

Installation, Operating, Maintenance and Safety Instructions **ACCUMULATOR TANKS & EXPANSION TANKS** in **PRESSURISED WATER SYSTEMS**



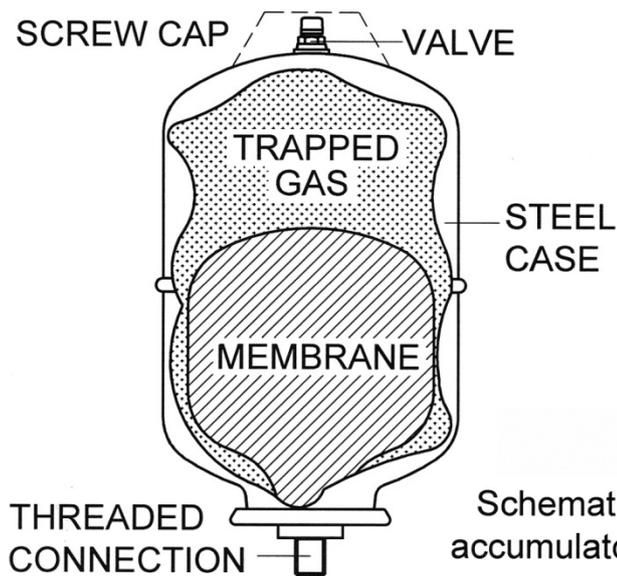
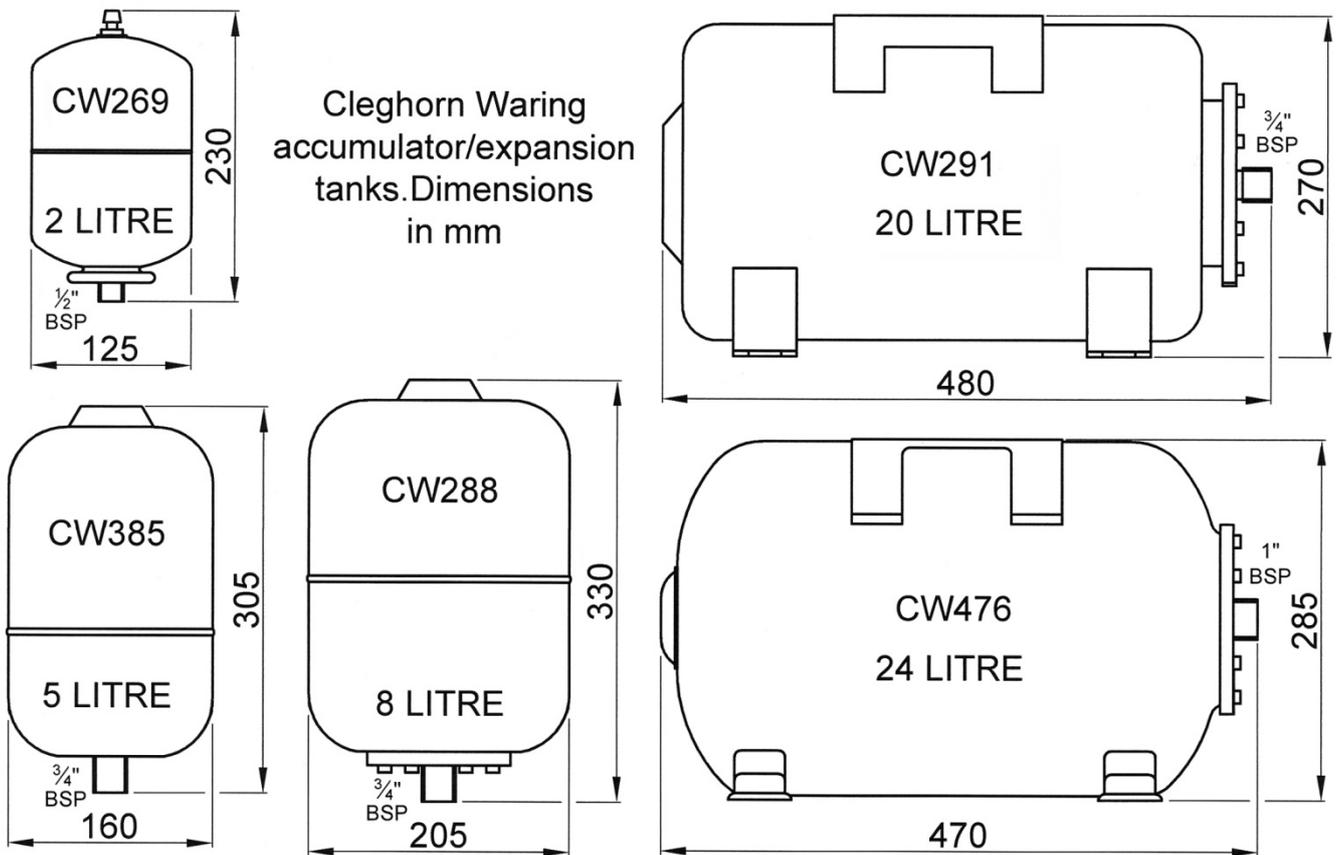
IMPORTANT

