Armstrong PT-516 High Capacity Pump Trap

Effective recovery of condensate as well as having trouble free equipment to return hot condensate is essential to overall plant efficiency while conserving energy. Large amounts of condensate provide one of the best opportunities to save energy.

The Armstrong PT-516 High Capacity Pump Trap is the low maintenance, non-electric solution to moving large amounts of condensate and other liquids from low points, low pressures or vacuum spaces to an area of higher elevation or pressure. Condensate can be returned at temperatures well above the 210°F limit of conventional electric pumps without the headaches of leaking seals or cavitation.

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Features

- Non-electric — utilizes inexpensive steam, air or gas to operate the pump trap.
- No leaking seals/packings, impeller wear, electrical or motor problems — reduces maintenance and down time.
- Single trade installation or repair reduces installation and maintenance costs.
- Direct spring/float actuated mechanism — no maintenance intensive diaphragm operated valve mechanism.
- Compression spring design with life time spring warranty — Reduces down time, ensures performance and reliability.
- Rugged stainless steel internals — durable and corrosion resistant for enhanced service life.
- "Closed Loop" — no motive steam or flash steam loss, therefore capturing and returning all valuable btu's back to the system (see "General Applications").
- Safety — pump can be placed in flooded pits without fear of electrocution or circuit breaker defaults.
- Explosion Proof — standard unit intrinsically safe without additional cost.

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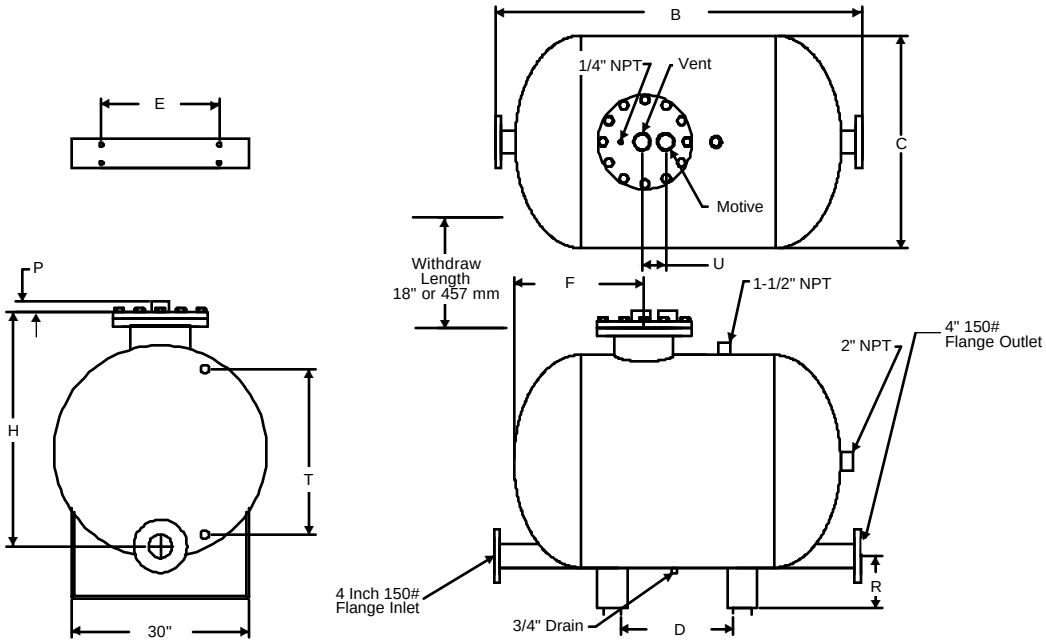
List of Materials - PT-516 High Capacity Pump Trap	
Name of Part	**Description**
Cap, Body, Bolting	Fabricated steel 150 psi ASME Sec. VIII Design "U" stamp coded.
Cap Gasket	Compressed non-asbestos
Inlet Valve Assembly	Stainless Steel
Vent Valve Assembly	Stainless Steel
Mechanism Assembly: Frame, Float and Spring	Stainless Steel

Note: 300 psi ASME vessel available upon request, consult factory. PT-516 available in all stainless steel. Consult Factory.

