ERE-CE Series

Closed expansion vessels

Technical Data Sheet

WattsIndustries.com

WATTS®

Description

ERE-CE Series expansions vessels are hermetically sealed and consist of two half-shells with a flexible diaphragm located at the centre line and fixed along its circumference, which separates one chamber, for system water, from the other, filled with inert gas. The closed expansion vessel automatically compensates changes in the volume of the water in the system, which are caused by changes in its temperature. This prevents system pressure from exceeding the safety pressure setpoint, and therefore protects the boiler and the system as a whole.

ERE-CE

Fixed-diaphragm expansion vessels for heating and cooling systems.
Designed to resist fluid blends containing up to 50% glycol.
Male threaded connection at top of vessel (excluding 500 litre model).
The 80÷300 litres models are equipped with a circular base.
The 500 litres model is equipped with support feet and bottom connection.

Compliant with Directive PED 2014/68/EU.

Type	Part No.	Capacity	Pmax	Pre-charge	Connection	Weight (Kg)
ERE CE	06820035C	35	5	1.5	3/4" M	6.80
ERE CE	06820050C	50	6	1.5	3/4" M	7.35
ERE CE	06820080C	80	6	1.5	3/4" M	13.57
ERE CE	06820100C	100	6	1.5	3/4" M	16.20
ERE CE	06820150C	150	6	1.5	1" M	22.0
ERE CE	06820200C	200	6	1.5	1" M	31.7
ERE CE	06820250C	250	6	1.5	1" M	34.0
ERE CE	06820300C	300	6	1.5	1" M	38.5
ERE CE	06820500C	500	6	2.5	1" M	58.0

Technical features	
Maximum operating pressure	5 bar (35 litres model) 6 bar (all other models)
Pre-charge pressure	1.5 bar (35÷300 litres models) 2.5 bar (500 litres models)
Operating temperature	-10÷100°C
Inert pre-charge gas	air

Design characteristics	
Body	steel
Diaphragm	SBR
External finish	polymerised epoxy powder in RAL 300 red

Application

ERE-CE Series closed expansion vessels are generally used in heating systems with nominal heat output of more than 35 kW that use hot water at temperatures below 100°C and in cooling circuits with water mixed with glycol (<50%).
Their function is as follows:
- in heating systems: to provide sufficient volume for the water in the system to expand when switching from OFF to ON, thus limiting the increase in circuit pressure;
- in cooling systems: to create a reserve of fluid in order to prevent the formation of a vacuum, which would cause air to be drawn into the circuit from all points communicating with the external environment during system operation (cooling), i.e. reduction in the volume of fluid in circulation.

Operation

In any circuit in which the carrier fluid changes temperature, there will always be corresponding changes in fluid volume.
ERE-CE Series closed expansion vessels have the capacity to absorb these increases in volume by means of a cushion of inert gas inside them, which is separated from the water by a rubber diaphragm.
When the heating system is OFF, the diaphragm adheres to the walls of the vessel (Fig.1), but when it is ON, the fluid in the system expands, thus compressing the cushion of inert gas and pushing the diaphragm half way down the vessel (Fig.2). Unlike what happens in open-vessel systems, when the fluid temperature increases, the system pressure increases accordingly: the increase in volume is absorbed by the cushion of inert gas, whose pressure increases when it is compressed. In the cooling phase, the fluid contracts and its reduced volume enables the cushion of inert gas to expand, thus restoring the fluid level in the system.

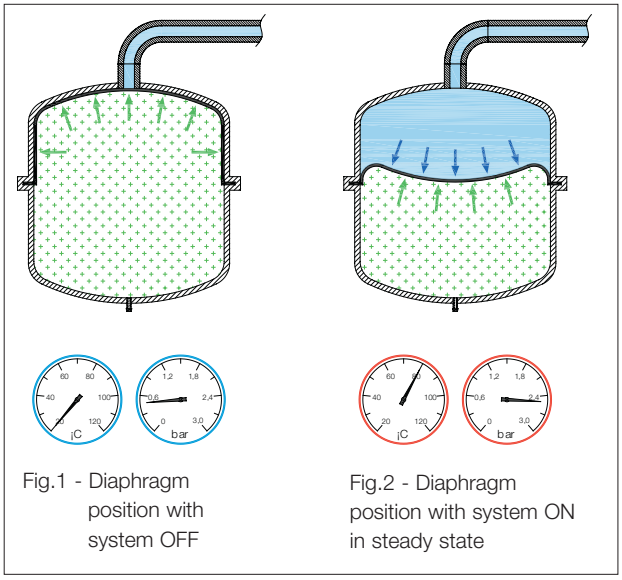


Fig.1 - Diaphragm position with system OFF

Fig.2 - Diaphragm position with system ON in steady state

Sizing

Selecting a diaphragm expansion vessel is similar to selecting an open vessel except that - in addition to the amount of water in the system, the temperature range and the increase in specific volume during heating - you also need to take account of the maximum permissible operating pressure range.
It therefore follows that, the bigger the difference between the initial pressure and the final pressure of the air cushion, the larger the effective volume of the expansion vessel has to be.
To calculate the effective volume of the vessel, simply apply the formula below ("R" regulations – 2009 Edition):

