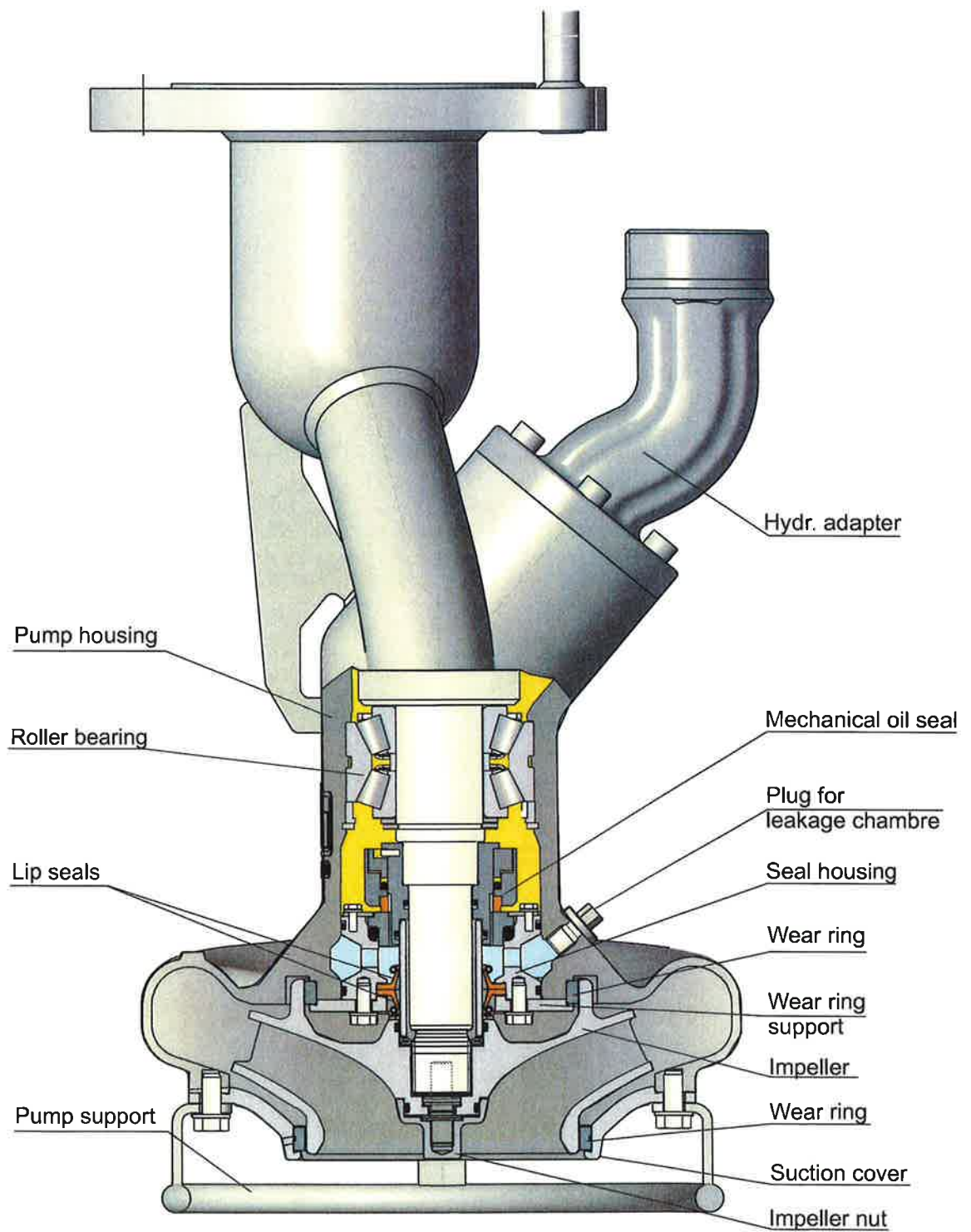




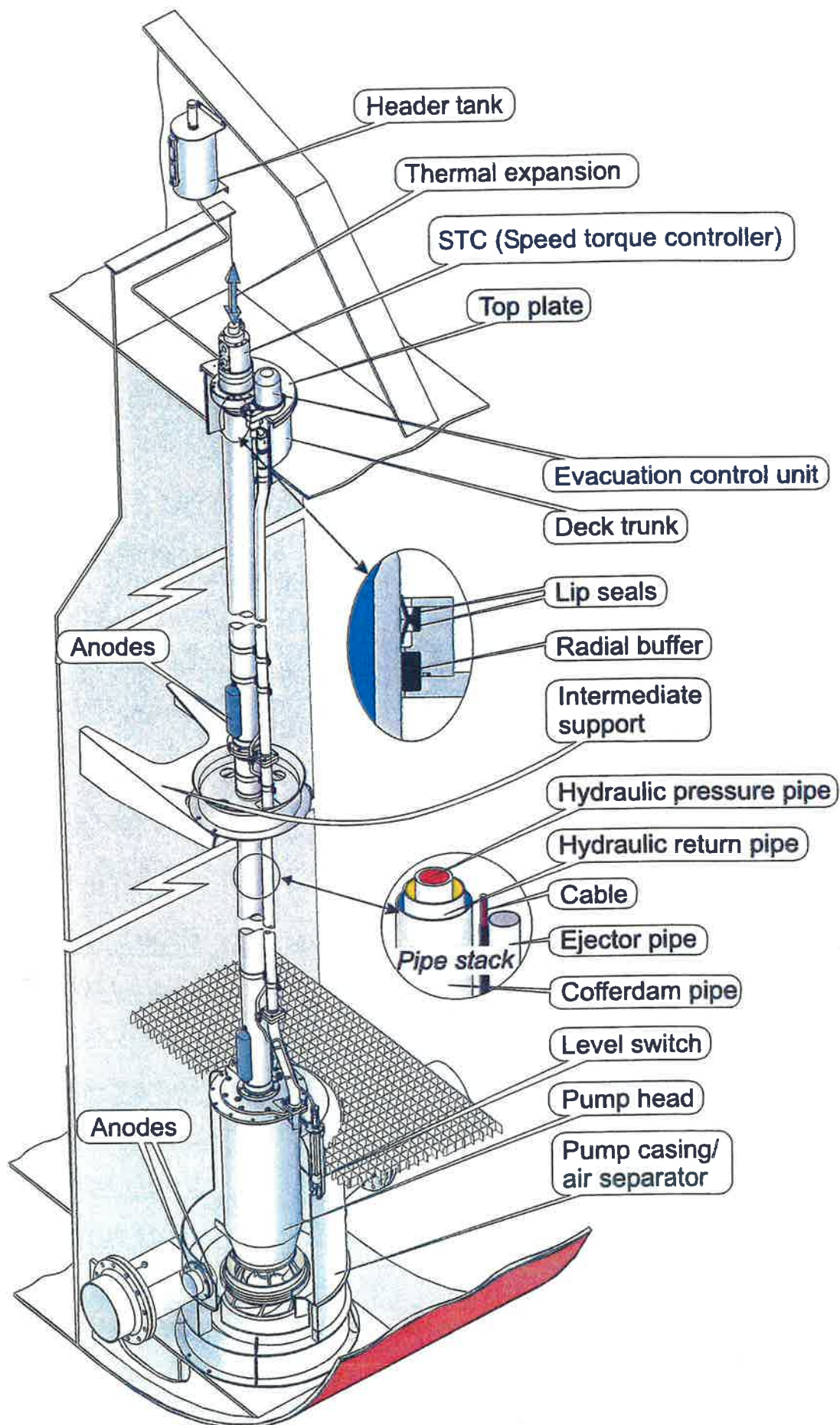
8 RULES FOR PORTABLE PUMP

1. Reduce system pressure to minimum, stop power packs
2. Always connect the Snap-On coupling to the return side first.
3. Then connect the pressure side in the same way.
4. Be sure that the Snap-On couplings are secured by means of locking ring.
5. Start the pump slowly and run it on deck for about 30 sec. to make sure that oil flow is free and the pump runs normal – flush the seal area with water.
6. Lower the portable pump into the cargo tank by means of a sling and never by the hoses.
7. Always disconnect the pressure hose first, and then disconnect the return the same way.
8. Before storing pump; drain 0,5 litre hydr. oil from the hoses.

