

# **Armstrong® Engineered Solutions—Armstrong Condensate Pump Trap Packages**

From institutional low pressure steam heating to industrial process critical heat transfer, Armstrong's engineered condensate pump trap packages provide the most efficient and cost-effective solution to customers' condensate recovery requirements.

Armstrong Engineered Condensate Pump Trap Packages provide the following benefits:

- Reduce piping layout, detailed engineering and procurement
- Minimize field labor
- Prevent installation errors and safety mishaps
- Shorten overall project lead times
- Single source responsibility
- Lower total cost of ownership for the customer

To optimize the return on your condensate investment, consider Armstrong Engineered Pump Trap Package Solutions.



Condensate Recovery Equipment

Pumping Trap Receiver Package Capacities																	
Motive Pressure	Total Lift or Back Pressure	SPT-104RP 1" x 1"		DPT-104RP 1" x 1"		SPT-204RP 1" x 1"		DPT-204RP 1" x 1"		SPT-404RP 1" x 1"		DPT-404RP 1" x 1"		SPT-206RP 1-1/2" x 1-1/2"		DPT-206RP 1-1/2" x 1-1/2"	
		Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive
psig	psig	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
15	5	1,125	2,100	2,250	4,200	1,800	2,100	3,600	4,200	1,900	2,250	3,800	4,500	2,700	3,000	5,400	6,000
25		1,300	2,200	2,600	4,400	2,025	2,300	4,050	4,600	2,500	2,650	5,000	5,300	3,200	3,500	6,400	7,000
50		1,550	2,275	3,100	4,550	2,100	2,500	4,200	5,000	3,100	3,225	6,200	6,450	3,400	3,600	6,800	7,200
75		1,650	2,300	3,300	4,600	2,200	2,700	4,400	5,400	3,400	3,500	6,800	7,000	3,500	3,700	7,000	7,400
100		1,400	2,350	2,800	4,700	2,300	*	4,600	*	3,500	*	7,000	*	3,600	*	7,200	*
125		*	*	*	*	2,400	*	4,800	*	3,600	*	7,200	*	3,700	*	7,400	*
25	15	650	1,900	1,300	3,800	1,500	2,000	3,000	4,000	2,200	2,525	4,400	5,050	2,400	2,700	4,800	5,200
50		700	2,050	1,400	4,100	2,000	2,250	4,000	4,500	2,600	2,800	5,200	5,600	3,200	3,400	6,400	6,800
75		750	2,100	1,500	4,200	2,100	2,500	4,200	5,000	2,800	2,950	5,600	5,900	3,300	3,500	6,600	7,000
100		800	2,150	1,600	4,300	2,110	*	4,220	*	3,100	*	6,200	*	3,350	*	6,700	*
125		*	*	*	*	2,125	*	4,250	*	3,200	*	6,400	*	3,400	*	6,800	*
35	25	400	1,800	800	3,600	1,500	1,700	3,000	3,400	2,000	2,350	4,000	4,700	2,100	2,300	4,200	4,600
50		450	1,935	900	3,870	1,700	2,000	3,400	4,000	2,400	2,675	4,800	5,350	2,400	2,600	4,800	5,200
75		500	2,050	1,000	4,100	1,900	2,300	3,800	4,600	2,600	2,800	5,200	5,600	2,700	2,900	5,400	5,800
100		550	2,075	1,100	4,150	2,000	*	4,000	*	2,800	*	5,600	*	2,800	*	5,600	*
125		*	*	*	*	2,100	*	4,200	*	2,900	*	5,800	*	2,900	*	5,800	*
50	40	250	1,620	500	3,240	1,400	1,700	2,800	3,400	1,900	2,350	3,800	4,700	1,500	2,000	3,000	4,000
60		265	1,730	530	3,460	1,500	2,000	3,000	4,000	2,200	2,600	4,400	5,200	2,000	2,300	4,000	4,600
75		300	1,850	600	3,700	1,700	2,200	3,400	4,400	2,400	2,675	4,800	5,350	2,300	2,500	4,600	5,000
100		350	1,950	700	3,900	1,800	*	3,600	*	2,500	*	5,000	*	2,400	*	4,800	*
125		*	*	*	*	1,920	*	3,840	*	2,700	*	5,400	*	2,500	*	5,000	*
70	60	*	*	*	*	1,100	2,000	2,200	4,000	1,800	2,400	3,600	4,800	1,150	2,000	2,300	4,000
75		*	*	*	*	1,300	2,300	2,600	4,600	2,000	2,450	4,000	4,900	1,325	2,300	2,650	4,600
100		*	*	*	*	1,600	*	3,200	*	2,300	*	4,600	*	1,900	*	3,800	*
125		*	*	*	*	1,720	*	3,440	*	2,400	*	4,800	*	2,000	*	4,000	*

