

ADCAMAT PRESSURE OPERATED PUMP PPA312

DESCRIPTION

The ADCAMAT PPA (Pressure Operated Pump), fabricated in carbon steel (stainless steel on request), is recommended in the transfer of high temperature liquids such as condensate, oils and others, to a higher elevation or pressure.

Under certain conditions, it can drain a closed vessel under vacuum or pressure.

The pump can be operated by steam, compressed air or other gases, and can be used for lifting any kind of non-corrosive liquids.



OPERATION

Liquid flows by gravity into the pump through an inlet check valve lifting a float which, at the upper limit of its stroke, opens the supply valve, allowing steam or compressed air to enter the pump's body. Pressure in the pump builds up until it's just sufficient to overcome back pressure.

The pressurized liquid opens the outlet check valve and discharge begins. When the float reaches the minimum lower level, it closes the steam or compressed air supply valve and opens the vent, allowing the liquid to fill the pump again.

As the amount of liquid discharged at each stroke is known, the total volume that flows during a given period of time can be calculated by counting the number of cycles during that period. For that purpose, a special counter is available which screws into a tapped connection on the top cover of the pump. This counter records the number of pumping strokes, thus enabling the pump to function as a reliable flow meter.

MAIN

FEATURES: No electric requirements.

OPTIONS: Duplex packaged design.
Stainless steel construction.
Level gauge.
Stroke counter.

USE: To lift condensate or other hot and cold liquids.

AVAILABLE

MODELS: PPA312 – carbon steel construction.
(Sandblasted, metalized and black painted).

SIZES: DN 50 x 50; DN 80 x 50.

CONNECTIONS: Flanged EN 1092-1 PN 16.
Flanged ASME B16.5 class 150.
Special flanges on request.

INSTALLATION: Horizontal installation.
See IMI – Installation and maintenance instructions.

MOTIVE GAS: Steam or compressed air.

LIMITING CONDITIONS

Minimum density	0,80 kg/L
Maximum viscosity	5 °Engler
Maximum motive pressure	10 bar
Minimum motive pressure	1 bar
Pump discharge per cycle	45 L

BODY LIMITING CONDITIONS *

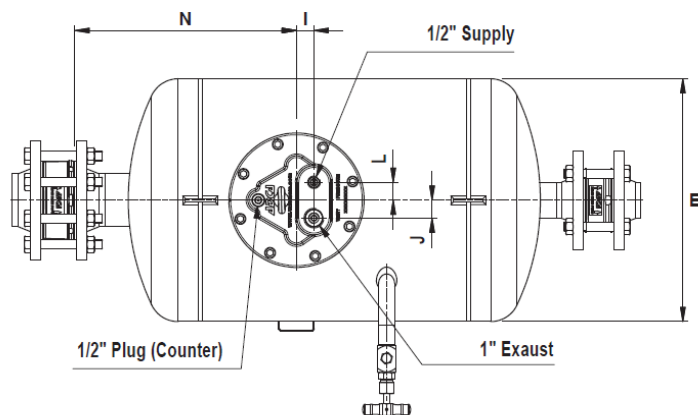
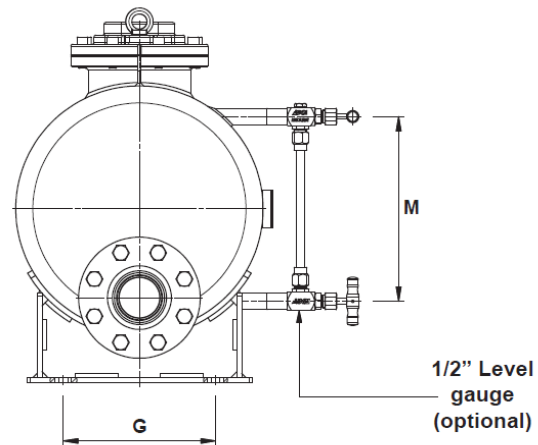
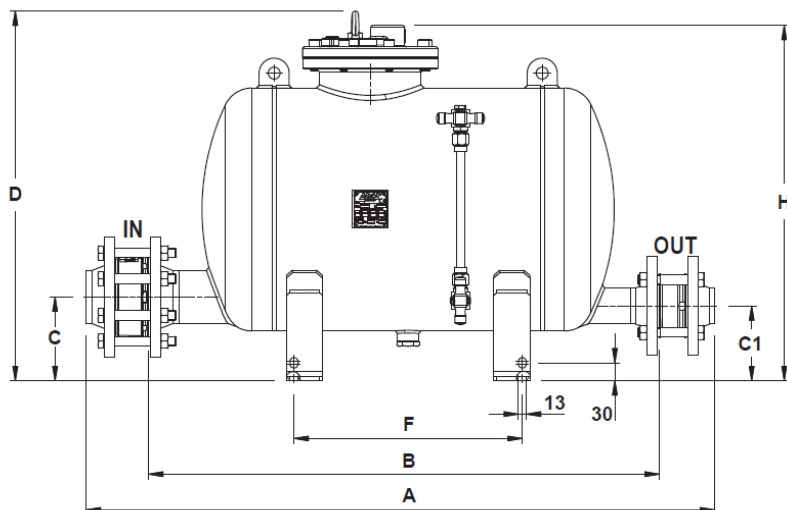
PN 16	ALLOWABLE PRESSURE	RELATED TEMPERATURE
	16 bar	50 °C
	14 bar	100 °C
	13 bar	195 °C
CLASS 150	12 bar	250 °C
	16 bar	50 °C
CLASS 150	13 bar	195 °C

Min. operating temp.: 20 °C; Design code: AD-Merkblatt.

