



Cal-Pro Installation & Operations Guide



Installation & Maintenance Guide

Operation

The CAL-PRO range of Expansion Vessels is specifically designed for domestic and commercial unvented central heating systems.

The purpose of these vessels is to accommodate the increased liquid volume which occurs during system heating in an Unvented Circuit. A pressurised membrane allows ingress/egress of the liquid only during periods of heating / cooling.

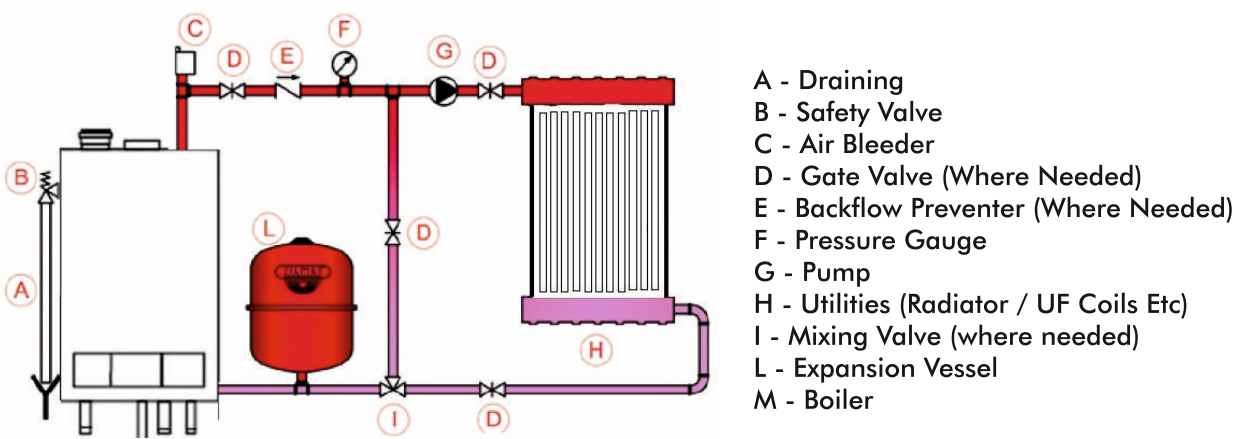
The correct size of vessel must be considered prior to installation and installed by appropriately trained engineers.

Installation Siting

The Expansion Vessel must be fitted to the Return Side of the Central Heating System and in such a way that there can at no time be an obstruction between the vessel and the system.

The orientation of the expansion vessels Water Connection should be downwards to avoid risk of sediment ingress or other debris from the system. Some provision for the prevention of air ingress into the vessel must also be made as this will degrade the vessel very quickly.

Adequate provision for the mounting of the expansion vessel must be made by the installer and a suitable bracket or other mounting method used. A range of suitable brackets are available as accessories.





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Sizing

The appropriate sizing of an expansion vessel must be undertaken by qualified or appropriately trained engineers.

$$V = \frac{e \times C}{1 - P_i/P_f}$$

V = Expansion Vessel Size

e = Expansion Co-efficient corresponding to the difference between the cold water system temperature and the maximum working pressure.

In standard plants:-

$$e = 0.04318 (T_{max} 99^{\circ}\text{C} - T_{min} = 10^{\circ}\text{C})$$

C = Total Water Capacity of the system in Litres (as a general approximation, C is between 10 & 20 Litres for every 1000kcal/hour of boiler output).

860kcal/hour = 1 Kilowatt

P_i = Initial charge pressure (Absolute) - this pressure must not be less than the minimum head pressure required by the system OR the Boiler (Whichever is greater).

P_f = Maximum operating pressure (Absolute) of the Safety Relief Valve, taking into account any differences in height between the vessel and the safety relief valve.

Temp	e Value
0	0.00013
10	0.00025
20	0.00174
30	0.00426
40	0.00782
50	0.01207
55	0.01450
60	0.01704
65	0.01980
70	0.02269
75	0.02580
80	0.02899
85	0.03240
90	0.03590
95	0.03960
100	0.04343

Example

C = 500 Litres

P_i = 1.5 Bar (2.5 Bar atmospheric)

P_f = 3 Bar (4 Bar Atmospheric)

$$V = \frac{0.04326 \times 500}{1 - (2.5 / 4)}$$

$$V = 57.57$$

Nearest vessel size with this capacity = 80 Litres

Maintenance

The vessel requires inspection at least once a year (or as and when a drop in performance is noted from the system). The vessel must be visibly inspected for pinholes in the metal body of the vessel and the air pressure must be checked against the required pre-charge. Some pressure loss is to be expected and should be rectified to within 20% accuracy but a significant drop in air pressure may signify that the vessel is nearing the end of its life span and may require replacement or more detailed inspection.

The air pressure may only be inspected when the vessel is either detached completely from the system or when the system itself is de-pressurised to atmospheric pressure.