NOTES: Published capacities are based on the use of external check valves supplied by Armstrong. Fill head measured from drain point to top of pump cap. See figures on page CRE-25. Although motive pressures are shown at high pressure differentials (difference between motive inlet pressure and total lift or back pressure), it is preferable to use a motive pressure of 10 - 15 psig (0.65 - 1.0 bar) above discharge (outlet) pressure. This ensures longevity of economical (brass) check valves and reduces both venting time and temperature differential (on steam). If a higher differential is used, stainless steel check valves are recommended.

\*Consult factory.

Custom packages available upon request—consult factory.

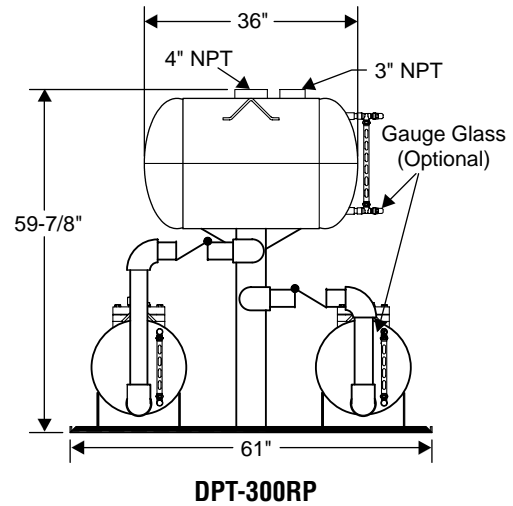
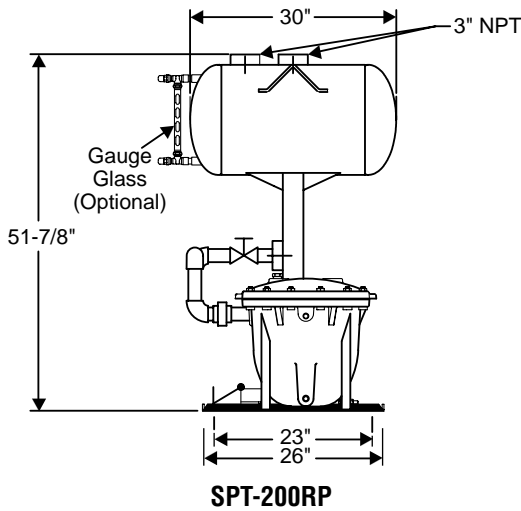
## Metric Conversion Formulas

**Convert lb/hr to kg/hr—By dividing by 2.2046** Example: 1,800 lb/hr ÷ 2.2046 = 816 kg/hr

**Convert psig to bar—By dividing by 14.5** Example: 15 psi ÷ 14.5 = 1.03 bar

**Convert psig to kg/cm<sup>2</sup>—By dividing by 14.22** Example: 15 psi ÷ 14.22 = 1.05 kg/cm<sup>2</sup>

*All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.*



For a fully detailed certified drawing, refer to:  
**SPT-400RP/DPT-400RP CDF #1005**  
**SPT-3500RP/DPT-3500RP CDF #1046**

