



# Automatic Pumping Trap

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## Applications

**VOLFRAM** make Automatic Pumping Trap - Steam generated by boiler contains heat energy which is used directly or indirectly as per the industrial application. When steam loses its energy by heating the product, condensate is formed. Also a little part of steam energy is lost through the radiation losses from pipes and fittings. After losing heat, steam gets converted into condensate. If this condensate is not drained immediately, it can reduce the operating efficiency by slowing the heat transfer to the process. The immediate condensate discharge out of process equipments is absolutely necessary to retain the maximum possible capacity of the heat exchange and to minimize the danger of corrosion, water-hammering & temperature fluctuations in the process.

It is a task of a steam trap to discharge condensate out of process equipments and to keep the steam inside it. This action of steam trap creates a back pressure on the process equipment and this phenomenon can affect the functioning of the equipment if it is recommended not to put a back pressure. To avoid the back pressure of the traps, we install an Automatic Pumping trap to the system. Automatic Pumping trap is an intelligent part of steam system which collects condensate, do not allow steam to get released and pumps the condensate to the boiler feed water tank. Another advantage of using APT over traditional traps is that APT can pump the condensate to the desired location and height. This reduces the requirement of separate pump for moving the collected condensate.

## Stalling Effect:

Considering the example of Heat Exchanger with steam trap where steam is used to heat the fluid. In this process, when exchange of heat occurs, steam is condensed after loss of latent heat. This condensate gets down with gravitation and gets collected in the trap. The trap has float assembly which allows condensate to pass when a float gets up with the level of condensate.

Once the temperature is reached in Heat Exchanger, the steam inlet is closed by the control valve. Here, the steam inside the exchanger condenses and starts collecting inside the trap. As the trap outlet is filled with condensate, and inlet has no pressure as the steam control valve is closed, the condensate does not flow out from trap. This causes sudden drop in temperature. This effect is Stall Effect. This causes control valve throttle and purge steam into Heat Exchanger. When steam starts again, condensate stalled inside the Heat exchanger tubes rushes out. Due to sudden increase in flow, trap starts hammering. Once the condensate is drained, the temperature is again reached by the steam and the cycle repeats. This creates sudden rise and sudden fall in temperature.

Hence to avoid this stalling effect, back pressure and sudden temperature change, we install an Automatic Pumping trap to the system. The installation of APT eliminates the back pressure by keeping the pumping vessel open to atmosphere. Also stalling does not happen as more space is given for condensate to get collected. The biggest advantage of the APT is that it can pump the collected condensate back to boiler feed water tank.

## Specifications

- **Material of construction (Body): IS 2039**
- **Material of construction (Internals): Stainless Steel (SS 304)**

## Available Sizes:

- 15 NB (1/2")
- 20 NB (3/4")
- 25 NB ( 1")
- 40 NB ( 1.1/2")
- 50 NB (2")

## Function Overview

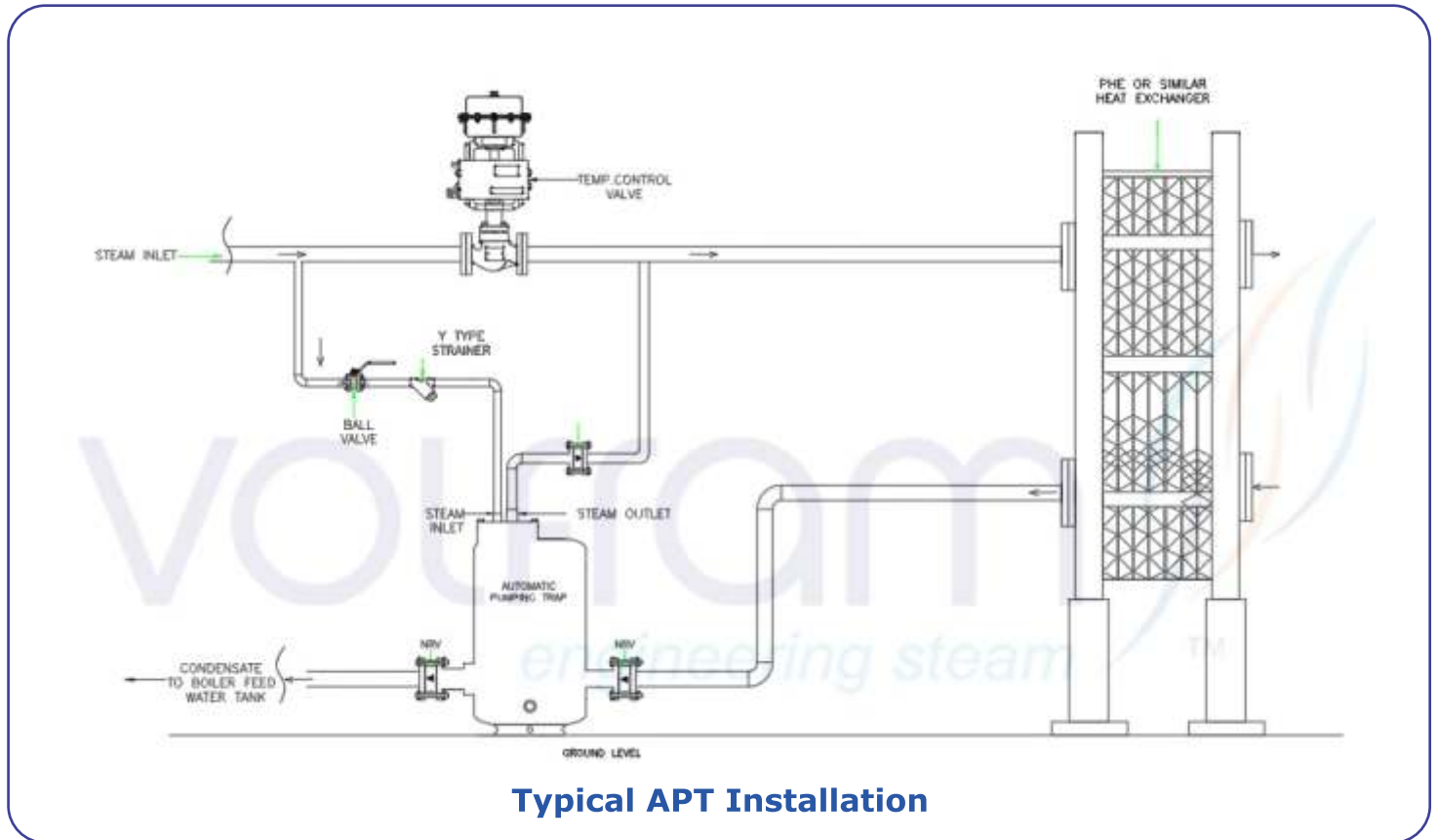
The Volfram Automatic Pumping Trap (APT) is a multifunctional device which collects a condensate from process equipment, do not allow steam to get released, and pumps the collected condensate back to feed water tank. The APT collects the condensate from process equipments by gravitational force through a NRV (Non Return Valve). This NRV restricts the condensate to flow back. The APT offers enough space to store the large volume of condensate inside it. The float trap module is connected at the Outlet of the APT which allows condensate to pass when a float rises with the level of condensate. The second NRV is installed here to avoid the flow back to the APT. There is another Float assembly, which is used to pump the condensate to the desired height. For pumping, we use a steam as a motive supply. Initially the motive supply inlet remains closed and exhaust remains open to atmosphere. This allows condensate to get collected into the tank. As the float rises with the level of condensate inside tank, the motive supply inlet opens and purges steam inside. At the same time, motive supply exhaust gets closed. This increases pressure inside the tank by motive steam. The pressure inside the tank pushes the collected condensate to the outlet and condensate is pumped out of the tank towards Condensate collection tank.