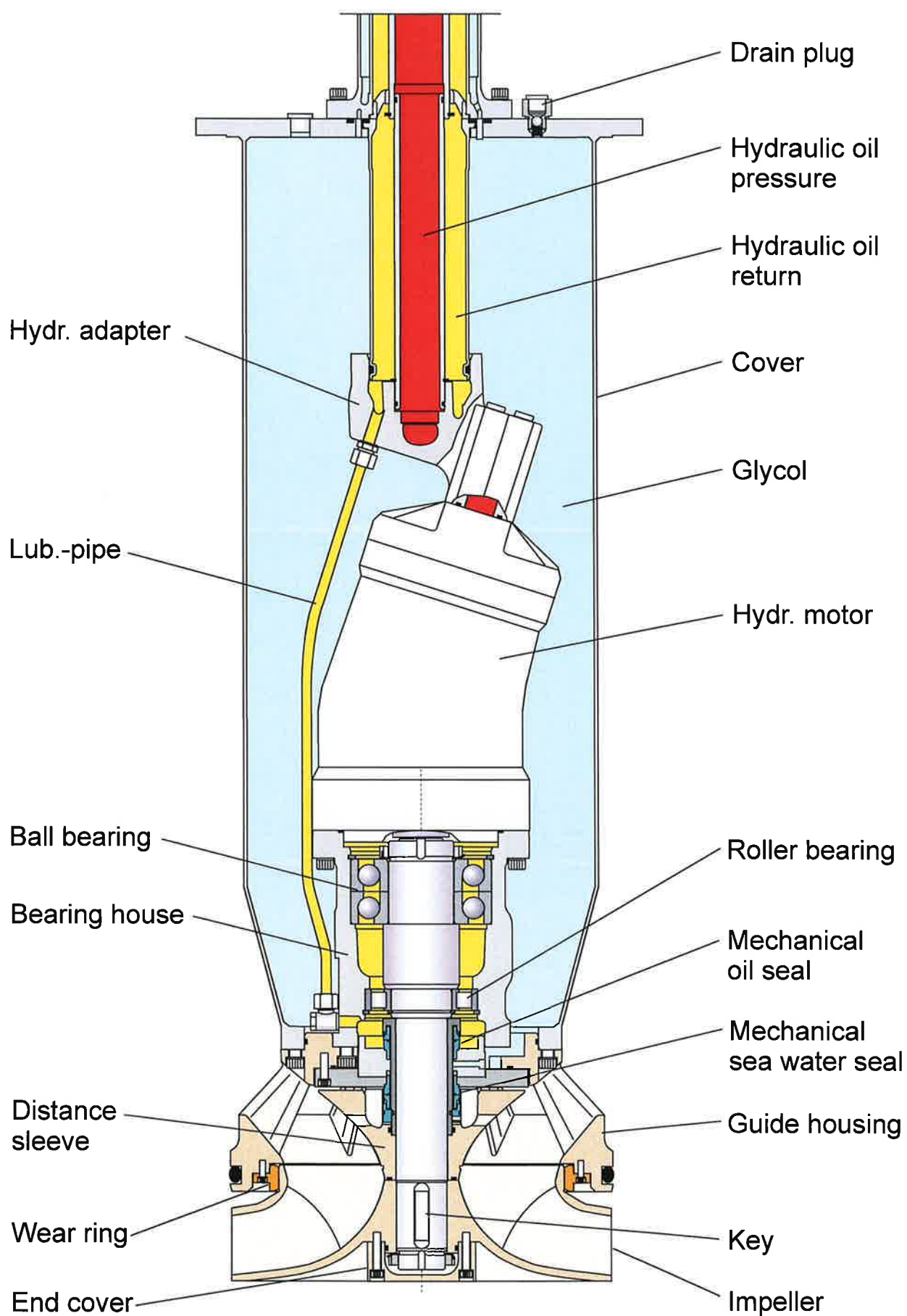
TK100



Submerged ballast pump



Ballast pump SB300



Common pilot air supply (7 bar)

Filter/water trap
or instrument air
(Yard supply)