* Rating according to EN 1092-1:2018.

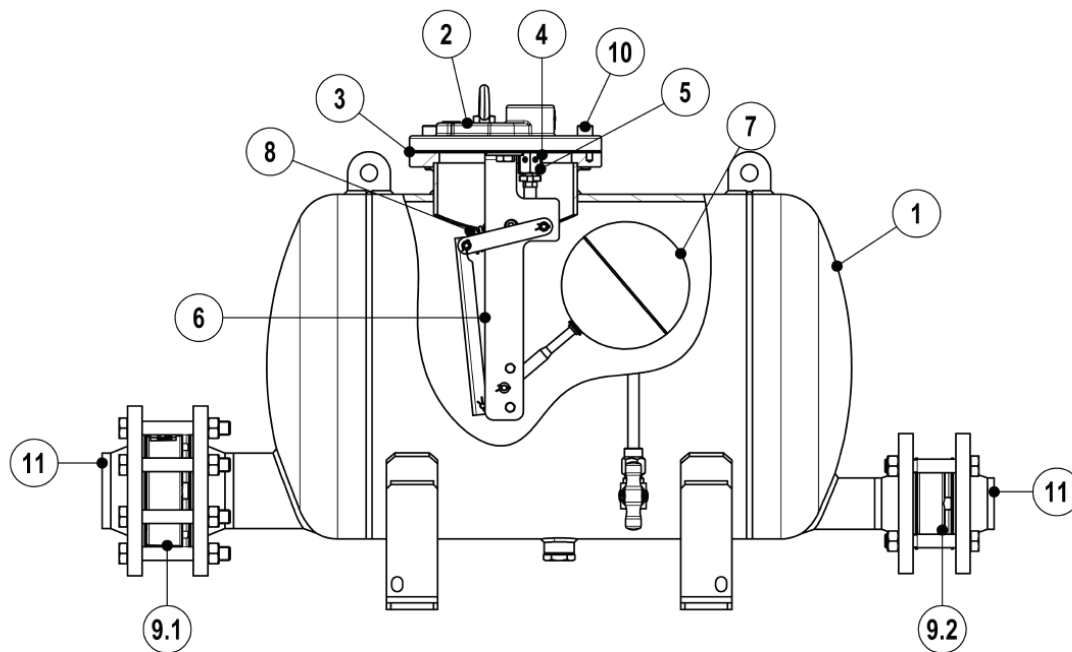
CE MARKING – GROUP 2 (PED – European Directive)

PN 16	Category
DN 50 x 50; DN 80 x 50	3 (CE marked)



DIMENSIONS (mm)

SIZE	A PN 16	A CL. 150	B PN 16	B CL. 150	C	C1	D	E	F	G	H	I	J	L	M	N	WGT. (kg)	VOL. (L)
DN 50 x 50	1020	1082	836	867	125	125	619	406	380	250	595	29	30	30	305	355	109	75,5
DN 80 x 50	1046	1117	850	885	140	125	619	406	380	250	595	29	30	30	305	369	113	76



MATERIALS

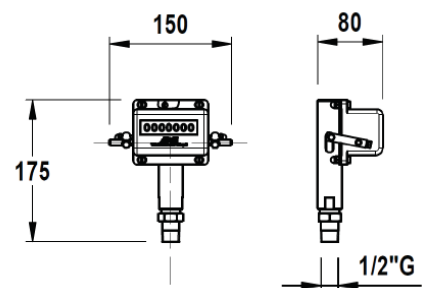
POS. N°	DESIGNATION	MATERIAL
1	Pump body	P265GH / 1.0425; P235GH / 1.0345; S235JR / 1.0038
2	Cover	GJS-400-15 / 0.7040
3	* Cover gasket	Non asbestos
4	* Inlet valve / Seat assembly	Stainless steel
5	* Exhaust valve / Seat assembly	Stainless steel
6	Internal mechanism	Stainless steel
7	* Float	Stainless steel
8	* Spring assembly (2 pieces)	Inconel
9.1	* RD40 outlet check valve	A351 CF8M / 1.4408
9.2	* RD40 Inlet check valve	A351 CF8M / 1.4408
10	Bolts	Steel 8.8
11	** PN16 EN 1092-1 flanges	P250GH / 1.0460

* Available spare parts.

** Welding neck EN 1092-1:2018 flanges. Threaded flanges on request.

STROKE COUNTER

Available on request, it can be screwed directly into the top cover of the pump or above the pump, through a 1/2" size pipe for easier reading (max. 1 m).



