Easy-Pro Installation & Operations Guide

Installation & Maintenance Guide

Operation

The EASY-PRO range of Expansion Vessels is specifically designed for Unvented Potable Systems to deal with increased water volume resulting from heat expansion.

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.

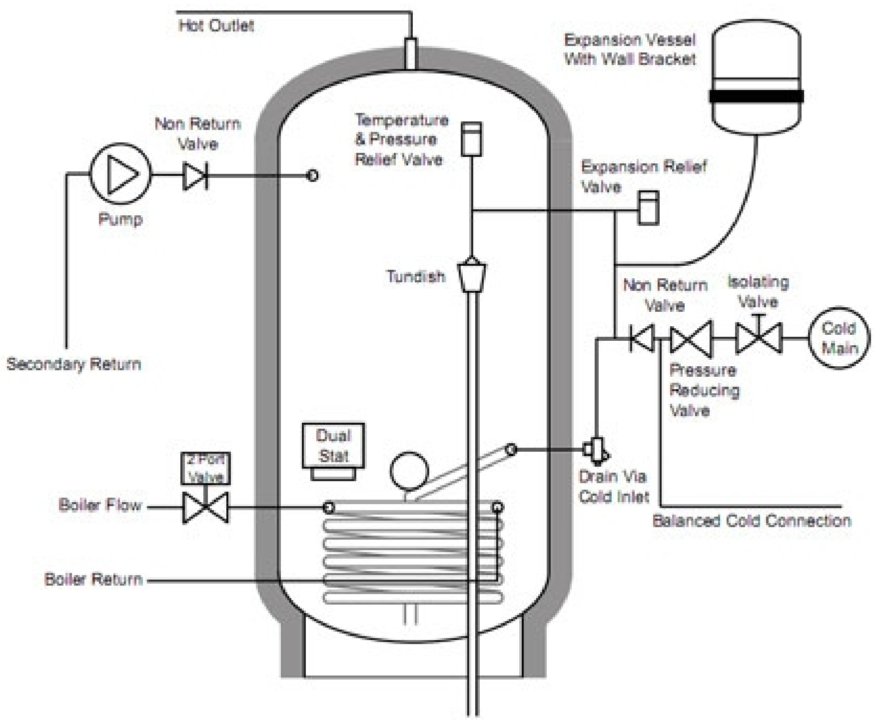
The correct size of vessel must be considered prior to installation and installed by appropriately trained engineers.

Installation Siting

The Expansion Vessel may be fitted to a very wide range of systems, different sources of heat are applied to Unvented Hot Water Systems, and as long as the temperature is controlled within normal limits, the EASY-PRO will be compatible in it's application.

Installations where the heat source is augmented by Solid Fuel, Solar Thermal or other heat sources with potentially uncontrolled input temperatures are not compatible with these vessels and an alternative model should be specified.

The physical siting of the vessel should always be in accordance with the Cylinder manufacturers instructions as a variety of acceptable siting options is available.



Installation & Maintenance Guide

The UK Water Supply Industry Recommendations for Pressure testing state:-

"When testing rigid pipe systems all the outlets in the installation should be sealed and all float operated valves should be capped off or isolated. The water pressure should then be increased, by pumping, until the internal water pressure at the lowest point of the installation is 50% above the normal operating pressure. This pressure should be maintained for one hour without further pumping".

Where the expansion vessel is concerned, there may be times when this testing procedure will take the system pressure to something in excess of the maximum working pressure. At times like this there is the potential to burst the membrane. This is due to the tremendous strain that the membrane is subjected to in these conditions, which is caused ultimately by a greatly increased "acceptance factor".

The acceptance factor in this case is essentially the percentage of the overall vessel volume which is filled.

In order to successfully pressure test the system without endangering the membrane, it is necessary to increase the pre charge of the vessel temporarily to a magnitude that prevents the acceptance factor exceeding 40% while the maximum working pressure is exceeded.

The method of calculating the increased pre charge required is:-

Where,

P_i = Initial charge pressure (Absolute) - This should equal the value of the static system pressure minus 0.2 Bar.

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.

$(P_i / P_f) \times 100$ = acceptance factor

If acceptance factor exceeds 40% then increase P_i until this is not so.

P_i = final value of pre charge required before system pressure test.

For example if the normal operating pressure of a system is 9 Bar, then the expected test pressure for the system is 13.5 Bar.