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Materials

Shell: Carbon Steel

Water Connections: Carbon Steel

Membrane: Synthetic Butyl Rubber (SBR)

Colour: Red

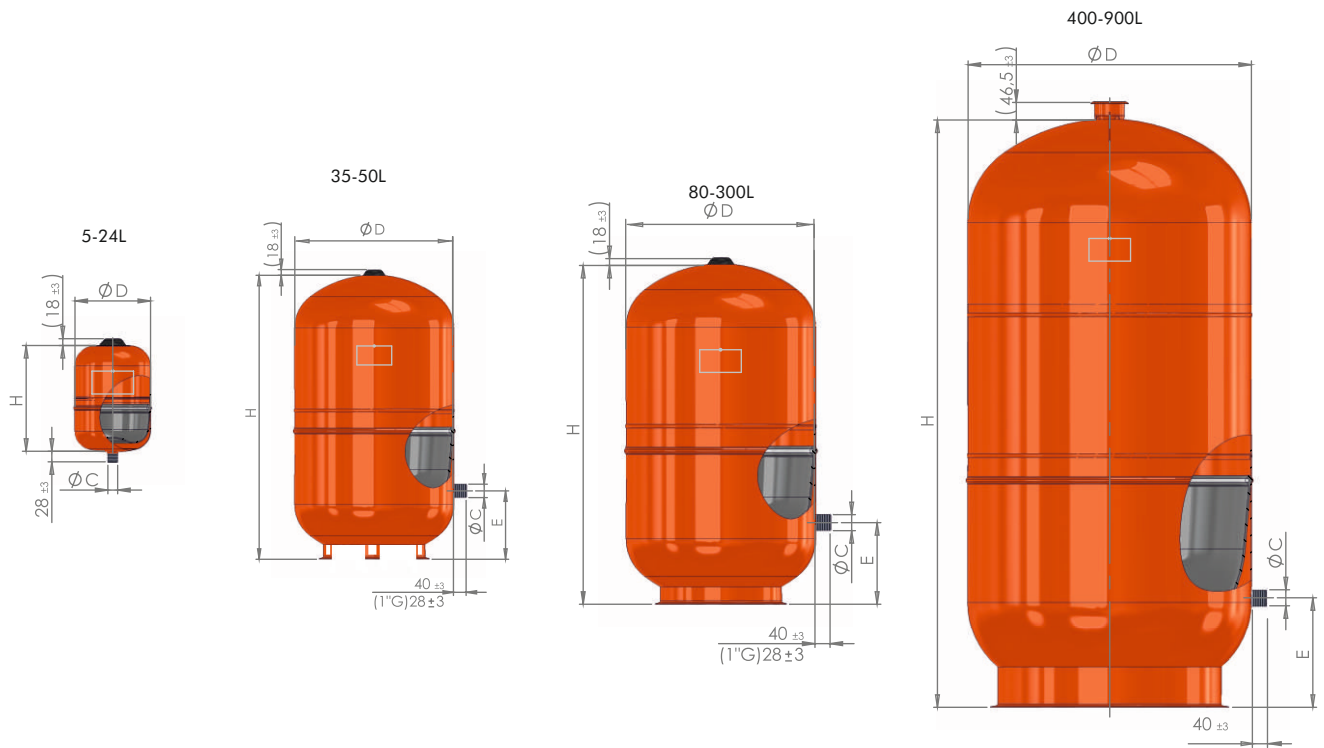
Dimensions

Code	Capacity	Diameter	Height	Pmax	Pre charge	Connection	E
	(Litres)	Ø (mm)	H (mm)	(Bar)	(Bar)	ØC (BSP)	(mm)
1300000400B	4 c/w Bracket	225	195	5	1.5	3/4" G	-
1300000800B	8 c/w Bracket	220	295	5	1.5	3/4" G	-
1300001200B	12 c/w Bracket	294	281	4	1.5	3/4" G	-
1300001800B	18 c/w Bracket	290	375	4	1.5	3/4" G	-
1300002400B	24 c/w Bracket	324	415	4	1.5	3/4" G	-
1300003503	35 c/w Feet	404	387	4	1.5	3/4" G	119
1300005003	50 c/w Feet	407	507	4	1.5	3/4" G	157
1300008000	80	450	608	6	2	3/4" G	150
1300010500	105	500	665	6	2	3/4" G	165
1300015000	150	500	897	6	2	3/4" G	216
1300020000	200	600	812	6	2.5	3/4" G	225
1300025000	250	630	957	6	2.5	3/4" G	245
1300030000	300	630	1105	6	2.5	3/4" G	245
1300040000	400	630	1450	6	2.5	3/4" G	245
1300050000	500	750	1340	6	2.5	1" G	290
1300060000	600	750	1555	6	2.5	1" G	290
1300070000	700	750	1755	6	2.5	1" G	290
1300080000	800	750	1855	6	2.5	1" G	290
1300090000	900	750	2105	6	2.5	1" G	290



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Dimensions - Continued



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Notes



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