

Effective recovery and return of hot condensate are essential to overall plant efficiency while conserving energy. Large amounts of condensate provide 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 200°F (93°C) limit of conventional electric pumps without the headaches of leaking seals or cavitation.

Features

- Economical non-electric operation. Uses inexpensive steam air or inert gas.
- Low-maintenance operation. No leaking seals, impeller or motor problems means lower maintenance. No NPSH issues.
- Lower installation costs. Single trade required for installation and maintenance.
- Peace of mind. Standard unit is intrinsically safe—explosion-proof.
- Durable construction. ASME code-stamped carbon steel body vessel.
- Corrosion resistance. Internals are all stainless steel for corrosion resistance and long life.
- Heavy-duty springs. Springs are made from long-lasting Inconel X-750.
- Efficiency. A closed loop means no motive or flash steam is lost. All valuable Btu's are captured and returned to the system.
- Safety. The pump can be used in flooded pits without fear of electrocution or circuit breaker defaults.
- Externally removable/replaceable seats. Seats can be replaced or cleaned without removing the mechanism assembly.

For a fully detailed certified drawing, refer to FH1367.

| PT-516 High Capacity Pump Trap Physical Data | | |
|--|------------------|--------------------|
| | in | mm |
| 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 |
| Gauge Glass Conn. | 1/2 NPT | 15 NPT |
| "B" | 62 | 1,574 |
| "C" | 36 | 914 |
| "D" | 19-1/16 | 484 |
| "E" | 20 | 508 |
| "F" | 22 | 559 |
| "H" | 48 | 1,219 |
| "P" | 1-3/4 | 44 |
| "R" | 8-3/4 | 222 |
| "T" | 28 | 711 |
| "U" | 4 | 100 |
| Weight | 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 @ 500°F (10 bar @ 277°C). 300 psi (21 bar) vessel available upon request.

| PT-516 Capacity Conversion Factors for Other Fill Heads | | | | | | | | | | | | |
|---|-----|------|-----|------|-----|------|----|-----|----|-----|----|-----|
| Fill Head | in | | mm | | in | | mm | | in | | mm | |
| | 0 | 0 | 6 | 152 | 12 | 305 | 16 | 406 | 24 | 610 | 36 | 914 |
| PT-516 | 0.7 | 0.75 | 0.8 | 0.85 | 1.0 | 1.08 | | | | | | |

PT-516 High Capacity Pump Trap

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
- Sumps or submersed areas

| PT-516 High-Capacity Pump Trap Materials | |
|---|--|
| Name of Part | Description |
| Cap, Body, Bolting | Fabricated steel 150 psi ASME Sec. VIII design "U" stamp coded |
| Cap Gasket | Stainless steel spiral wound |
| Inlet Valve Assembly | Stainless steel |
| Vent Valve Assembly | Stainless steel |
| Mechanism Assembly: Frame, Float and Spring | Stainless steel |

NOTES: 300 psi ASME vessel available upon request. PT-516 available in all stainless steel. Consult factory.

Armstrong PT-516 Pump Trap Sizing and Selection

| PT-516 Pump Trap Capacities | | | | | | | | | |
|-----------------------------|-------|-----------------------------|--------|-----------------------------------|--------|------------|--------|--------|--------|
| Motive Pressure | | Total Lift or Back Pressure | | 4" x 4" Connections 24" Fill Head | | | | | |
| | | | | Steam Motive | | Air Motive | | | |
| psig | bar | psig | bar | lb/hr | kg/hr | lb/hr | kg/hr | | |
| 15 | 1.0 | 5.0 | 34 | 28,962 | 13,137 | 57,619 | 26,136 | | |
| 25 | 1.7 | | | 37,162 | 16,857 | 61,911 | 28,083 | | |
| 35 | 2.5 | | | 42,563 | 19,307 | 64,738 | 29,365 | | |
| 50 | 3.5 | | | 48,288 | 21,903 | 67,735 | 30,725 | | |
| 60 | 4 | | | 51,214 | 23,231 | 69,267 | 31,420 | | |
| 70 | 4.5 | | | 53,688 | 24,138 | 70,562 | 32,007 | | |
| 75 | 5 | | | 54,796 | 24,855 | 71,142 | 32,270 | | |
| 100 | 7 | | | 59,414 | 26,950 | 73,559 | 33,366 | | |
| 125 | 8.5 | | | 62,995 | 28,575 | * | * | | |
| 150 | 10.34 | | | 65,922 | 29,902 | * | * | | |
| 25 | 1.7 | 15 | 1 | 36,720 | 16,656 | 50,783 | 23,035 | | |
| 35 | 2.5 | | | 40,611 | 18,421 | 54,293 | 24,627 | | |
| 50 | 3.5 | | | 45,196 | 20,501 | 58,013 | 26,315 | | |
| 60 | 4 | | | 47,740 | 21,655 | 59,915 | 27,177 | | |
| 70 | 4.5 | | | 50,005 | 22,682 | 61,523 | 27,907 | | |
| 75 | 5 | | | 51,054 | 23,159 | 62,243 | 28,233 | | |
| 100 | 7 | | | 55,675 | 25,254 | 65,243 | 29,594 | | |
| 125 | 8.5 | | | 59,552 | 27,013 | * | * | | |
| 150 | 10.34 | | | 62,923 | 28,542 | * | * | | |
| 35 | 2.5 | | | 25 | 1.7 | 29,212 | 13,251 | 46,238 | 20,973 |
| 50 | 3.5 | 33,413 | 15,156 | | | 50,962 | 23,116 | | |
| 60 | 4 | 35,672 | 16,181 | | | 53,376 | 24,211 | | |
| 70 | 4.5 | 37,646 | 17,076 | | | 55,418 | 25,138 | | |
| 75 | 5 | 38,548 | 17,485 | | | 56,313 | 25,544 | | |
| 100 | 7 | 42,454 | 19,257 | | | 60,141 | 27,280 | | |
| 125 | 8.5 | 45,649 | 20,706 | | | * | * | | |
| 150 | 10.34 | * | * | | | * | * | | |
| 50 | 3.5 | 40 | 3 | | | 26,210 | 11,889 | 41,244 | 18,708 |
| 60 | 4 | | | | | 27,353 | 12,407 | 44,028 | 19,971 |
| 70 | 4.5 | | | 28,319 | 12,846 | 46,382 | 21,039 | | |
| 75 | 5 | | | 28,752 | 13,042 | 47,435 | 21,517 | | |
| 100 | 7 | | | 30,555 | 13,860 | 51,828 | 24,022 | | |
| 125 | 8.5 | | | 31,954 | 14,494 | * | * | | |
| 150 | 10.34 | | | 33,097 | 15,013 | * | * | | |
| 70 | 4.5 | | | 60 | 4 | 25,973 | 11,781 | 32,026 | 14,527 |
| 75 | 5 | | | | | 26,373 | 11,963 | 33,514 | 15,202 |
| 100 | 7 | | | | | 28,042 | 12,720 | 40,951 | 18,575 |
| 125 | 8.5 | 29,336 | 13,307 | | | * | * | | |
| 150 | 10.34 | 30,394 | 13,787 | | | * | * | | |
| 100 | 7 | 80 | 5.5 | | | 23,892 | 10,837 | 34,893 | 15,827 |
| 125 | 8.5 | | | | | 24,231 | 10,991 | * | * |
| 150 | 10.34 | | | | | 24,570 | 11,145 | * | * |