List of Materials - PT-516 High Capacity Pump Trap		
	Inches	**Millimeters**
Inlet Connection	4 150# ANSI Flg.	100 150# ANSI Flg.
Outlet Connection	4 150# ANSI Flg.	100 150# ANSI Flg.
Motive Connection	2 NPT	50 NPT
Vent Connection	2 NPT	50 NPT
Guage Glass Connection	3/4 NPT	20 NPT
"B"	62	1574
"C"	36	914
"D"	19-1/16	484
"E"	20	508
"F"	22	559
"H"	48	1219
"P"	1-3/4	44
"R"	8-3/4	222
"T"	28	711
"U"	4	100
Weight lb (kg)	807	366
Number of Bolts	12	12

Maximum operating pressure on standard unit 150 psig (10 bar). For higher pressure, consult factory.
Maximum allowable pressure (standard vessel design) 150 psig @ 650°F (10 bar @ 185°C). 300 psi (21 bar) vessel available upon request.



Armstrong PT-516 High Capacity Pump Trap

"Open Systems" - For the majority of applications, a steam trap is recommended on each piece of heat exchange equipment. The steam trap, or traps, discharge to a vented receiver where flash steam will be vented to the atmosphere. The pump trap is located down stream and below the vented receiver allowing for proper fill head height. See Table 6-2 for vented receiver and vent sizing for an "open system". For additional "open loop" applications reference Armstrong Installation Bulletin IB-100.

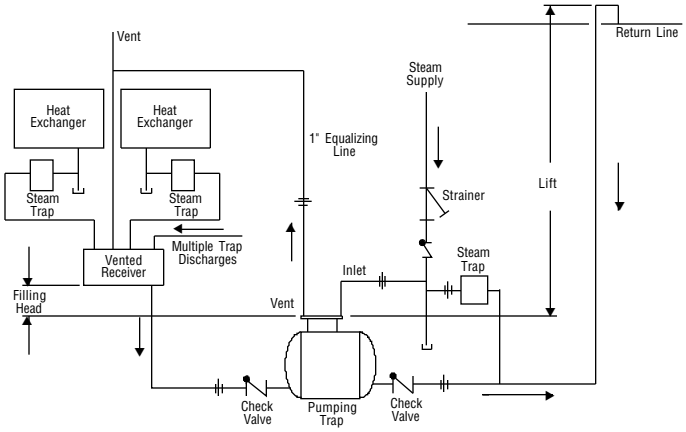


Fig. 3-1 Multiple or single traps discharging to a vented receiver.

"Closed Systems" - Applications exist where it is desireable to tie the vent line back into the heat exchange space "equalizing" the pressure in the heat exchanger, reservoir/piping and the pump trap. This allows water to flow by gravity down to the pump where it can be returned. Valuable btu's remain within the system due to no flash steam loss to the atmosphere through the vent. Closed system applications can also be used to drain liquid from the equipment under a vacuum. For reservoir pipe sizing reference Table 6-1. For additional details on "closed loop" applications reference Armstrong Installation Bulletin IB-100.

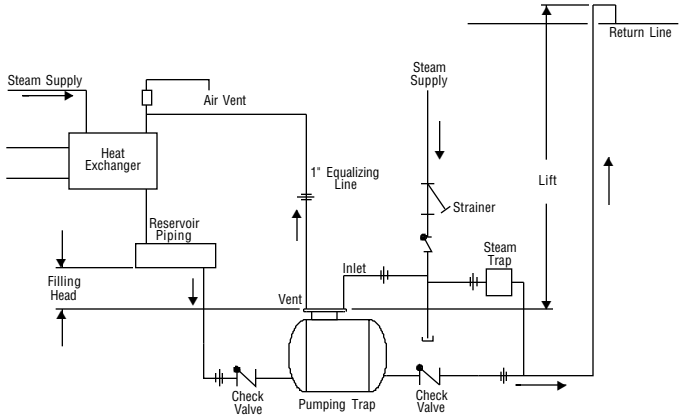


Fig. 3-2 Draining steam coil or heat exchanger when system pressure is lower than return line pressure. Note that a steam trap is not required in this application. If steam system pressure exceeds the return line pressure, a steam trap would be required on the discharge side of the pump trap. See installation and operation manual IB-100.