SIZING AND INSTALLATION

SIZING OF THE SYSTEM

The discharge capacity of the pump is a function of:

1. Condensate load (kg/h).
2. The pressure of the operating medium (steam, compressed air or other gases).
3. The total lift or back pressure the pump will have to overcome. This includes the change in fluid level elevation after the pump (0.0981 bar/m of lift), plus pressure in the return piping, plus the pressure drop in bar caused by pipe friction, plus any other system component pressure drop the pump exhaust will have to overcome (barg).
4. Filling head available (300 mm is recommended).

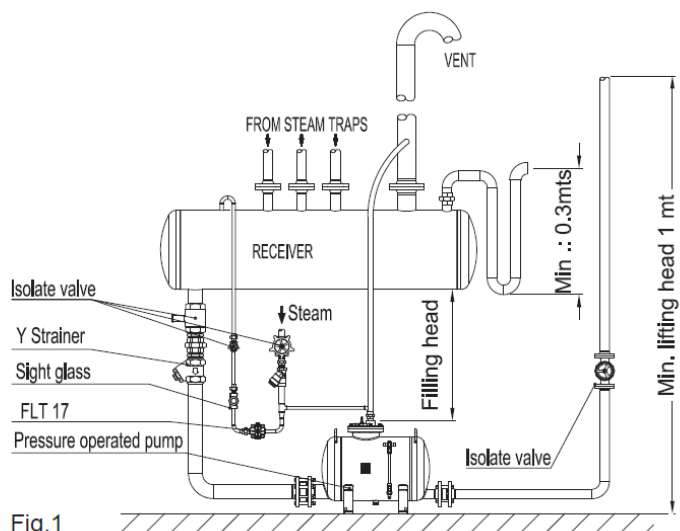


Fig.1

INSTALLATION

Fig.1 shows a typical installation example of an ADCAMAT pump. For further details and instructions, please contact manufacturer.

RECEIVER

A receiver is recommended to temporarily hold the liquid and prevent any flooding of the equipment, while the pump is performing a pumping cycle. A length of pipe of large diameter can be used.

SUGGESTED RECEIVER	
PUMP SIZE	DN 50 x 50; DN 80 x 50
Receiver size (Diam x length)	323 x 1000

Table 1

CAPACITY CORRECTION FACTOR FOR GASES OTHER THAN STEAM					
% Backpress. vs Motive press. (BP/MP)	10%	30%	50%	70%	90%
Correction factor	1,04	1,08	1,12	1,18	1,28

Table 2

CAPACITY MULTIPLYING FACTORS FOR OTHER FILLING HEADS				
PUMP SIZE	FILLING HEAD (mm)			
	150	300	600	900
DN 50 x 50 DN 80 x 50	0,9	1	1,08	1,2

Table 3

FLOW RATE (kg/h) INSTALLATION WITH 300 mm FILLING HEAD ABOVE THE PUMP COVER			
Motive pressure (bar)	Total lift (bar)	DN 50 x 50	DN 80 x 50
1	0,35	3125	4070
1,7		4625	5980
3,5		4810	6845
5		4905	6935
7		5075	7030
8,5		5250	7520
10		5280	7540
1,7	1	3170	4075
3,5		4350	5800
5		4880	6430
7		4950	6480
8,5		5120	6845
10		5150	6870
2,5	1,5	3210	3670
3,5		3760	4625
5		4585	5660
7		4635	5755
8,5		4680	5895
10		4695	5925
3,5	3	2580	2990
4		2990	3805
5		3440	4440
7		3810	4575
8,5		4260	4665
10		4285	4695
4,5	4	2030	2715
5		2120	2900
7		2900	3215
8,5		2985	3355
10		3000	3385

Table 4 (based on liquid specific gravity 0,9 – 1,0).

Filling head measured from the bottom of receiver to top of pump cover.

Example:

Condensate load	3500 kg/h
Filling head	150 mm
Motive fluid	Compressed air
Available pressure	7 bar
Vertical lift after pump	10 m
Return piping pressure	1,2 bar
Piping friction pressure drop	Negligible

Correction for filling Head:

With 150 mm filling head the correction factor from Table 3 is 0,9. The corrected capacity is:
 $4575 \text{ kg/h} \times 0,9 = 4117,15 \text{ kg/h}$.

Calculations:

Total back pressure: $1,2 \text{ bar} + (10 \text{ m} \times 0,0981) = 2,181 \text{ bar}$.
Pump choice, assuming steam as motive fluid, at a pressure of 7 bar and a back pressure of 3 bar: the DN 80 x 50 pump has a capacity of 4575 kg/h, according to Table 4, so it is the one we should select.

Correction for air as a motive fluid:

The % back pressure $2,181 \text{ bar} / 7 \text{ bar} = 31\%$
The correction factor from table 2, is 1,08.
The corrected capacity is $3636 \text{ kg/h} \times 1,08 = 3926,88 \text{ kg/h}$,
and so, the DN 80 x 50 pump is still recommended.