NOTES: Published capacities above are based on actual steam testing using a minimum 200°F condensate. Published capacities are based on the use of external check valves supplied by Armstrong.
*Consult factory.

Options

External check valves required for use of pumping trap.

- Inlet/Outlet Check Valve
CS/SS Wafer Style or All Stainless Steel Wafer Style
- Bronze Gauge Glass Assembly
- Removable Insulation Jacket
- Digital Cycle Counter



Armstrong® Reservoir Sizing — DD-12/PT-516 Series High Capacity

Either a closed reservoir pipe or a vented receiver is required for proper condensate storage during the pump-down cycle of the pumping trap. Refer to the tables for sizing.

For Closed Reservoir Piping

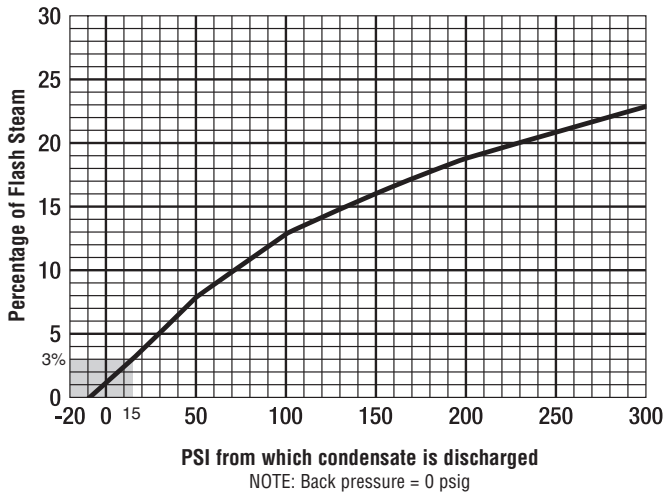
- Determine condensate load.
Example 30,000 lb/hr:
 - Reference the Inlet Reservoir Pipe table top right. Find the 30,000 lb/hr condensate load in column one. Move across the columns to find the proper pipe sizing.

For Vented Receiver Sizing

- Determine the pressure from where the condensate is being discharged.
- Determine condensate load.
 - Reference the chart below to find the pressure that corresponds with the discharge condensate pressure. For this example, use 15 psig.
 - Follow 15 psig to where it intersects the “0” psig curve. Move to the left from intersecting lines for the percentage of flash that will be created. For this example, it will be 3%.
 - Multiply the 3% by the condensate load. For this example, it is 30,000 lb/hr. Thus, 30,000 x .03 = 900 lb/hr of flash steam.

Using the Vented Receiver table bottom right, find the amount of flash steam in column one. Follow the table across to determine the sizing of the vented receiver.

**Percentage of Flash Steam Formed
When Discharging Condensate to Reduce Pressure**



PT-516 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 | 6-1/2 | 6 | 5 | 3 | 2 | |
| 20,000 | 12 | 11-1/2 | 10 | 7 | 4 | |
| 30,000 | | 12 | 10-1/2 | 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" (15 mm). When draining condensate from a single piece of equipment in a **closed system**, to achieve maximum energy efficiency (see Closed System figure on page 228) 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 table above shows the minimum reservoir sizing, based on the condensate load, to prevent equipment flooding during the pump trap discharge cycle.

PT-516 Vented Receiver 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 |

NOTE: When draining from single or multiple pieces of equipment in an **open system**, a vented receiver should be installed horizontally above and ahead of the pump trap (see Open System figure on page 228). 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" (305 mm). The table above shows proper receiver tank sizing based on flash steam present. See chart left to calculate the percentage (%) of flash steam at a given pressure drop.

Condensate Recovery Equipment