



# Medium-sized vessels water connection

**White paper**



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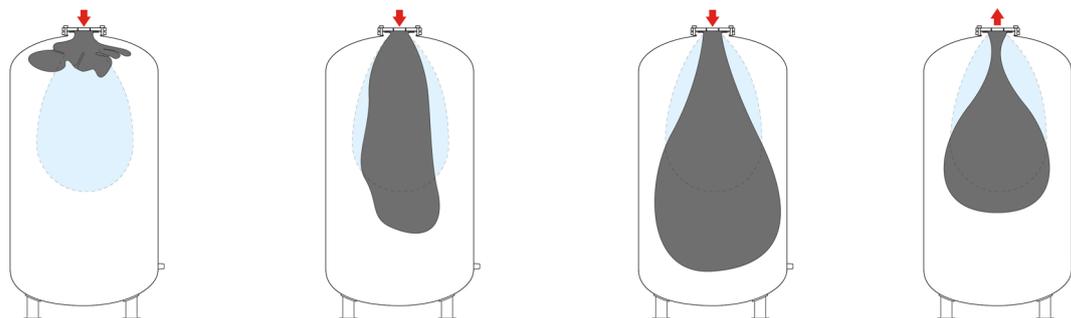
In practice you will find expansion vessels with the water connection on bottom, and with the connection on top. In this white paper we want to expose what philosophies are behind the position of the water connection.

### Bladder type expansion vessels

The bladder type expansion vessels have a bladder to separate the water from the gas cushion. These type of tanks must have a water connection at or close to the bottom of the vessel. Other positions may result in trapped water inside the vessel under normal working conditions.



Most modern expansion vessels with a bladder keep the water inside the bladder, resulting in a gas cushion between the bladder and the tank's construction material. Water will not come into contact with the steel body of the tank. In that situation the weight of the water inside the bladder is causing a load to the neck of the bladder. This reduces the life time, so the upright position of the water connection is not preferred with bladder tanks.



### Fixed / Cup type vessels

These vessels have a membrane/diaphragm, mostly shaped as a cup, to separate the water from the gas cushion. These diaphragms are fixed in the tank and are not replaceable. In this construction the water is in contact with the non-coated inner steel wall. For this type of tanks the place of the water connection can be determined freely: on or close to the bottom, or on top of the tank.



The Flexcon vessels have the water connection on top. This construction is not by accident and has vast technical benefits towards a water connection in the bottom area:

### *Trapped air*

When the water connection is situated at the bottom part of the vessel, gasses may enter the tank simultaneously with water. Free gasses will rise and get trapped, especially in the space where the diaphragm is clamped to the tank.

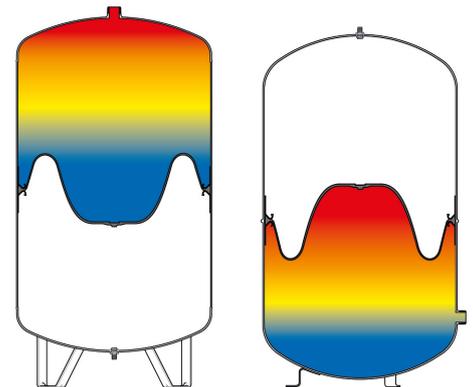
There is no way to remove these gasses and air vents and air separators will not get it out. Due to pressure changes and movement the diaphragm, air and water will alternate each other. This is a perfect condition for corrosion and must be avoided.

For these kind of vessels it is a technical advantage to have the water connection on top. Air will rise, and will not be trapped in the vessel. The mild steel vessel wall will only come in contact with water, not with air, which prevents further corrosion

### *Heat exposure to diaphragm*

Another important advantage is that the hot water will not come into direct contact with the diaphragm. Hot water has a higher specific volume than cold water so this will be at the upper side of the vessel. In case of a water connection on top, the hottest water will stay at the top part, and will not come into contact with the diaphragm.