Accommodation

Bulkhead

Safe area

Zener barriers

Control system

ⓑ ⓐ Min ID 6mm

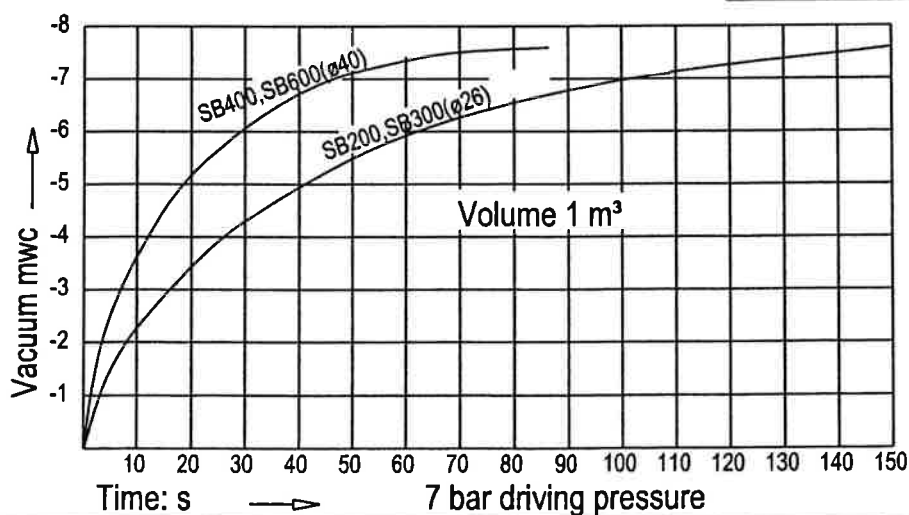
Ejector Ø26: Min ID 15mm
Ejector Ø40: Min ID 21mm

ⓓ Compr. Air

Max 12 bar

BALLAST
TANK

BALLAST
PUMP
type SB


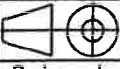


----- Ejector Ø26

Air consumption: 18NI/s=
1.1 Nm³ /min.

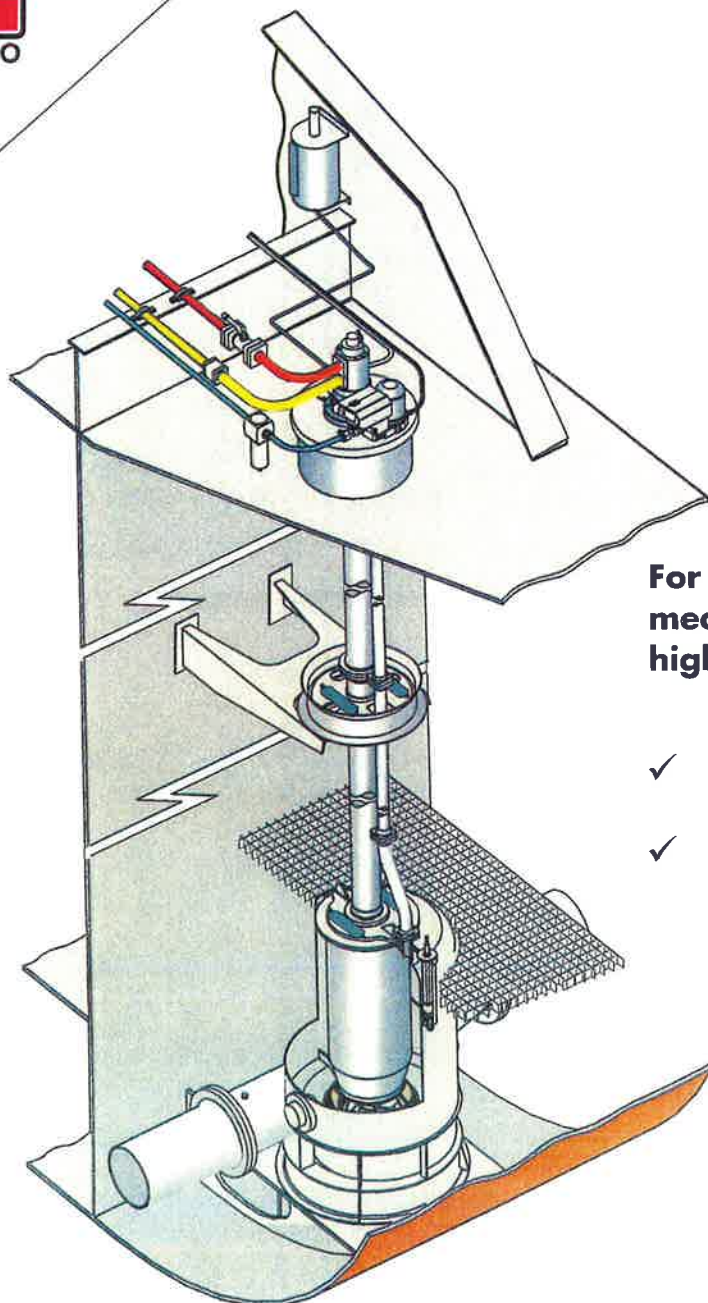
————— Ejector Ø40

Air consumption: 49NI/s=
2.9 Nm³ /min.