Typical Applications

- Low pressure heating systems
- Process heat exchanger or coils with modulating steam control
- Remote installations (tracing, tank farms or remote coils)
- Systems under vacuum
- Hazardous (explosion proof) areas
- Caustic Environments
- Hydrocarbons (specific gravity 0.06 - 0.09) light liquid pumping.
- Sumps or submersed areas

Armstrong's Packaged Solution

Armstrong also offers a pre-piped, pre-engineered packaged solution to your condensate return requirements. All equipment is properly sized, piped, and fabricated to meet your plant specifications. Simple and quick field installation is achieved with the following benefits:

Cost Savings

- Saves time in design and specification
- Saves time during installation
- Saves cost in field fabrication
- Saves maintenance - Life time spring warranty
- Saves shipping and field handling costs
- Saves vendors - Single source responsibility
- Saves purchasing costs - reduces overall procurements costs by eliminating multiple component purchases and contracting.

Reliability

Ensures product is designed and built per manufacturer's recommendation as well as customer's specifications.

Let Armstrong help design a cost effective trouble free condensate return package that suits your specific plant requirements. See the sizing and selection form on page 4 and fill in the data required to accurately size a pump trap for your specific application.

Armstrong PT-516 Pump Trap Sizing and Selection

Pump Traps are sized and selected based on actual capacity and specific application requirements. Information on fluid characteristics as well as application specific requirements (reservoir piping, fill head, physical space etc...) are all critical for proper selection as well as trouble free installation and operation of the pump trap. Please provide the following information and fax it to Armstrong Fluid Handling's application engineering department at (616) 279-3150. Armstrong will then promptly size, select and quote your pump trap requirements through your local Armstrong Representative.

Company _____

Name _____ Title _____

Address _____

City _____ State _____ Zip Code _____

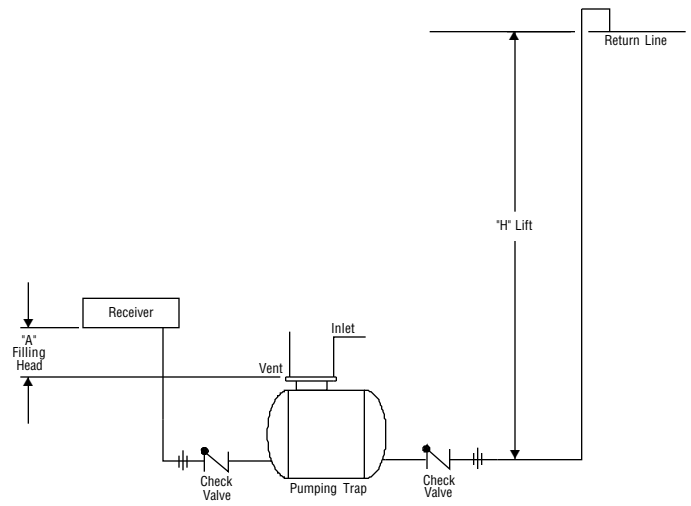
Phone No. _____ Fax No. _____

Application Data

1. Fluid to be pumped: _____
2. Temperature of fluid to be pumped: _____ ☐ °F ☐ °C
3. Specific Gravity: _____
4. Required flow rate: _____ ☐ lb/hr ☐ GPM ☐ kg/hr
5. Equipment Pressure: _____ a) ☐ Constant ☐ Modulation
   b) ____ psig Min. _____ to Max. _____
   c) ☐ psig ☐ kg/cm^2
6. Fill Head Distance (A): _____ ☐ Inches ☐ Millimeters
7. Discharge condensate return line size: _____ ☐ Inches ☐ Millimeters
8. Motive Gas — ☐ Steam ☐ Air ☐ Gas
9. Motive pressure available: _____ ☐ psig ☐ kg/cm ☐ Other _____
10. Return line pressure: _____ ☐ psig ☐ kg/cm ☐ Other _____
11. Vertical lift (H): _____ ☐ Feet ☐ Meters
12. Can pump be vented to atmosphere? ☐ Yes ☐ No
13. Is there a condensate reservoir? ☐ Yes ☐ No If yes, what size ? _____
14. Is reservoir vented? ☐ Yes ☐ No
15. Would you like Armstrong to quote on a packaged pre-piped engineered system? ☐ Yes ☐ No

Please indicate if the following Pump Trap options are required

- ☐ Carbon Steel Check Valve
- ☐ Cycle Counter
- ☐ Stainless Steel Check Valve
- ☐ Insulation Jacket
- ☐ Armored Gauge Glass Assembly
- ☐ Pressure Reducing Valve for
  - ○ Steam
  - ○ Air