## Installation Guidelines

The best outputs from the Automatic Pumping traps can be observed if the arrangement of the APT is done properly and according to the process and guidelines.

The Automatic Pumping traps have one condensate input and one condensate output. We need an additional motive steam inlet and motive steam exhaust for the pumping.



### Points to be considered while installing the APT:

1. The APT should be mounted on the flat surface, so that condensate inlet and condensate outlet should be at equal height.
2. Check if the Non Return valves are properly connected so that it can allow the condensate to come in from inlet and restrict the flow in opposite, and allow condensate to go out of APT and oppose the flow of condensate back into the APT through outlet.
3. Make sure that the APT will get a motive steam supply from the inlet at the flange on the top.
4. The motive steam exhaust should be properly routed so that exhausted steam will be utilized again by connecting it to the inlet of the process equipment, and passing the steam to serve the purpose or exhaust into the atmosphere.

## OPERATION

The operation of the Automatic Pumping Trap is very simple and easy to understand. The APT should be provided with a continuous steam or air supply and the condensate should be continuously flowing towards the APT.

First, the condensate out of the process equipment should be connected to the condensate inlet of the APT tank. The tank has one inlet and one outlet which is mentioned on the respective ends. The condensate inlet will have NRV which will allow condensate to flow inside the tank only. It will restrict condensate to come out of inlet. The condensate outlet also has NRV connected to allow condensate to go out of tank and restrict the reverse flow.

APT has 1 float assembly inside which functions as a trap. It is connected at the outlet of the APT. This assembly works on a principle of Rotating plug. The float is connected mechanically to the rotating plug. It has a pipe-like outlet which gives condensate a direction to pass.

When a condensate and steam gets in into the APT, level rises inside a vessel along with the level of condensate. The float rises along with the increase in condensate level only by sensing the difference in densities of steam and condensate. This results in trapping the steam and allows only condensate to pass.

There is another float assembly installed at the top flange. This assembly is used for pumping the collected condensate in APT. The assembly consists of a steam inlet valve, steam exhaust valve, mechanical assembly and a float. The steam inlet valve is connected to a continuous steam supply which will create pressure inside the pump vessel to push the condensate to the outlet. When the float is at low level, the stem of the mechanical assembly stays down.

The actuating disc is connected to this stem. As the disc is down, the exhaust valve remains open and inlet valve is closed fully. As the condensate keeps filling to the vessel, the float starts coming up with the level. When the high level at vessel is reached, the spring pushes the stem up and hence disc is pushed to open the steam inlet valve and closes exhaust valve. The steam is burst into the pump vessel and increases the pressure inside it. As the Non Return Valve from inlet restricts condensate to go back, pressure pushes the condensate to the outlet of pump. Again the level inside the vessel decreases pulling the stem and the actuating disc down with the float. As a result, the steam inlet gets closed and exhaust port remains open taking out the steam inside the vessel. Again the condensate starts filling at the pump vessel and cycle keeps repeating.



## SERVICE POLICY

Volfram Automatic Pumping Trap has a **One year warranty** against manufacturing defects.

Out of warranty repairs or replacements are done on a flat fee basis after the warranty is expired.

# Volfram Boiler and Steam Accessories



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