$$Vn \geq \frac{V_E}{\left(1 - \frac{P_1}{P_2}\right)}$$

where:
V = volume of expansion vessel in litres
V_e= amount of water in the system (Va) in litres multiplied by the expansion volume (Va x n/100);
n = 0.31+3.9 x10-4 x tm^2;
t_m = maximum permissible temperature in °C in relation to the trip threshold of the safety devices;
P_1 = absolute pressure, in bar, to which the gas cushion is pre-charged; this pressure cannot be less than the hydrostatic pressure at the point of installation of the expansion vessel (or the re-fill pressure of the filling unit);
P_2 = absolute pressure setpoint of the safety valve, in bar, minus an amount corresponding to the height difference between the expansion vessel and the safety valve if the safety valve is lower, or plus the same amount if it is higher.

Example:
Calculate the capacity of an expansion vessel for a heating system having:
- system hydrostatic head 12m (1.2 bar);
- initial cold pre-charge pressure 15m (1.5 bar);
- initial absolute pressure (P_1) 1.5+1= 2.5 bar;
- final absolute pressure (P_2) 3.0+1= 4.0 bar;
- amount of water in system 1000 litres;
- maximum fluid temperature 90°C.

n = 0.31+3.9 x10-4 x 902 = 3.469
Ve = (1000 x 3.469/100) = 34.69 litres

$$V_n \geq \frac{34.69}{\left(1 - \frac{2.5}{4.0}\right)} = 92.5 \text{ litres}$$

On the basis of selecting the nearest size up, we will need one ERE-CE 100 or two ERE–CE 50s installed in parallel.

Installation

ERE-CE Series expansion vessels must be installed as required by the technical specifications set out in the "R" regulations – 2009 Edition (Chap.R .3.B). The expansion pipe (minimum internal diameter 18 mm) must not be fitted with shut-off devices or have its section reduced. A 3-way shut-off valve (**296 Series**) connecting the boiler to the atmosphere may be fitted, provided that the size of the vent way is not less than the size of the expansion pipe. When installing a closed expansion vessel, it is good practice to ensure that the temperature of the water that comes into contact with the diaphragm is lower than the temperature of the water circulating around the system. To do this, prevent the natural circulation that could occur in the connection pipe between the closed expansion vessel and the system. To prevent natural circulation, simply connect the expansion vessel at least 10 cm below the main pipe. If space constraints make it necessary to install the expansion vessel above main pipe, it is advisable to create a U-bend as shown in **Fig.3**. Normally, closed expansion vessels must always be located on the pump intake pipe (upstream) so that the pump operates at constant pressure.

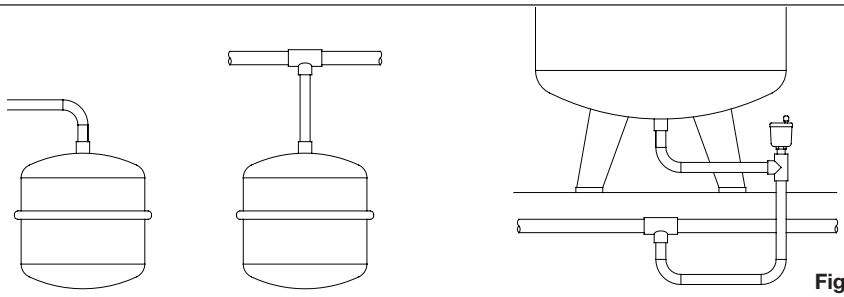
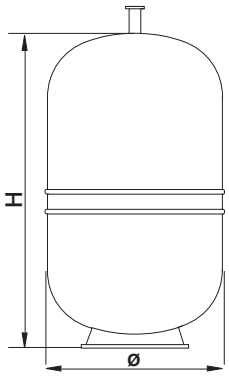


Fig.3 - Connection examples

Overall dimensions (mm)

ERE-CE



Capacity (L)	Ø	H
35	380	455
50	380	590
80	460	690
100	460	810
150	510	970
200	590	985
250	590	1230
300	650	1220
500	750	1575

Specification text

ERE-CE Series – Fixed-diaphragm expansion vessel **ERE-CE Series** – WATTS brand – for heating and cooling systems. Designed to resist fluid blends containing up to 50% glycol. Male threaded connection at top of vessel (excluding 500-litre model). The 80-300-litre models are equipped with a circular base. The 500-litre model is equipped with support feet and bottom connection. Compliant with Directive PED 2014/68/EU.

Watts Industries Italia S.r.l.
Via Brenno, 21 • 20853 Biassono (MB) • Italy
Tel. +39 039 4986.1 • Fax +39 039 4986.222
infowattsitalia@wattswater.com • www.wattsindustries.com