## Pumping Trap Receiver Package Capacities

Motive Pressure	Total Lift or Back Pressure	SPT-406RP 1-1/2" x 1-1/2"		DPT-406RP 1-1/2" x 1-1/2"		SPT-408RP 2" x 2"		DPT-408RP 2" x 2"		SPT-3508RP 2" x 2"		DPT-3508RP 2" x 2"		SPT-308RP 2" x 2"		DPT-308RP 2" x 2"	
		Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive
psig	psig	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
15	5	3,100	3,350	6,200	6,700	4,500	4,850	9,000	9,700	6,100	8,100	12,200	16,200	6,900	9,200	13,800	18,400
25		4,600	4,875	9,200	9,750	6,600	7,000	13,200	14,000	8,700	9,300	17,400	18,600	10,200	10,900	20,400	21,800
50		4,900	5,100	9,800	10,200	7,100	7,375	14,200	14,750	8,900	9,675	17,800	19,350	10,600	11,100	21,200	22,200
75		5,200	5,300	10,400	10,600	7,200	7,400	14,400	14,800	9,200	9,800	18,400	19,600	10,750	11,300	21,500	22,600
100		5,400	*	10,800	*	7,300	7,450	14,600	14,900	9,400	*	18,800	*	10,900	*	21,800	*
125		5,500	*	11,000	*	7,400	*	14,800	*	9,900	*	19,800	*	11,600	*	23,200	*
25	15	3,500	4,025	7,000	8,050	5,400	6,200	10,800	12,400	6,300	8,200	12,600	16,400	7,000	10,100	14,000	20,200
50		4,100	4,425	8,200	8,850	6,300	6,800	12,600	13,600	8,200	10,400	16,400	20,800	9,600	12,200	19,200	24,400
75		4,300	4,550	8,600	9,100	6,500	6,900	13,000	13,800	9,200	11,100	18,400	22,200	10,800	13,100	21,600	26,200
100		4,800	*	9,600	*	6,700	*	13,400	*	9,600	*	19,200	*	11,200	*	22,400	*
125		4,900	*	9,800	*	6,800	*	13,600	*	9,800	*	19,600	*	11,600	*	23,200	*
35	25	2,900	3,425	5,800	6,850	4,200	4,950	8,400	9,900	6,100	7,900	12,200	15,800	7,100	9,200	14,200	18,400
50		4,000	4,500	8,000	9,000	5,800	6,400	11,600	12,800	7,100	9,600	14,200	19,200	8,300	11,200	16,600	22,400
75		4,400	4,730	8,800	9,500	6,000	6,500	12,000	13,000	8,600	10,800	17,200	21,600	10,100	12,700	20,200	25,400
100		4,700	*	9,400	*	6,100	*	12,200	*	8,700	*	17,400	*	10,200	*	20,400	*
125		4,800	*	9,600	*	6,200	*	12,400	*	9,100	*	18,200	*	10,300	*	20,600	*
50	40	3,300	4,050	6,600	8,100	4,350	5,350	8,700	10,700	5,000	6,500	10,000	13,000	5,700	7,600	11,400	15,200
60		3,600	4,250	7,200	8,500	5,100	6,000	10,200	12,000	5,900	7,400	11,800	14,800	6,600	8,800	13,200	17,600
75		4,000	4,475	8,000	8,950	5,700	6,375	11,400	12,750	6,650	8,300	13,300	16,600	7,600	10,100	15,200	20,200
100		4,200	*	8,400	*	6,000	*	12,000	*	7,200	*	14,400	*	8,400	*	16,800	*
125		4,500	*	9,000	*	6,400	*	12,800	*	7,800	*	15,600	*	9,400	*	18,800	*
70	60	3,200	4,300	6,400	8,600	3,800	5,050	7,600	10,100	4,300	6,100	8,600	12,200	4,500	7,000	9,000	14,000
75		3,500	4,650	7,000	9,300	4,100	5,175	8,200	10,350	4,500	6,300	9,000	12,600	4,700	7,100	9,400	14,200
100		3,700	*	7,400	*	4,500	*	9,000	*	5,500	*	11,000	*	6,400	*	12,800	*
125		3,800	*	7,600	*	4,800	*	9,200	*	5,700	*	11,400	*	6,600	*	13,200	*

NOTES: Published capacities are based on the use of external check valves supplied by Armstrong. Fill head measured from drain point to top of pump cap. See figures on page CRE-25. Although motive pressures are shown at high pressure differentials (difference between motive inlet pressure and total lift or back pressure), it is preferable to use a motive pressure of 10 - 15 psig (0.65 - 1.0 bar) above discharge (outlet) pressure. This ensures longevity of economical (brass) check valves and reduces both venting time and temperature differential (on steam). If a higher differential is used, stainless steel check valves are recommended.

\*Consult factory.

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## Metric Conversion Formulas

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Convert psig to bar—By dividing by 14.5 Example: 15 psi ÷ 14.5 = 1.03 bar

Convert psig to kg/cm<sup>2</sup>—By dividing by 14.22 Example: 15 psi ÷ 14.22 = 1.05 kg/cm<sup>2</sup>

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.



