CAL-PRO

ZILMET®

Heating

cal-pro

Applications : expansion vessels for heating systems.

general features

Advantages
The CAL-PRO expansion vessels absorb the water volume variations in a closed heating system maintaining constant pressure and help to reduce energy consumption. The broad range available meets the requirements of various heating systems sizes.

Technical Features
Crimped or welded carbon steel shells, synthetic SBR rubber according to DIN 4807-3 norms are suitable to every capacity for maximizing tank drawdown. Vessels are painted externally with long-lasting epoxy-polyester powder coating and are 100% factory-tested.

Working
In a closed heating system water cannot be compressed and any increase in water volume due to the increase of its temperature is absorbed by the expansion vessel. When water is cold, the precharge pressure of the tank presses the diaphragm against the tank. As temperature increases, the expanded water volume pushes against the membrane and water enters the tank, providing additional space to the system. With the temperature decrease, the air cushion forces water back into the system. This permits the system to maintain the pressure, helping to reduce energy consumption of the heating system.

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certifications

technical and dimensional data

Model	Code	Capacity	Ø Diameter	H height	E	Connection
		litri /litres	mm	mm		
CAL - PRO 4	1300000400	4	225	195	-	¾"G
CAL - PRO 8	1300000800	8	220	295	-	¾"G
CAL - PRO 12	1300001200	12	294	281	-	¾"G
CAL - PRO 18	1300001800	18	290	400	-	¾"G
CAL - PRO 24	1300002400	24	324	415	-	¾"G
CAL - PRO 35	1300003500	35	404	408	-	¾"G
CAL - PRO 35 *	1300003503	35	404	387	119	¾"G
CAL - PRO 50	1300005000	50	407	530	-	¾"G
CAL - PRO 50 *.	1300005003	50	407	507	157	¾"G
CAL - PRO 80	1300008000	80	450	608	150	¾"G
CAL - PRO 105	1300010500	105	500	665	165	¾"G
CAL - PRO 150	1300015000	150	500	897	216	¾"G
CAL - PRO 200	1300020000	200	600	812	225	¾"G
CAL - PRO 250	1300025000	250	630	957	245	¾"G
CAL - PRO 300	1300030000	300	630	1105	245	¾"G
CAL - PRO 400	1300040000	400	630	1450	245	¾"G
CAL - PRO 500	1300050000	500	750	1340	290	1"G
CAL - PRO 600	1300060000	600	750	1555	290	1"G
CAL - PRO 700	1300070000	700	750	1755	290	1"G
CAL - PRO 800	1300080000	800	750	1855	290	1"G
CAL - PRO 900	1300090000	900	750	2105	290	1"G

* with feet

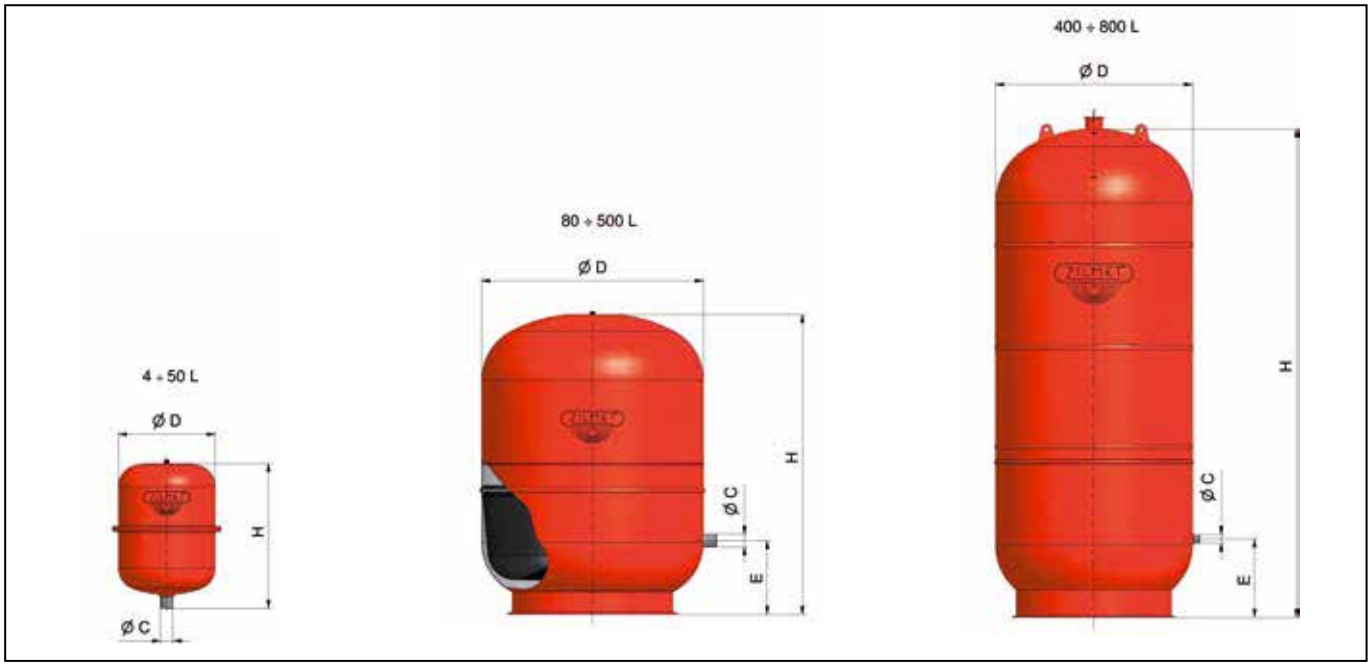
material description

description	material
shell	carbon steel
connections	carbon steel
membrane	SBR synthetic rubber
colour	red

