



Operation of FRAMO Cargo Pumping System

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1.0 LOADING THE CARGO TANKS

Correct operation of pumps and valves is essential to avoid pressure surges in a cargo pipeline system during loading. Pressure surges may cause severe damage to the pipeline, hoses, metal arms and cargo pumps. Pressure surges will be excessive if a valve is closed too quickly and especially where long pipelines and high flow rates are involved.

Note: If a separate drop line is installed, we recommend to load through the drop line only.

If this is not possible due to valve arrangement, use following procedures to avoid pressure peaks in the cargo piping during loading.

- 1.1 Procedure for loading through the drop line and cargo pump
 - 1.1.2 Keep manifold valve closed until the cargo reach the manifold.
 - 1.1.3 Open the manifold valve partly to fill cargo line on deck.
 - 1.1.4 ** Open the cargo pump discharge valve and drop line valve slowly, until you reach maximum capacity, or maximum 8 bar cargo pressure, measured at the top of the pump. For minimum opening time, see table on page 4.
 - 1.1.5 Continue to load through the drop line and the cargo pump.
- 1.2 Procedure for loading through the cargo pump without drop line
 - 1.2.1 Keep manifold valve partly closed until the cargo reach the manifold.
 - 1.2.2 Open manifold valve partly, to fill cargo line on deck.
 - 1.2.3 ** Open cargo pump discharge valve slowly. For minimum opening time, see table on page 4.
 - 1.2.4 ** Open the manifold valve slowly until you reach maximum capacity, or maximum 8 bar cargo pressure, measured at the top of the pump. For minimum opening time, see table on page 4.
 - 1.2.5 Continue to load through the cargo pump.



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Note 1: Maximum acceptable loading pressure is 8 bar at the pump's top cover plate. During the initial stages of loading into each individual tank the flow rate in its branch line should not exceed a linear velocity of 1 metre/ second.

Note 2: For sampling procedures, ref. charterers' requirements.

Note 3: If the loading has been stopped and the cargo valves closed, it is important to restart the loading by following the same procedure as described above!

Note 4: For some ships like OBO's, it might be necessary to load through the pump only, until the cargo is above the drop line outlet. This because the drop line outlet is high above the tank top.

****) Valves which control liquid flow should be opened slowly. The time taken for power operated valves to move from open to shut and from shut to open should be checked regularly at their normal operating temperatures.*

Minimum opening time for cargo valves:

Cargo pump type	Cargo pipe diameter (mm)	Minimum opening time (seconds)
SD50 – SD100	< 100	10
SD100 – SD125 – SD150	100 – 150	15
SD150 – SD200	151 – 200	20
SD200 – SD 250	201 – 250	25
SD300 – SD350	251 – 400	30
SD350	> 400	45

2.0 DISCHARGING OF PARCEL CARGOES

- 2.1 Start the hydraulic power plant and increase the hydraulic system pressure to approximately 150 bar. If the hydraulic oil temperature is below 20 °C, circulate the oil for heating at maximum 100 bar prior to raising the hydraulic system pressure to 150 bar.
- 2.2 Start the cargo pump slowly and let it run with hydraulic pressure 40-50 bar for approximately 1-2 minutes with closed cargo pump valve.
- 2.3 Raise the pump's discharge pressure above manifold pressure to avoid "back flow" (overpumping). Then open the cargo pump discharge valve.
- 2.4 Increase the hydraulic motor pressure until required discharge pressure or capacity is achieved. If required, increase the hydraulic system pressure.
- 2.5 Follow the same procedure for the next parcel. Ensure that enough hydraulic power is available. If not, the hydraulic pressure will drop, and the capacity/ head will be reduced.
- 2.6 The hydraulic system pressure should be maximum 15 bar above the highest consumer pressure in order to minimize energy consumption, noise level and wear and tear.

Note: Remember to purge the cofferdam before and after using the cargo pump!