PLEASE READ THESE INSTRUCTIONS CAREFULLY BEFORE INSTALLING OR USING YOUR ACCUMULATOR / EXPANSION TANK. FAILURE TO FOLLOW THE RECOMMENDED PROCEDURES MAY RESULT IN REDUCED PERFORMANCE OR NON-FUNCTIONING OF THE TANK, MAY CAUSE DAMAGE TO OTHER EQUIPMENT ON BOARD, PERSONAL INJURY, AND INVALIDATE THE SUPPLIER'S WARRANTY.

WARNING

Cleghorn Waring's tanks are intended for use as accumulator tanks or as expansion tanks in pressurised water systems. They are designed for a maximum internal pressure of 6 bar (90 psi). In no circumstances must the internal pressure be allowed to exceed this figure. The supplier accepts no responsibility for use of the tank for any other purpose than those described in these instructions.





***Accumulator Tanks and Expansion Tanks -
What's the difference?***

There is no difference in construction. Cleghorn Waring's tanks are suitable for either duty. They are cylindrical steel tanks with an internal rubber membrane. The tank is supplied charged with inert nitrogen gas, to prevent internal corrosion. The internal pressure is regulated via the air valve located beneath the black cap at the closed end of the cylinder.

The tank is designed for two *separate* and *alternative* functions in a pressurised water system:

1. As an **ACCUMULATOR TANK**. *See section A*
2. As an **EXPANSION TANK**. *See section B*

SECTION A - ACCUMULATOR TANKS

Why do I need an accumulator tank?