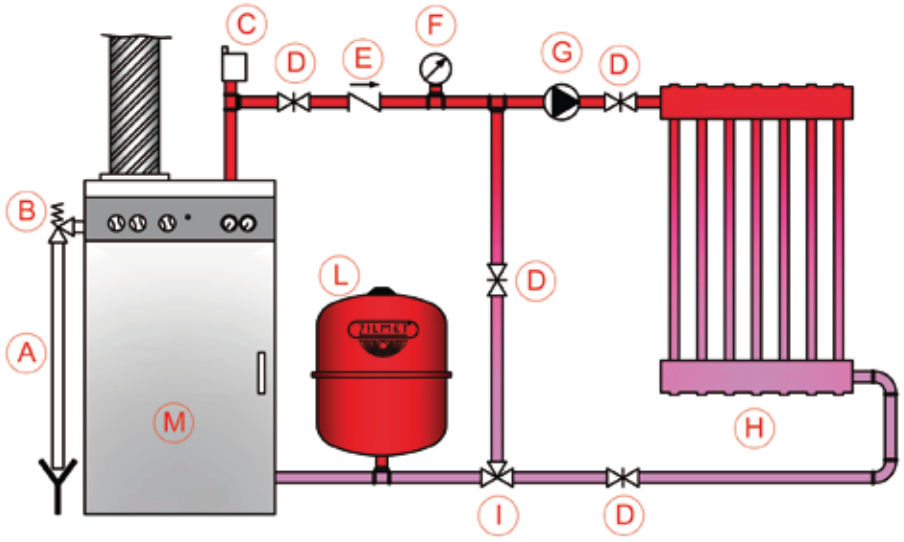
operating conditions

max. working pressure 4-8 litres	5 bar
max. working pressure 12-50 litres	4 bar
max. working pressure 80-900 litres	6 bar
max. operating temperatures	-10 ÷ 99 °C
factory precharge 4-8 litres	1,5 bar
factory precharge 12-50 litres	2 bar
factory precharge 80-900 litres	2,5 bar

technical drawings



assembly diagram



A - Draining
B - Safety valve
C - Air bleeder
D - Gate valve
E - Backflow preventer
F - Pressure gauge
G - Pump
H - Utilities
I - Mixing valve
L - Zilmet expansion vessel
M - Boiler

sizing examples

			Maximum working temperature (°C)						
			40	50	60	70	80	90	99
			Coefficient of water expansion with respect to 10 °C						
			0,008	0,012	0,017	0,022	0,029	0,036	0,043
precharge	***system press.***	***system water volume***	***Approximate volume of the vessel (litres) as function of the max. working temperature***						
bar	***bar***	***lt***							
0,5	1	100	3	4,7	6,7	9	11,5	14,3	17,3
0,5	1,5	100	1,9	3	4,2	5,6	7,2	8,9	10,8
0,5	2	100	1,5	2,4	3,4	4,5	5,7	7,1	8,6
0,5	2,5	100	1,3	2,1	2,9	3,9	5	6,2	7,6
1	1,5	300	11,4	17,7	25,2	33,7	43,1	53,5	64,8
1	2	300	6,8	10,6	15,1	20,2	25,9	32,1	38,9
1	2,5	300	5,3	8,3	11,8	15,7	20,1	25	30,2
1	3	300	4,5	7,1	10,1	13,5	17,2	21,4	25,9
1,5	2,5	500	13,2	20,7	29,4	39,3	50,3	62,4	75,6
1,5	3	500	10,1	15,8	22,4	29,9	38,3	47,5	57,6
1,5	3,5	500	8,5	13,3	18,9	25,2	32,3	40,1	48,6
1,5	4	500	7,6	11,8	16,8	22,4	28,7	35,7	43,2
2	3	1000	30,3	47,3	67,2	89,8	115	142,6	172,7
2	4	1000	18,9	29,5	42	56,1	71,9	89,1	108
2	5	1000	15,1	23,6	33,6	44,9	57,5	71,3	86,4
2	6	1000	13,2	20,7	29,4	39,3	50,3	62,4	75,6

The formula for the calculation is: V = e C [1- ((Pprec + 1) / (Pmax + 1))]
V = Volume of the vessel (litres) e = Coefficient of water expansion C = System water volume (litres) Pmax = System pressure (bar) Ppre= Precharge pressure (bar)

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ATTENTION: The calculation, that is valid provided that the expansion vessel and the safety valve are at the same height, gives only an approximation of the volume needed for the expansion vessel and, anyway, has to be verified by a specialized and authorized technician for keeping into account the real characteristics of the system and of the used fluid (e.g. mixtures water / glycol). The choice of the vessel has to be made considering that its max. working pressure must be at least equal to the max. system pressure (pressure setting of the safety valve).

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