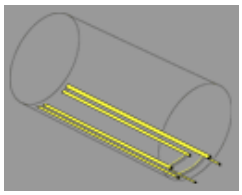
Steam Heating

Tanks equipped for steam heating have a series of steam channels on the outside of the lower half of the tank, and on some designs, around the tank circumference. These channels provide up to ten square metres of heating area with a heat input roughly equivalent to 100 kW at a pressure of 2 bar (31 psi). Steam heating is the most efficient means of heating the tank cargo.

The steam channels terminate at the rear of the tank and are closed by threaded dustcaps.

The inlet and outlet can be fitted with a valve and the outlet should be fitted with a steam condensate trap.

The maximum working pressure of the system is indicated on the data plate.



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Electrical Heating

Two different methods are used:

• **Immersion Tubes** which have the highest efficiency

• **External Shell** heating which provides even cargo heating and a high degree of control.

Immersion System
The immersion system consists of two 17 foot (5.2m) heating elements fitted within fully welded, pressure tested, stainless steel tubes running inside and parallel to the base of the tank shell. This system operates on either 200-280 V 3-phase or 340-480 3 phase. Power output at 440 V is 12kW.

External Heating Shell

The external shell heating system consists of a network of elements in contact with the shell over the bottom third of the circumference of the tank. These heaters are especially suitable for heat sensitive products. This system operates on either 200-280 V 3-phase or 340-480 3 phase. Power output at 440 V is 15kW.

Click here for samples
(see Mannings electrical)

General Precautions

1. Do not exceed the maximum steam working pressure. This is marked on the tank data plate. The use of excessive pressure may damage the tank shell.

2. Do not overheat the cargo. Excess heat can degrade sensitive cargoes, so it is important that the heat input is directly related to steam pressure. To avoid damage to the tank shell or cargo through excess steam pressure, it is recommended that a variable relief valve and gauge be fitted to the steam supply line.

3. Prevent pressure build-up. The pressure build-up caused by cargo expansion must be relieved. If the cargo is non toxic, open the air inlet. If toxic, vent back to a storage tank.

Note: With some solidified products such as maleic anhydride the pressure increase in the lower melted portion of the cargo may not find

4. Do not discharge during heating. Continue to apply heat until ALL the cargo is melted and has reached the correct temperature. Do not commence discharge until the correct temperature has been reached. This will assist the melting of solidified material, and prevent overheating and consequent damage to the cargo or tank shell.

Cargoes with low heat-transference properties may require a long time to melt.

5. Do not attempt to force open valves blocked with solid cargo. Continue to apply heat until all the cargo has melted. A steam trace at the valve outlet might be necessary.

6. Heat small quantities of cargo with extreme care, overheating may damage the cargo and tank shell.

7. Ensure that the carrier is aware of the maximum temperature to which the cargo

Connecting the steam supply

1. Check that the correct steam pressure has been determined, and that the cargo characteristics have been properly considered.

2. Connect the steam supply hose to the inlet BSP connection.

3. Fit a steam trap to the condensate outlet. This will allow the latent heat in the steam to be fully used, so reducing both heating time and cost.

4. Open steam supply SLOWLY. This will prevent 'water hammer' as the condensate in the saturated steam is discharged. Check all hoses and connections for leaks.

Examples of Reefer Components

a leakage path through the solid portion, and the pressure build-up may exceed the working pressure of the tank. In such a case it is necessary to fit steam traces on the dip tube to provide a path for the molten product through the still solid product to the top of the tank.

may be heated.

8. Ensure that neither personnel nor cargo are endangered by escaping steam.