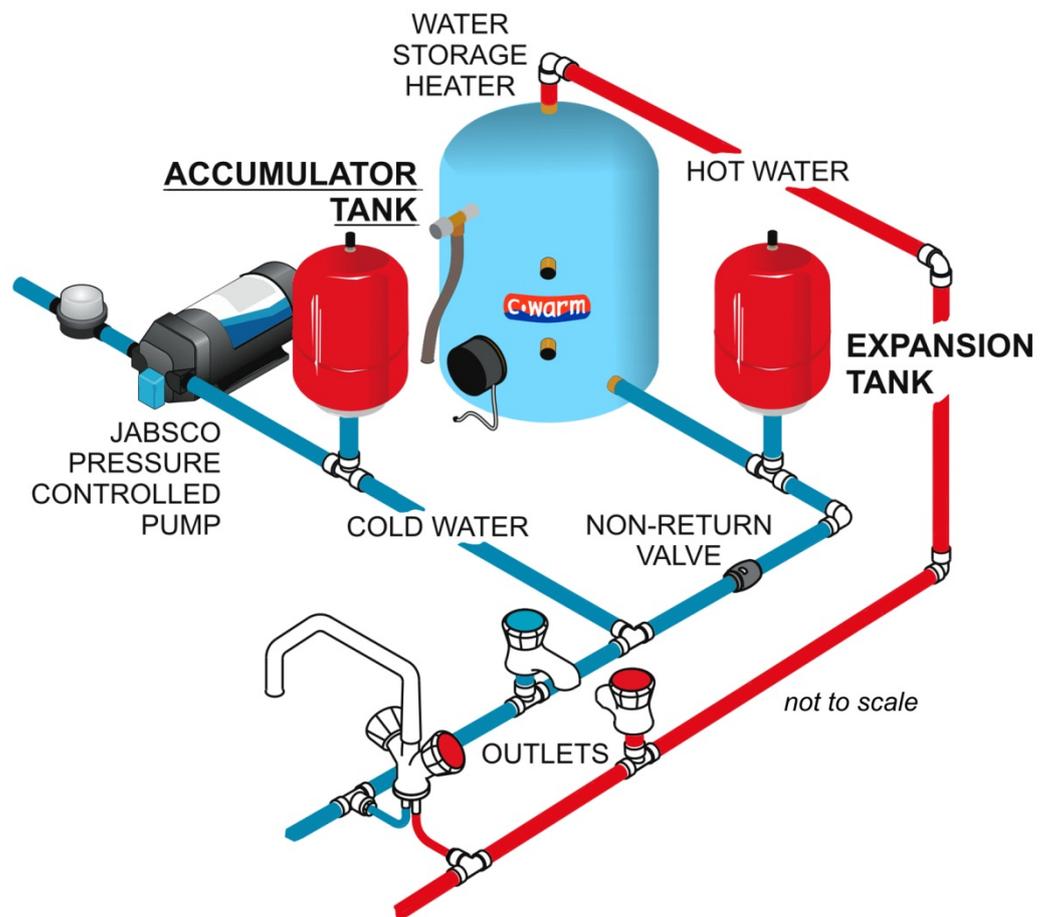
An accumulator tank is an important part of any pressurised water system that includes a pressure-controlled pump. (Some modern computer-controlled pumps may not require an accumulator tank, but see **Section B - Expansion tanks**.) Fitted close to the discharge port of the pressurised water pump, the accumulator tank acts as a pressure buffer, ensuring a smooth flow of water from the outlets. Without an accumulator tank, the pump is liable to switch itself rapidly on and off whenever its flow rate exceeds demand from the outlets. Constant on-off cycling leads to increased pump wear and unnecessary battery drain. The accumulator tank stops this rapid cycling, resulting in smooth water flow (important in showers) and an extended pump life.

Where do I fit an accumulator tank?

The accumulator tank should be fitted in the **discharge** line from the **pump**, as close as possible to the pump itself (see diagram). The tank will serve no useful function if fitted in the pump inlet pipework.

How do I install an accumulator tank?

The tank should be installed in a dry place. Tanks may be fitted in any attitude, vertical or horizontal. The tank may be secured by stout strapping or by stainless steel bands, or it may be mounted in a wooden cradle. The steel tank casing is robust, but care should be taken during installation not to scratch, dent or puncture it. A special bracket mounting kit CW324 is available for the 2, 5 and 8-litre models.



What size of accumulator tank do I need?

This depends on the number of outlets in your system, their frequency of use, on the flow rate of the pump and on the space available. The larger the tank, the less frequently the pump will start, and the longer it will run before stopping. Contact your supplier if you require advice.

At what pressure should I set the accumulator tank?

The pressure in the tank is adjusted by means of the air valve in the closed end. The tank is supplied with an internal pressure of about 2.8 bar (35 psi). Reduce this pressure to

2 - 3 psi **below the cut-in** pressure of the pump (refer to pump instructions for details). This pressure adjustment is best done before installation of the tank, using a car-type pressure gauge to determine when the required pressure is reached, as follows:

- i. Depress the central pin of the Schrader valve with your finger, to release gas
- ii. Release gas a little at a time, until the pressure is correct
- iii. If you release too much gas by mistake, air may be pumped back in with a hand - or foot-pump.

WARNING

Make sure that there is adequate ventilation when setting or adjusting pressure in an accumulator tank. Nitrogen is non-toxic, but oxygen levels may be reduced in confined spaces.

