

Expansion Vessels

for heating systems



altecnic

Expansion Vessels for heating systems



Introduction

Altecnic offer a complete range of expansion vessels to meet the requirements of most heating systems.

Expansion vessels for heating systems are manufactured to meet the requirements of PED 97/23/EC Directive and BS EN 13831:2007 'Closed expansion vessels with built in diaphragm for installation in water'.

Design

The vessel is fabricated by welding the various sections together which results in a very reliable structure suitable for internal pressures up to 6 bar.

Epoxy coated in red.

Suitable for temperatures up to 99°C, resistant to ethylene or propylene glycol mixtures and has low gas permeability.

Altecnic expansion vessels are all tested according to the Pressure Systems Directive.

How It Works

In a closed heating system water cannot be compressed so any increase in volume, created by an increase in temperature, has to be accommodated by an expansion vessel.

When water is cold, the pre-charge pressure forces the diaphragm against the tank towards the inlet.

As the temperature increases, the expanded water volume pushes against the diaphragm creating additional volume for the water to enter.

When the temperature decreases, the pre-charge pressure forces the water from the tank and back into the main heating system.

This maintains a constant pressure within the heating system helping to reduce energy consumption.

Materials

Component

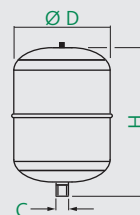
Shell	Carbon Steel
Connections	Carbon Steel
Diaphragm	SBR synthetic rubber
Coating	Powder Epoxy

Technical Specification

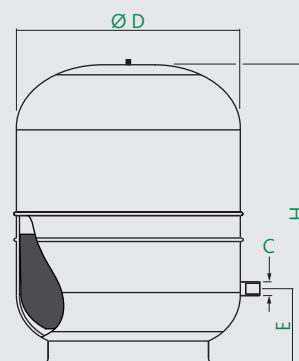
Max. working pressure	4 to 8 litres	5 bar
	12 to 50 litres	4 bar
	80 to 700 litres	6 bar
Max. operating temperature		-10°C to 99°C
Factory air pre-charge	4 to 8 litres	1.5 bar
	12 to 50 litres	2.0 bar
	80 to 700 litres	2.5 bar

Dimensions

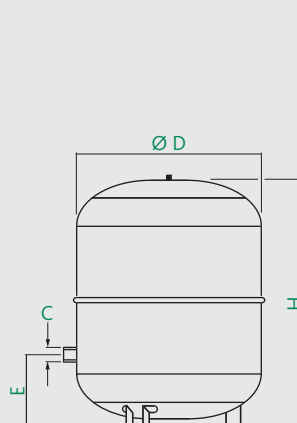
Prod Code	Capacity litres	ØD mm	H mm	E mm	C Connection
ZI-301004	4	225	195	n/a	G $\frac{3}{4}$ "
ZI-301008	8	220	295	n/a	G $\frac{3}{4}$ "
ZI-301012	12	294	281	n/a	G $\frac{3}{4}$ "
ZI-301018	18	290	400	n/a	G $\frac{3}{4}$ "
ZI-301024	24	324	415	n/a	G $\frac{3}{4}$ "
ZI-302035.CP	35	404	387	119	G $\frac{3}{4}$ "
ZI-302050.CP	50	407	507	157	G $\frac{3}{4}$ "
ZI-302080	80	450	608	150	G $\frac{3}{4}$ "
ZI-302105	105	500	665	165	G $\frac{3}{4}$ "
ZI-302150	150	500	897	216	G $\frac{3}{4}$ "
ZI-302200	200	600	812	225	G $\frac{3}{4}$ "
ZI-302250	250	630	957	245	G $\frac{3}{4}$ "
ZI-302300	300	630	1105	245	G $\frac{3}{4}$ "
ZI-302400	400	630	1450	245	G $\frac{3}{4}$ "
ZI-302500	500	750	1340	290	G1"
ZI-302600	600	750	1555	290	G1"
ZI-302750	700	750	1755	290	G1"



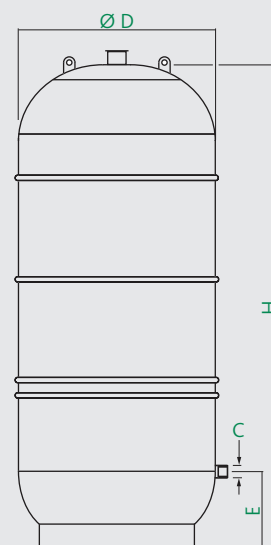
4 to 24 litres



80 to 400 litres



35 to 50 litres



500 to 700 litres

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Sizing Chart

Maximum working temperature - °C			40	50	60	70	80	90	99
Coefficient of water expansion related to 10°C			0.008	0.012	0.017	0.022	0.029	0.036	0.043
Pre-charge	System Pressure	System Water Volume	Approximate volume in (litres) as a function of the max. working temperature						
bar	bar	litre							
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	29.2	39.3	50.3	62.4	75.6

Sizing formula

$$V = e C / [1 - ((P_{prec} + 1) / (P_{max} + 1))]$$

where V = Volume of the vessel in litres

e = Coefficient of water expansion

C = System water volume in litres

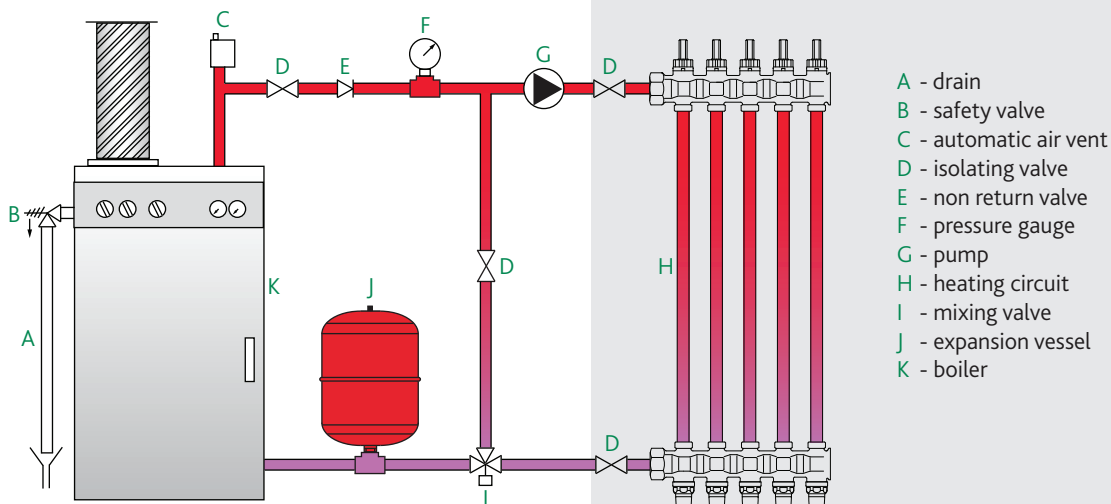
P_{max} = System pressure bar

P_{prec} = Pre-charge pressure bar

Attention: The calculation gives only an approximation of the volume needed for the expansion vessel. The system designer needs to confirm the above using details of the heating system and the fluid to be used.

The maximum working pressure of the expansion vessel must be at least equal to the maximum system pressure (pressure setting of the safety valve).

Typical Application



E & O.E

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