Armstrong PT-516 Series High Capacity Pump Trap

Table 6-1 Inlet Reservoir Pipe Sizing For "Closed Systems"

Condensate Load lb/hr	Reservoir Pipe Diameter (in)					
	8	10	12	16	20	24
up to	Length of Pipe (feet)					
10,000	6½	6	5	3	2	
20,000	12	11½	10	7	4	
30,000		12	10½	9	6	4
40,000		17	14	12	8	6
50,000			16	13	9	6
60,000				15	11	8
70,000					15	10

Note: When BP/MP is less than 50% the reservoir diameters above can be reduced by 1/2". **Note:** Inlet reservoir piping sizing. When draining condensate from a single piece of equipment in a **"closed system"** to achieve maximum energy efficiency **(see Fig. 3-2)**, a reservoir should be installed horizontally above and ahead of the pump trap. Sufficient reservoir volume is required above the filling head level to hold condensate during the pump trap discharge cycle. The chart above shows the minimum reservoir sizing, based on the condensate load to prevent equipment flooding during the pump trap discharge cycle.

Table 6-2 Vented Receiver Sizing for an "open system"

Flash Steam lb/hr	Receiver Diameter (in)	Receiver Length (in)	Vent Line Diameter (in)
up to			
1,000	16	60	6
2,000	20	60	8
3,000	24	60	8
4,000	26	60	10
5,000	28	60	10
6,000	30	72	12
7,000	32	72	12
8,000	36	72	14

Important Note: Vented Receiver Sizing. When draining from single or multiple pieces of equipment in a **"open system"**, a vented receiver should be installed horizontally above and ahead of the pump trap **(see Fig. 3-1)**. In addition to sufficient holding volume of the condensate above the fill head of the pump trap to hold the condensate during the pump trap cycle, the receiver must also be sized to allow enough area for flash steam and condensate separation. An overflow could also be added when required. The minimum recommended water seal is 12". The chart above shows proper receiver tank sizing based on flash steam present. See chart 6-3 to calculate the percentage (%) of flash steam at a given pressure drop.

Suggested Specification

The condensate pump shall be non-electric and will operate utilizing steam, air or other pressurized gas to transfer liquid. Electricity, seals, packings, or motors shall not be used.

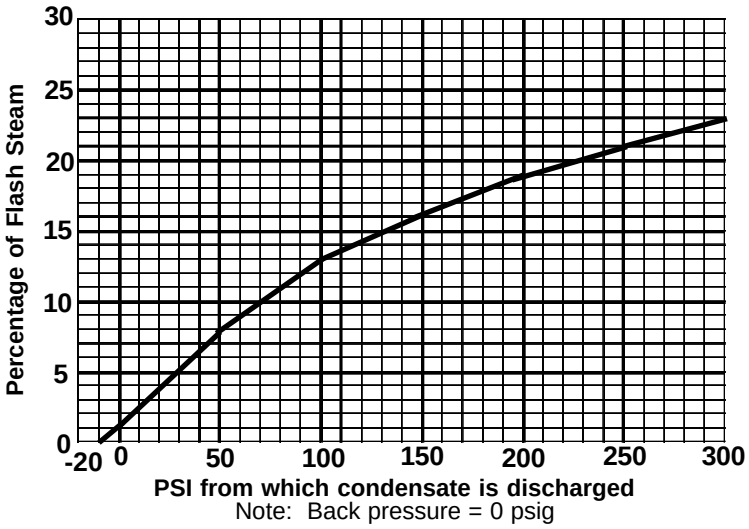
The body shall be constructed of carbon steel and the vessel shall be ASME VIII "U" stamp coded.

Pump internals shall consist of an all stainless steel float operated mechanical mechanism. Springs shall be compression type and will have a life time warranty against failure. Motive valves shall be hardened 420 stainless steel.

Pump will operate as a direct spring/float mechanical mechanism. No diaphragm operated or piloted valve arrangement shall be used.

Condensate pump shall be Armstrong pump trap Model PT-516.

Chart 6-3 Percentage of flash steam formed when discharging condensate to reduce pressure



Note: Back pressure = 0 psig

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