If the tank pressure requires adjustment after installation, ensure first that the pump is switched off and that an outlet is open, so that there is no pressure in the system. Then regulate the pressure as indicated above.

Check the accumulator tank performance in this way every 6 months, and adjust the pressure if necessary.

EXAMPLE

<i>Pump Cut-in Pressure</i>	<i>Acc. Tank Pressure setting</i>
1 bar (15 psi)	0.8 bar (12 psi)
0.7 bar (10 psi)	0.5 bar (7 psi)
0.5 bar (7 psi)	0.3 bar (5 psi)

Winter precautions

To avoid risk of frost damage, drain all the water from your pressurised water system, before winter lay-up. Switch off the pump, open all outlets until flow ceases. This will allow water to be expelled from the accumulator tank. Drain all remaining water from the lowest point in the system. Remember to drain your calorifier from the bottom (cold-water inlet)

Temperature range.

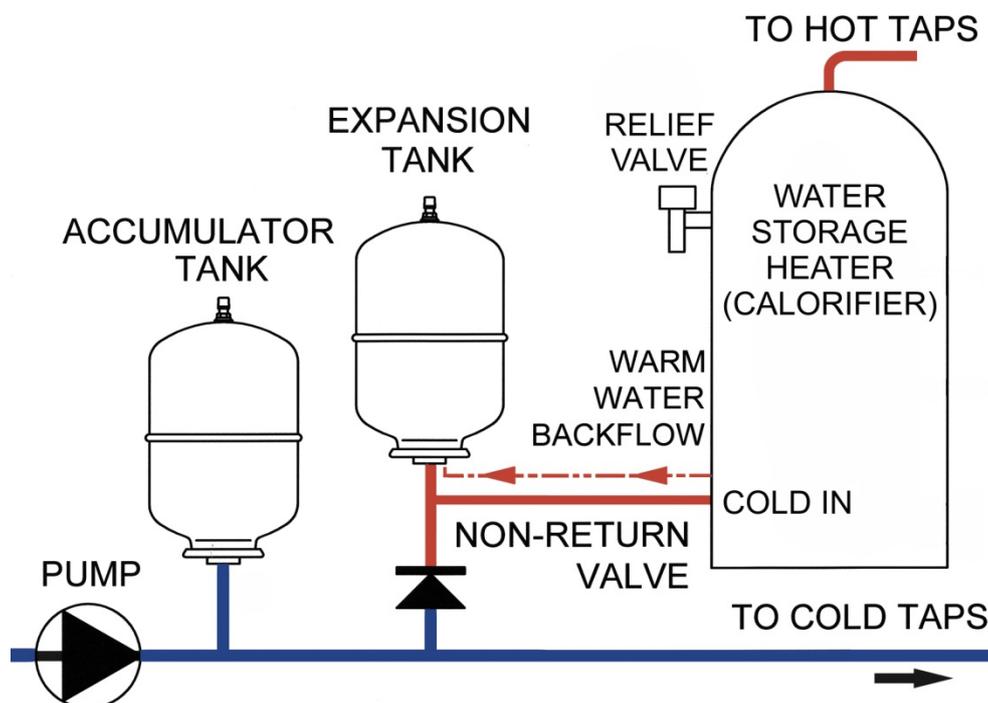
Cleghorn Waring accumulator / expansion tanks are designed for use within the temperature range 0 to 90°C.

SECTION B - EXPANSION TANKS

Why do I need an expansion tank?

Heated from 10 to 60°C, water expands in volume by about 2%. The calorifier expands too, but not as much as the water. A litre or more of hot water may need to escape from your calorifier as it heats up.

A normal accumulator tank can absorb this excess water, provided it is of sufficient size. In the process, hot water will flow back into the cold water line. If hot water back-flow cannot be tolerated, a non-return valve may be fitted in the inlet line to the calorifier. The expansion water will then be discharged through the calorifier temperature / pressure relief valve, which opens at the maximum working pressure of the calorifier.



To avoid water wastage, to prevent unnecessary stress on the calorifier, and to avoid build-up of deposits in the relief valve, an additional expansion tank may be fitted in the inlet line to the calorifier (see diagram).