# Engineered Solutions— Armstrong Condensate Pump Trap Packages

Pumping Trap Receiver Package Capacities													
Motive Pressure	Total Lift or Back Pressure	SPT-412RP 3" x 2"		DPT-412RP 3" x 2"		SPT-3512RP 3" x 2"		DPT-3512RP 3" x 2"		SPT-312RP 3" x 2"		DPT-312RP 3" x 2"	
		Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive	Steam Motive	Air Motive
psig	psig	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr
15	5	7,500	8,100	15,000	16,200	8,300	10,300	16,600	20,600	9,000	12,300	18,000	24,600
25		11,000	11,650	22,000	23,320	12,100	12,950	24,200	25,900	13,200	14,200	26,400	28,400
50		11,700	12,150	23,400	24,300	13,400	14,000	26,800	28,000	15,100	15,800	30,200	31,600
75		12,000	12,350	24,000	24,700	13,700	14,300	27,400	28,600	15,300	16,100	30,600	32,200
100		12,100	*	24,200	*	14,000	*	28,000	*	15,500	*	31,000	*
125		12,200	*	24,400	*	14,400	*	28,800	*	16,600	*	33,200	*
25	15	7,200	8,275	14,400	16,550	8,100	9,800	16,200	19,600	9,000	11,200	18,000	22,400
50		10,400	11,250	20,800	22,500	11,600	12,600	23,200	25,200	12,800	13,800	25,600	27,600
75		10,800	11,450	21,600	22,900	12,500	13,300	25,000	26,600	14,200	15,000	28,400	30,000
100		11,000	*	22,000	*	11,000	*	22,000	*	14,300	*	28,600	*
125		11,200	*	22,400	*	11,300	*	22,600	*	15,100	*	30,200	*
35	25	6,900	8,150	13,800	16,300	7,600	9,900	15,200	19,800	8,100	11,500	16,200	23,000
50		9,700	10,850	19,400	21,700	10,000	10,650	20,000	21,300	10,200	12,750	20,400	25,500
75		10,000	10,900	20,000	21,800	11,200	12,200	22,400	24,400	12,500	13,500	25,000	27,000
100		10,200	*	20,400	*	11,450	*	22,900	*	12,700	*	25,400	*
125		10,400	*	20,800	*	11,600	*	23,200	*	13,000	*	26,000	*
50	40	5,800	7,125	11,600	14,250	6,200	8,500	12,400	17,000	6,600	9,800	13,200	19,600
60		6,900	8,150	13,800	16,300	7,700	9,400	15,400	18,800	8,400	10,500	16,800	21,000
75		7,600	8,500	15,200	17,000	8,700	10,600	17,400	21,200	9,800	12,700	19,600	25,400
100		8,100	*	16,200	*	9,100	*	18,200	*	10,100	*	20,200	*
125		8,500	*	17,000	*	9,400	*	18,800	*	10,300	*	20,600	*
70	60	5,000	6,650	10,000	13,300	5,700	8,500	11,400	17,000	5,000	10,200	12,000	20,400
75		5,400	6,900	10,800	13,800	5,900	8,700	11,800	17,400	6,400	10,400	12,800	20,800
100		6,000	*	12,000	*	6,500	*	13,000	*	7,100	*	14,200	*
125		6,400	*	12,800	*	6,900	*	13,800	*	7,400	*	14,800	*

NOTES: Published capacities are based on the use of external check valves supplied by Armstrong. Fill head measured from drain point to top of pump cap. See figures on page CRE-25. Although motive pressures are shown at high pressure differentials (difference between motive inlet pressure and total lift or back pressure), it is preferable to use a motive pressure of 10 - 15 psig (0.65 - 1.0 bar) above discharge (outlet) pressure. This ensures longevity of economical (brass) check valves and reduces both venting time and temperature differential (on steam). If a higher differential is used, stainless steel check valves are recommended.

\*Consult factory.

Custom packages available upon request—consult factory.

## Metric Conversion Formulas

Convert lb/hr to kg/hr—By dividing by 2.2046 Example: 1,800 lb/hr ÷ 2.2046 = 816 kg/hr

Convert psig to bar—By dividing by 14.5 Example: 15 psi ÷ 14.5 = 1.03 bar

Convert psig to kg/cm<sup>2</sup>—By dividing by 14.22 Example: 15 psi ÷ 14.22 = 1.05 kg/cm<sup>2</sup>

All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

# Sizing and Selection—PT-100/200/300/3500/400 Series

The Armstrong non-electric pump trap is sized based on actual condensate load (lb/hr or kg/hr) being pumped. The following steps are used to size the pump.

