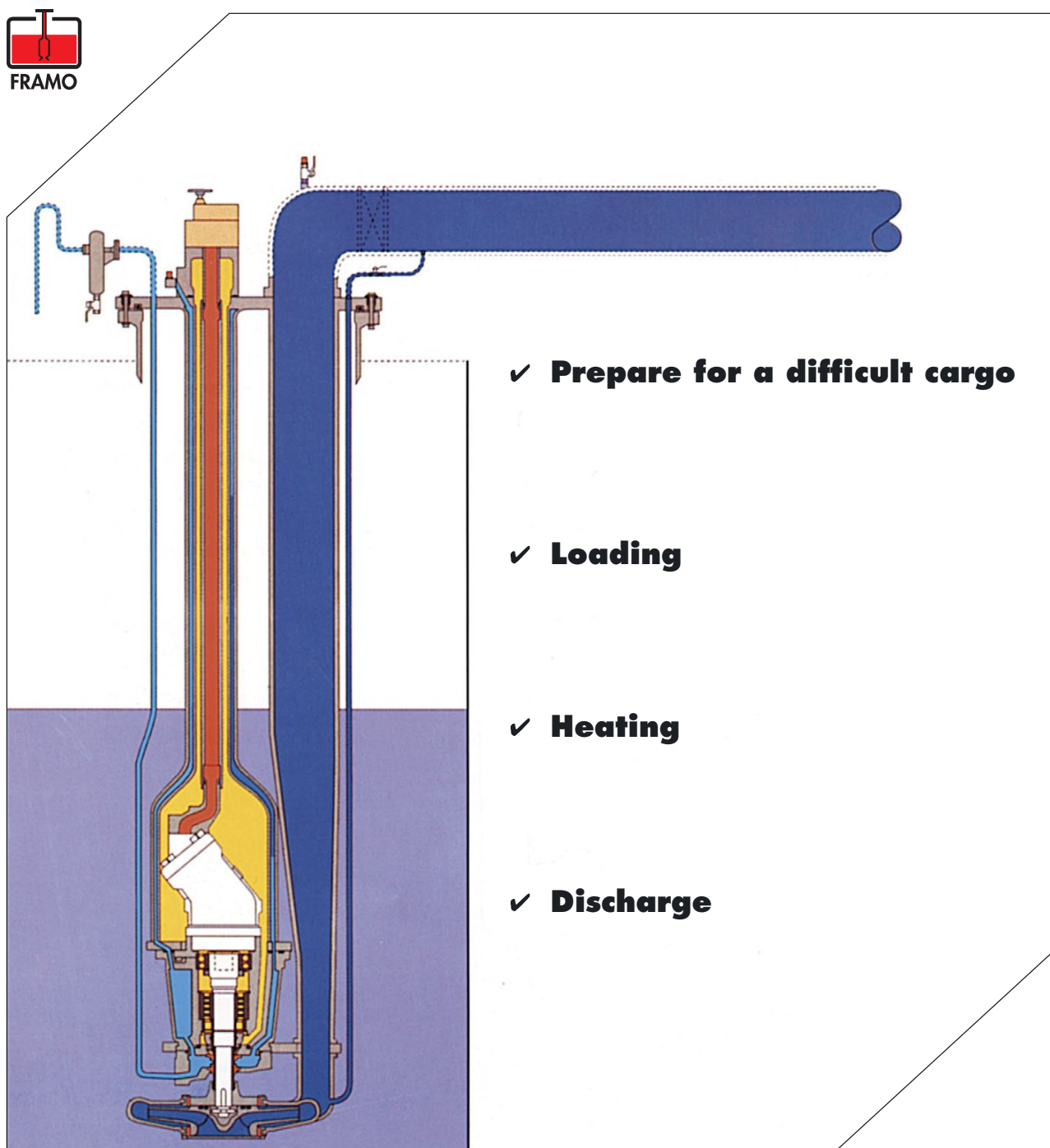


Service Bulletin

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Handling of High Viscous Molasses



Dear Customer

Handling of extreme molasses is complicated and several problems have arisen because there has not been taken sufficient precautions for this difficult cargo.

Molasses is a non newtonian fluid and the pumpability does not only depend on viscosity, but where the molasses comes from, the storage time, the fermentation process in the molasses, brix value etc.

It is of great importance that the loading of the molasses is done in a manner avoiding foam building up.

Further the cargo heating during the voyage has to be carefully balanced with a low temperature on heating medium in order to avoid crystallisation of molasses on and near the heating coils. At the same time the heating has to be sufficient for ensuring a high temperature and even distribution throughout the entire cargo tank, enabling the molasses to be as pumpable as possible.

Since the molasses is very sensitive to heat, and overheating leads to crystallisation, heating should preferably be done by heating coils and hot water as heating medium, if steam is utilized as heating medium steam pressure has to be reduced. For vessels equipped with heat exchangers on deck, make sure you have sufficient circulation of cargo through the heater. Because of all these variables it is impossible to calculate an expected discharge rate on beforehand.

To minimize the problem with this cargo we therefore recommend you to take proper precautions, and in addition to your own experience we would highlight:

- Load the cargo through dropline at the bottom of the tank.
- Keep the temperature of the molasses close to the discharge temperature during the entire voyage.
- Make sure you have waterfilling/flushing of cargo pump cofferdam the whole period you have molasses in the tank to avoid burning of pump's cargo seals.
- Make sure that the actual molasses is pumpable with the ship's pumps.
If in doubt, prepare with special portable pumps and booster pump to increase the discharge capacity.
- Adding of limited quantity of water will improve the pumpability, make necessary option in the charter party.

If you need any further assistance, please contact one of Framo Service Stations world-wide.



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