What size of expansion tank do I need?

The required capacity of the expansion tank depends on:

- pump cut-out pressure
- the difference between the pump cut-out pressure and the opening pressure of the relief valve in the calorifier
- the volume of stored water in the calorifier

All three of these factors are taken into account by the EXPANSION TANK VOLUME FACTOR, shown in the table below.

To calculate the expansion tank volume you require, proceed as follows:

EXPANSION TANK VOLUME FACTOR				
Pressure relief valve setting	2.5 bar (37psi)	3 bar (44psi)	3.5 bar (51psi)	5 bar (74psi)
Pump cut-out pressure				
1.0 bar (15psi)	22	24	28	34
1.4 bar (21psi)	16	20	24	30
1.8 bar (25psi)	10	15	18	26
2.0 bar (29psi)	7	12	16	25
2.8 bar (40psi)	n/a	n/a	8	18

- STEP 1** From the table, find the volume factor appropriate to your system
- STEP 2** Divide the volume of your calorifier by the volume factor, to give the expansion tank volume you require

EXAMPLE

A 50 litre calorifier having a relief valve setting of 2.5 bar with a pump cut-out pressure of 1.4 bar (21psi).

From the table above we get a volume factor of 16.

We then divide the calorifier volume by this = $50 \div 16 = 3.1$ litre

Then use the next larger size expansion tank - 5 litre (CW385)

Where do I fit an expansion tank?

The expansion tank should be fitted in the cold water feed line to the calorifier, between the non-return valve and the calorifier.

How do I install an expansion tank?

Tanks may be installed in a vertical or horizontal position. The tank may be secured by stout strapping or by stainless steel bands, or it may be mounted in a wooden cradle. A special bracket mounting kit CW324 is available for the three smallest sizes

The steel tank casing is robust, but care should be taken during installation not to scratch, dent or puncture the tank.

At what pressure do I set the expansion tank?

The tank is supplied charged with nitrogen gas at about 2.3 bar (35 psi). The pressure should be adjusted to the **cut-out** pressure of the pressurised water pump. This should be done before the tank is installed. Follow the pressure adjustment procedure described in SECTION A, above.

Expansion tank setting with Jabsco Sensor-Max pump

The Jabsco Sensor-Max variable speed water pressure system pump requires the gas setting on the expansion tank to be 0.2 bar above the pump cut-out pressure. Ask for the free Cleghorn Waring leaflet

Check the pressure in the expansion tank every 6 months, and adjust it if necessary. Switch off pump and open hot water outlets before doing so.

Winter precautions

To avoid risk of frost damage, drain all the water from your pressurised water system, before winter lay-up. Switch off the pump, open all outlets until flow ceases. This will allow water to be expelled from the expansion tank. Drain all remaining water from the lowest point in the system. Remember to drain your calorifier from the bottom (cold water inlet)

Temperature range

Cleghorn Waring accumulator / expansion tank are designed for use within the temperature range 0 to 90°C.

Maintenance

Cleghorn Waring accumulator / expansion tanks require no regular maintenance.

TROUBLE SHOOTING

ACCUMULATOR TANKS		
PROBLEM	POSSIBLE CAUSE	REMEDY
Pressurised water pump cuts in & out rapidly when outlet is partially open	Pressure in accumulator tank incorrect Accumulator tank membrane split Accumulator tank incorrectly located	Check tank pressure and adjust (see instructions) Replace tank or membrane Re-locate tank (see instructions)
Schrader valve leaks water	Accumulator tank membrane split	Replace tank or membrane

EXPANSION TANKS		
PROBLEM	POSSIBLE CAUSE	REMEDY
Calorifier pressure relief valve opens when calorifier is heated normally	Pressure in expansion tank incorrect Expansion tank not large enough	Check tank pressure and adjust (see instructions) Fit larger tank
Hot water appears in cold water line	Non-return valve in inlet line to calorifier absent or ineffective	Check presence/condition of non-return valve
Schrader valve leaks	Expansion tank membrane split	Replace tank or membrane