When the water connection is on the bottom, the hot water will move upwards, towards the diaphragm. Due to the heat exposure to the diaphragm, the diaphragm material will age faster.



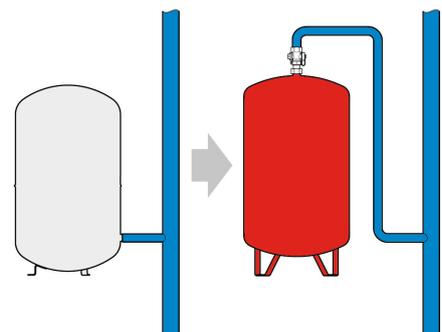
### *Easy installation*

A vessel with a water connection on top allows the pipework to be fitted easy and avoids piping on or near the ground. This will prevent people standing on the pipes and by that cause damage to the pipework. By means of a Flexcon connection group, the expansion pipe can be fitted horizontally. On the pressure gauge of the connection group the pressure behaviour of the installation can easily be checked.

Vessels with the water connection on top have a gas valve hidden under the vessel. In this position it is not likely that unauthorised persons accidentally remove (a part of) the gas pre-charge, which is a general reason for problems in the pressure maintenance / installation.

## **Replacement from bottom connection to top connection**

If a competitor's vessel with low water connection must be replaced by a Flamco vessel, it can be done e.g. by means of a thin walled tube from bottom to the top of the Flamco connection as per sketch. Depending on the vessel size a certain minimum diameter is prescribed according to EN 13831. This concerns the minimum water connecton at the vessel.



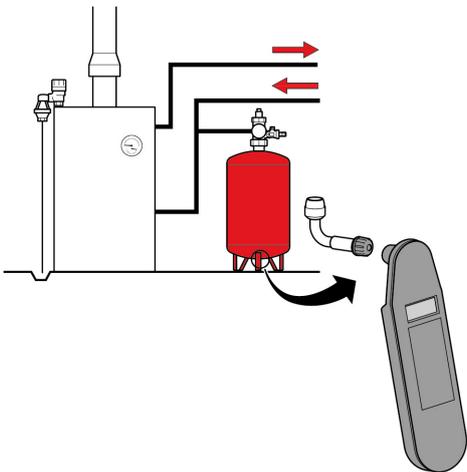


In several countries it is common use to have the expansion line in the same diameter as the connection of the vessel. This is however not obligatory. A 600 liter expansion vessel with DN 25 connection may be connected with a DN 20 expansion line according to the standard.

## Annual check

To monitor the vessel's performance, and estimate its condition, it is advised (VDI 4708) to annually check the precharge. Using a connection group (e.g. Flexcontrol) this can be done very easily:

- Connect a drain hose to the drain port,
- Turn the valve to shut off the expansion tank from the system and drain the water from the vessel,
- Check the pre-charge,
- Turn back the valve,
- Remove the drain hose.



## Even more convenient

The use of gas valve adapter (GVA 90) is even more convenient. This tool may be connected immediately when the vessel is placed on site and simplifies the annual pre-charge check considerably.

## Flexcon with water connection on top

The Flexcon with the water connection on top has several advantages:

- There will be no trapped air inside the vessel,
- There is no heat exposure to the diaphragm,
- It is easy to install,
- Annual checks are done at ergonomic working height.

## End-of-life disposal

Due to the very long life time of a Flexcon vessel (compared to our main competitors), it is less often required to exchange the vessel.

In case the diaphragm is broken and water is at the bottom of the vessel, it can be removed through the gas valve hole, or when quicker drainage is needed some holes may be drilled in the steel shell. (as the vessel is defect already).



**Flamco**

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**If you have any further questions, please contact:**

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a world leader in its field. Flamco has seven production locations and supplies successful and innovative products to the installation industry in more than 60 countries. Our three basic principles always come first: high quality, excellent service and sound advice.



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