1. Determine the total condensate load to be pumped in lb/hr or kg/hr. See table on page CRE-12 for conversion factors.
2. Determine the total back pressure the pump will operate against. Total back pressure is the sum of the following:
  - Vertical lift expressed in psig. See conversion formula below to convert lift to psig
  - Existing pressure in condensate return line or D.A. tank
  - Frictional loss from pipe, valves and fittings
3. Determine type of motive gas to be used (steam, air or other inert gas) and pressure available.

## Example:

- Condensate load = 7,100 lb/hr (3,221 kg/hr).
- Total back pressure = 25 psig (1.5 bar)  
(25 foot vertical lift = 10.8 psig, 14 psig in condensate return line).
- Motive pressure is steam at 50 psig (3.5 bar).

## Solution: Model PT-3508

Find 25 psig total lift or back pressure in column two of Low Profile Pump Trap Capacities table on page CRE-12. Then find 50 psig motive pressure in column one. Move across the capacity table until you reach a model number with the correct capacity. A PT-3508 has been highlighted above for this example.

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

## For vented/open system receiver sizing:

- Determine the pressure from where the condensate is being discharged.
- Determine condensate load.

Reference Percentage of Flash Steam chart on page CRE-23 to find the pressure that corresponds with the discharge condensate pressure. For this example, use 15 psig.

Follow 15 psig on the horizontal axis where it intersects the curve. Move left from the intersecting lines to the vertical axis for the percentage of flash steam that is created. For this example it will be 3% (see shaded area on Percentage of Flash Steam chart).

Multiply 3% by the condensate load. Using example above 7,100 lb/hr.  $7,100 \times .03 = 213$  lb/hr flash steam.

Using the Vented Receiver Sizing table on page CRE-23, find the amount of flash steam in column one. Follow the table across to determine the size of the vented receiver. (See shaded area on Inlet Reservoir Pipe Sizing table—page CRE-23 for this example.)

## For closed reservoir piping:

1. Determine condensate load (using example above 7,100 lb/hr).

Reference the inlet reservoir pipe sizing for closed systems on page CRE-23. Find 7,100 lb/hr in column one. Move horizontally across to find proper pipe size. (Note length or diameter may be slightly enlarged when capacity falls between given condensate loads in column one.) Selection is shaded.

## Accessories

Use of external check valves required for operation of pumping trap.

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>• <b>Inlet Swing Check Valve</b></li> <li>—NPT Bronze ASTM B62</li> <li>—Teflon® Disc</li> <li>—Class 150 (Minimum)</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Bronze Glass Gauge Assembly with Protective Bronze Rods</b></li> </ul>                               |
| <ul style="list-style-type: none"> <li>• <b>Outlet Lift Check Valve</b></li> <li>—NPT Bronze ASTM B62</li> <li>—Teflon® Disc</li> <li>—Class 150 (Minimum)</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Armored Steel Gauge Glass Assembly</b></li> </ul>  |
| <ul style="list-style-type: none"> <li>• <b>Inline Check Valves</b></li> <li>—Stainless Steel Non-Slam Check Valves</li> </ul>  | <ul style="list-style-type: none"> <li>• <b>Removable Insulation Jacket</b></li> <li>• <b>PRV Station</b></li> <li>• <b>Receivers</b></li> </ul> |

(Recommended for use when pressure differential is greater than suggested 10-15 psi and when using air as motive gas.)

NOTE: The above applies to all models.



## Digital Cycle Counter

### Features

- Totalizer is UL recognized, CSA certified
- 5-year lithium battery life
- Eight-digit counter readout
- Both totalizer and housing are NEMA 4 rated, for protection against dust particles and water
- Easily installed on pumping traps
- Optional auxiliary contacts available upon request
- Push-button reset on face or key lock reset for security
- Rated for temperatures up to 353°F
- Closed loop option available

Reference Bulletin No. AFH-237.

## Metric Conversion Formulas

**Convert lb/hr to kg/hr—By dividing by 2.2046** Example:  $1,800 \text{ lb/hr} \div 2.2046 = 816 \text{ kg/hr}$

**Convert psig to bar—By dividing by 14.5** Example:  $15 \text{ psi} \div 14.5 = 1.03 \text{ bar}$

**Convert psig to kg/cm²—By dividing by 14.22** Example:  $15 \text{ psi} \div 14.22 = 1.05 \text{ kg/cm}^2$