Fillets	Edges	D	Rev.	BJD	19Apr13	 Frank Mohn AS	Weld. drg./Cast. drg.
		C	E-6348	HB	27Mar08		
Surface roughness in Ra (m)		R.	R.O.no.	Sign.	Date	EVACUATION SYSTEM SB-PUMPS SUBMERGED	Replaced by:
		Status		Sign.	Date		
	1:1	Constr.	HB		31MAY05		0102-0555-4
		Checked					
Prod. rel.	Scale	Prod. rel.	HB		13JUN05		

Service Bulletin

Ballast Pumps: - Cofferdam Liquid, - Monitoring of Cofferdam



SB200
SB300
SB400
SB600

For increased life time of mechanical seals we like to high-light the following items:

- ✓ Correct cofferdam monitoring
- ✓ Correct type of liquid in the cofferdam



For all Framo SB-type ballast pumps - both submerged and dry mounted – the hydraulic section is surrounded by the liquid filled cofferdam that completely segregates the hydraulic oil from the ballast. Static overpressure in the cofferdam gives clean cofferdam liquid to the seal faces and lubrication of these.

Condition monitoring of the shaft seal arrangement is carried out by surveillance of the liquid level in the header tank.

Experience has shown that clean and correct type of cofferdam liquid is important in order to secure a long lifetime of the shaft seal arrangement.

Further the filling method is essential to avoid air pockets in the cofferdam. With air in the cofferdam the liquid level in the header tank can be unstable.

In case of change in cofferdam level, the level should be monitored over a certain period to ensure the problem is identified before carrying out service of the pump.

Cofferdam liquid (mixing rate):

- | | | | |
|------------------------|--------|---|------|
| - Demineralized water: | 40 | - | 50 % |
| - Glycol * | 60 | - | 50 % |
| - Freezing point | - 35°C | | |

* Propylene glycol, C₃H₈O₂ (monopropylene glycol, 1.2 propanediol, propanediol)
or

Ethylene glycol, C₂H₆O₂ (monoethylene glycol, 1.2 ethanediol, ethanediol)

Propylene glycol is less toxic and less corrosive than ethylene glycol. Therefore, Framo recommend propylene glycol to be used.

Use only pure glycol without additives.

Note! *Think safety and health. Read the Material Safety Data Sheet (MSDS) before using the different glycol.*

Note!

Never use other anti-freeze solutions. Some of the additives in the anti-freeze solutions form deposits on the seal faces and thereby cause seal failure.

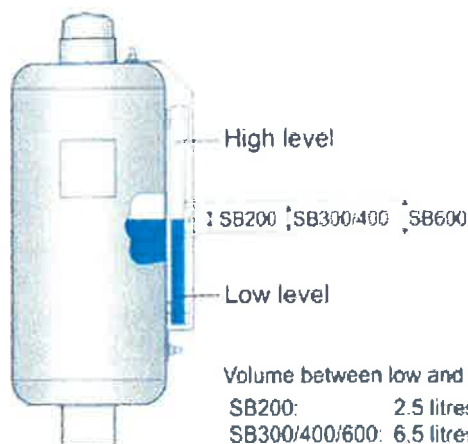
Glycol is added to prevent freezing. If no danger of frost, the cofferdam can be filled with demineralized water without glycol.

For filling of cofferdam it is important to follow the instructions given in the Operation Manual, which is available in the Service Manual.



We recommend regular control of the cofferdam level.

The liquid level in the header tank varies with the temperature of the ballast water, hydraulic oil and ambient temperature. Figure 1 indicates normal level variations for the different pump types with a temperature change of $\pm 10^{\circ}\text{C}$ on the cofferdam liquid.



Normal level variations depends on pump type and pump length. Figure indicates normal level variations with $\pm 10^{\circ}\text{C}$ temperature variation on cofferdam liquid.

Volume between low and high level:

SB200: 2.5 litres
SB300/400/600: 6.5 litres

Fig. 1

Because of level changes due to temperature variations, the level should always be monitored at the same temperature, i.e. at normal operating temperature.

The header tank level (H) to be measured in mm above low level mark on sight glass.

By using the enclosed log form, it is possible to establish a trend towards increasing or decreasing level. The filled in example below indicates how to use the log form.

$$\text{Leakage rate (to be calculated)} = \frac{(H_2 - H_1) \times 31}{h} \text{ [ml/h]}$$

H_1 = Header tank level before.
 H_2 = Header tank level after.
 h = hours of operation.

