

## TANK HEATERS

### Types of Tank Heaters

Typically Tank Heaters fall into two categories; tubular (which utilizes a fluid inside a tube to heat the tank contents), or electric (typically used in smaller tanks).

Tubular Tank Heaters usually use steam, hot oil, or glycol/water mixtures as the heating medium. They are available in a wide variety of styles which as single units or in multiple banks suit most applications.

The tank size, shape and design as well as the fluid in the tank and heating medium drives the design of the Tank Heater. As with most heat exchanger designs, the intention is to provide a standard design in order to reduce cost and lead-time. However, similar to other heat exchangers, as each application is unique the Tank Heater is often based on a standard design but customized for the specific application.

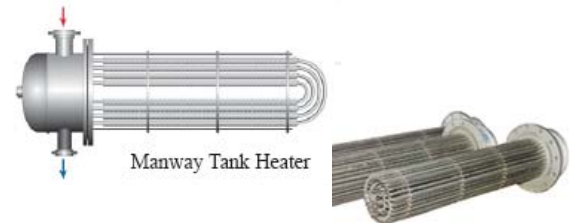
**Vertical** – The vertical Tank Heater design produces strong thermal currents within the tank which results in efficient heating.

Vertical Heater



Serpentine Heater

**Horizontal** – are often used in working tanks where low liquid levels may be encountered.



Manway Tank Heater

**Manway / Bayonet** – convenient to install, clean and change.



Suction Heater

**Flow Through Heaters (Suction or Line)** – are used when the requirement is to heat only the liquid being pumped, not the complete contents of the tank. These heaters are installed in the piping exiting the tank.

**Portable (drums, tank cars, trucks)** – are typically used in circumstances where a reduction of viscosity of the fluid in the tank will result in significantly improving the flow, increasing the speed of emptying the tank. These units are therefore often used in tanker car or truck applications.



**Over the side** – are typically used in portable tanks or drums. As the name implies these Tank Heaters are dropped in an open tank and can heat the tank in either a vertical or horizontal configuration.



**Band or Drum** – are heaters designed to fit over the outside of a tank or drum. These can be flexible or shaped for a standard sized tank. These heaters heat the fluid by heating the tank.

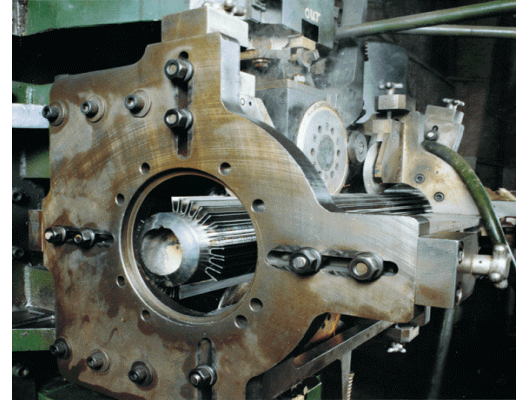


## Fintubes in Tank Heaters

Fintube heaters, overall, are less costly to install and maintain than other bare tube heaters. Either solid or perforated longitudinal fintubes are frequently used as dictated by the application. Various metallurgies are available for both the fin and tube materials.

The operational benefits of fintubes for a tank heating application are;

- Fintubes provide a compact, durable and reliable design.
  - Finned tubes provide up to 12 times the surface area of bare tubes.
  - Less surface area results in fewer tubes which in turn means fewer weld. Fewer welds inside the tank mean fewer potential leaks points.
  - Less Product Displacement. Volume-to-heat transfer surfaces ratios are low compared to bare tube. Therefore more product can be stored.
- Fintube heaters minimize sediment accumulation because strong thermal currents are created in the tank keeping sediments suspended.
- Fintubes minimize fouling due to the lower skin temperature and the creation of thermal currents in the tank.
- The fins reinforce the tube by giving strength, durability and long life to ensure the integrity of the assembly.
- Mean metal temperature of the surface in contact with the tank contents (skin temperature) can be lower than bare tubes. As a result;
  - Discoloration or degradation of product is minimized.
  - Reduced coking, carbonization and polymerization.
  - Can be used in heat-sensitive products such as light hydrocarbons, vegetable oils, syrups and lube oils.
  - Reduced corrosion and scaling.
- Lower Capital Cost
  - Extended (fin) surface is less expensive than equivalent primary (bare) surface.
  - Less weight and size requires less support and eases installation.
  - East installation. Less field welding required than bare coils.



The resistance welding process produces a permanent fin-to-tube weld that actually is stronger than the fin metal itself. It assures no air gaps or trapped dirt or flux that can diminish fin efficiency and durability. The expansion/contraction from repeated heating/cooling cycles will not separate fin from tube. Destructive "pull" tests have shown the fin being destroyed before weld separation.