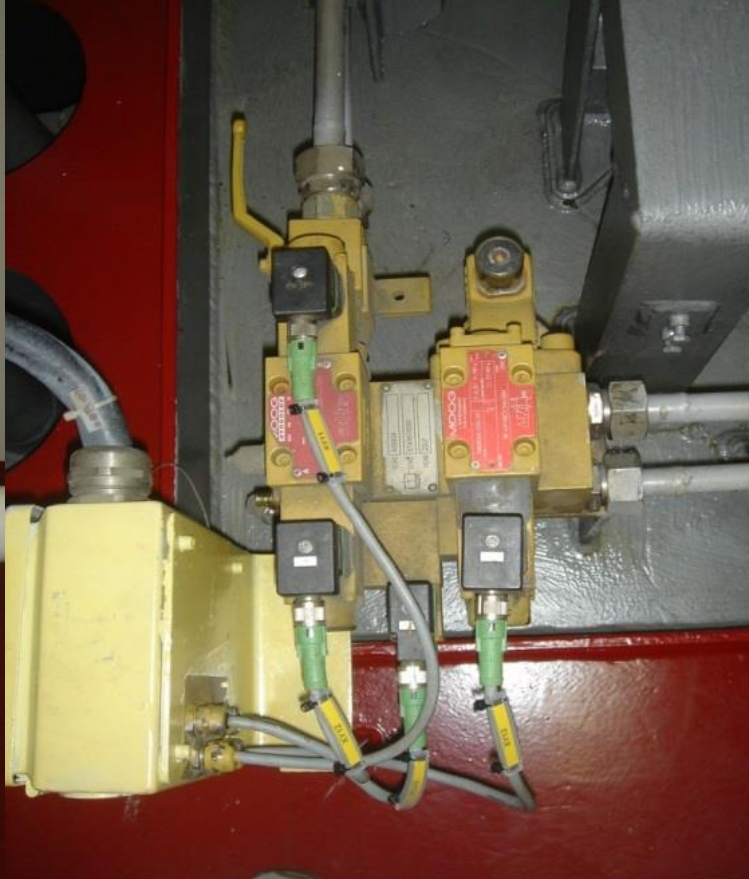
Pump Segment 6 – Cargo and Hydraulic Piping



Bow Thruster A4V Tandem motor







DSTC-80 (Directional Speed/Torque Controller)
and solenoids for directional- and speed control





Framo Fusa AS

| | |
|---------------------|-----------------------|
| Workshops - offices | 70.000m ² |
| Outdoor area | 60.000 m ² |
| Employees | 420 |



Framo Services AS
Workshops 5.100m²
Offices 4.250m²
Outdoor area 2.500 m²
Employees 207

Framo Services AS

Outdoor area 30.000 m²

Office 9.000 m²

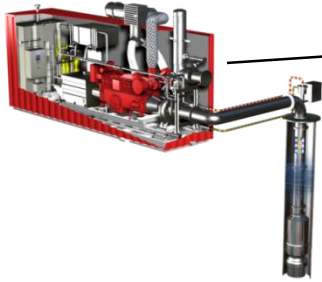
Workshops 7.580 m²

Deep water quay 36 m

Employees 260



Oil Gas Division



Fire Water Pump Systems

Electric Submersible Pumps



Water Injection Systems

Oil Recovery / Environmental

- Protection
- Specialised subsea pumping solution





Framo Flatøy AS

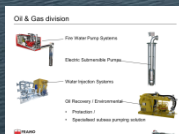
Workshops 20.300 m²

Offices 4.250 m²

Outdoor area 33.000 m²

Deep water quay

Employees 411





Framo Holsnøy AS

Workshops – offices: 12.000 m²

Outdoor area: 12.000 m²

Employees 64