LOG FORM FOR LIQUID FILLED COFFERDAM ON FRAMO SUBMERGED BALLAST PUMPS

VESSEL NAME: MT "Tanker" TYPE OF LIQUID USED IN COFFERDAM: 50 / 50 mixture - Water / Glycol

Header tank level(H) to be measured in mm above low level mark on sight glass. 1 mm on sight glass is equivalent to 31 ml volume.

[illegible]



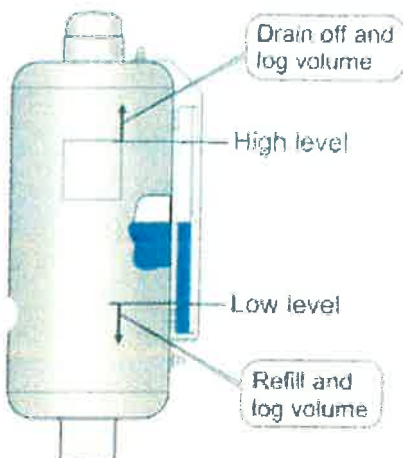
EVALUATION OF CHANGES IN LIQUID LEVEL IN HEADER TANK

When the pump is not running, the leakage rate from the mechanical seals is very low (up to 0,1 ml/h). Therefore increasing or decreasing level due to leakages from mechanical seals should not be expected when the pump is not in operation.

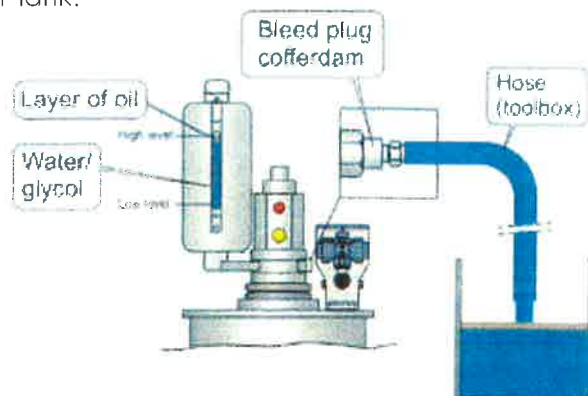
Changes in liquid level	Possible reason
Sudden decrease	Can indicate that it is air in the cofferdam system, which most likely occurs in the first period after initial water/glycol filling or complete refill after service.
Decreasing level (Leak from pump cofferdam to ballast tank)	Different temperature compared to the previous measurement (temperature of the ballast water, hydraulic oil and ambient temperature), ref. fig. 1. When pump is running the normal leakage rate can be up to 20 ml/h from the mechanical sea water seal. This will give a decreasing level in header tank of up to approx. 0,65 mm/h, i.e. 65 mm per 100 running hours. For a shorter period of time, higher leakage peaks can occur. Abnormal decreasing level over a period of time indicates a worn out mechanical sea water seal. For details see Framo Service Manual.
Increasing level (Hydraulic oil leak into pump cofferdam)	Different temperature compared to the previous measurement (temperature of the ballast water, hydraulic oil and ambient temperature), ref. fig. 1. Normal leakage rate can be up to 5 ml/h from the mechanical oil seal. This will give an increasing level in header tank up to approx. 0,16 mm/h, i.e. 16 mm per 100 running hours. For a shorter period of time, higher leakage peaks can occur. A continuous leakage rate > 20 ml/h or a sudden increasing level in header tank may indicate a worn out mechanical oil seal, and overhauling may be necessary. For details see Framo Service manual.

IN CASE OF ANY DOUBT, please contact any Framo service stations for assistance.

If the level drops under low level, refill the header tank. Log the volume.



If level exceeds high level, the header tank must be drained. Volume and amount of oil must be logged. Empty the header tank by draining through the cofferdam bleed plug, see fig. 15. Refill the header tank.





LOG FORM FOR LIQUID FILLED COFFERDAM ON FRAMO SUBMERGED BALLAST PUMPS

VESSEL NAME: _____ TYPE OF LIQUID USED IN COFFERDAM: _____

Header tank level(H) to be measured in mm above low level mark on sight glass. 1 mm on sight glass is equivalent to 31 ml volume.

[illegible]

$$\text{*Leakage rate (to be calculated)} = \frac{(H_2 - H_1) \times 31}{h} \text{ [ml/h]}$$



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