Because this exceeds the maximum working pressure, the pre charge should be temporarily increased to something like 5.4 Bar or more if possible. In this way, the integrity of the vessel is still tested properly without undue risk to the membrane.

Installation & Maintenance Guide

Sizing

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

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

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

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 = 0.02244

C = Total Water Capacity of the system in Litres

P_i = Initial charge pressure (Absolute) - This should equal the value of the static system pressure minus 0.2 Bar.

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.

Example

C = 300 Litres
P_i = 3.3 Bar (4.5 Bar atmospheric)
P_f = 6 Bar (7 Bar Atmospheric)

$$V = \frac{0.02244 \times 300}{1 - (4.3 / 7)}$$

V = 18.7

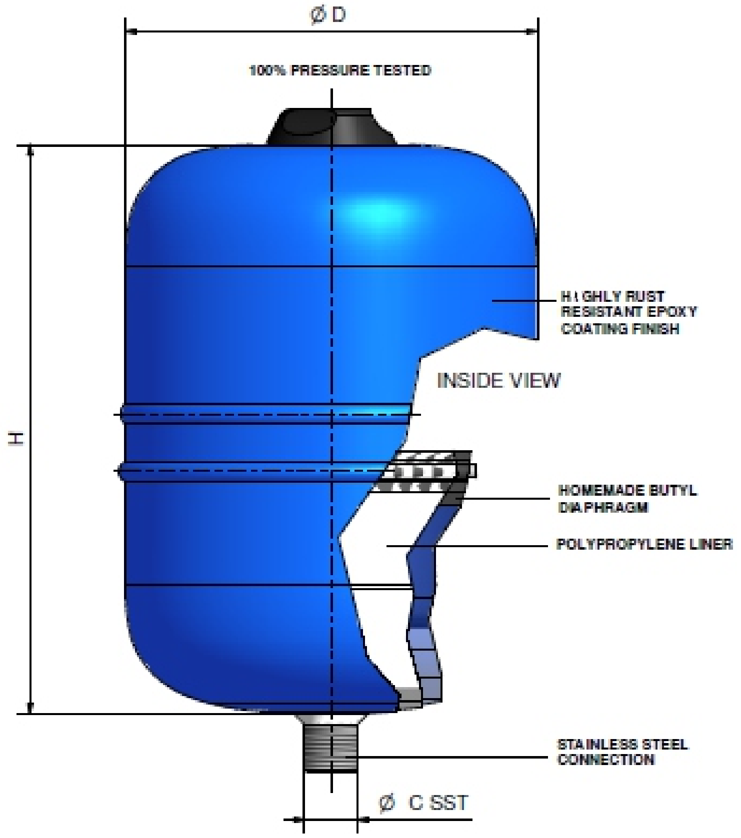
Nearest vessel size with this capacity = 24 Litres

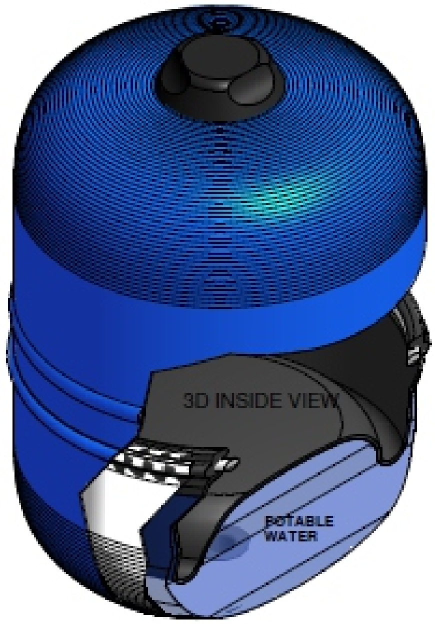
Maintenance

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 it's life span and may require replacement. Some provision should be made within a wider piece of equipment for access and 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.

Installation & Maintenance Guide





Code	Capacity	Diameter	Height	Pmax	Pre charge	Connection
	(Litres)	(mm)	(mm)	(Bar)	(Bar)	(BSP)
11E0000800	8	200	280	10	2	3/4"G
11E0001200	12	270	264	10	2	3/4"G
11E0001800	18	270	349	10	2	3/4"G
11E0002400	24	300	392	10	2	3/4"G

Available in Blue or White

Notes

Zilmet UK Ltd. Airfield Industrial Estate, Hixon,
Staffordshire, ST180PF
t: 01889272185, F: 01889272191
web: www.zilmet.co.uk, E Mail: sales@zilmet.co.uk
E & OE