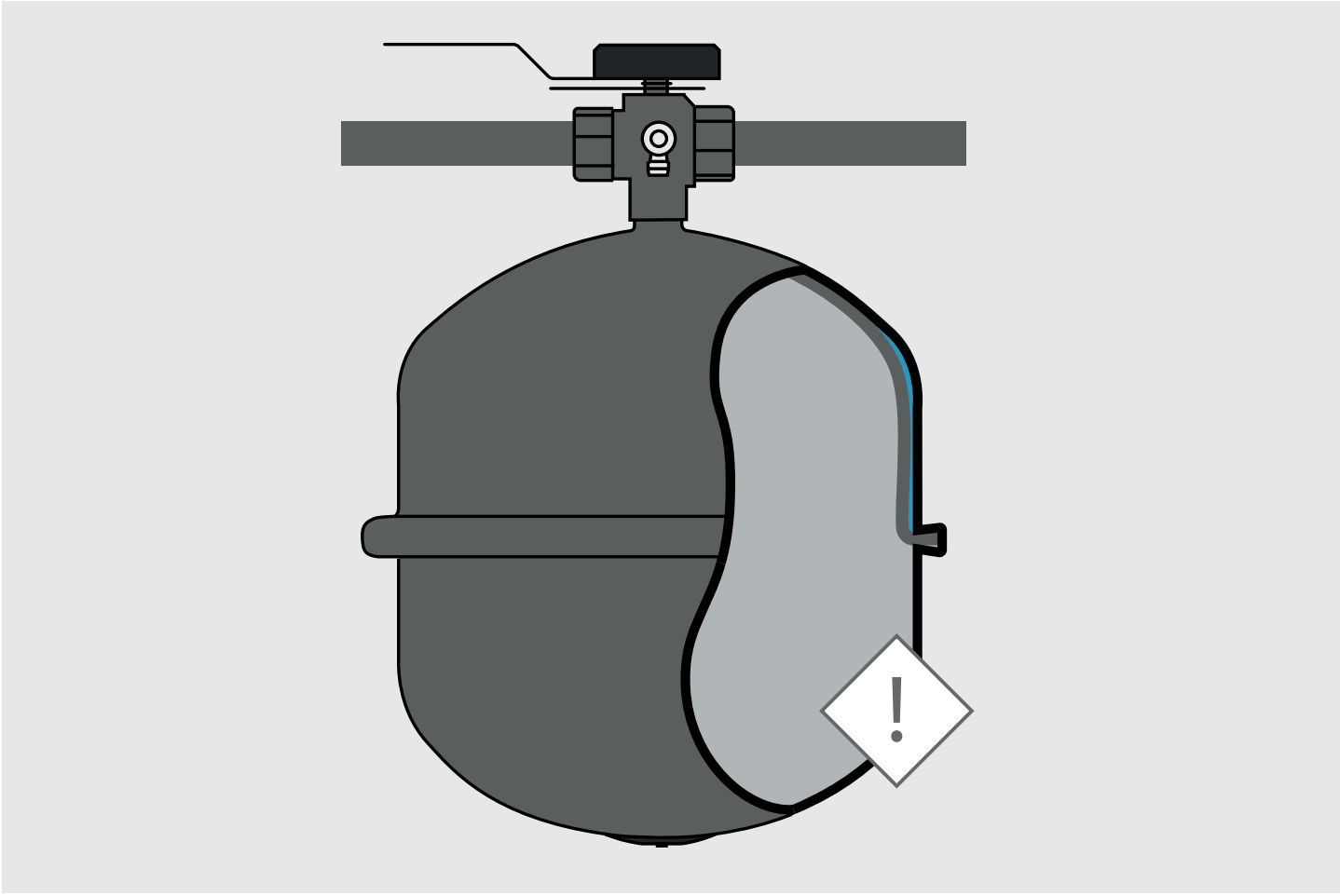
risycard

RICA 10 - Pre-pressure



RISK OF OXYGEN ENTRY

The incorrect gas fill pressure (pre-pressure) is often the cause of corrosion damage, especially in connection with automatic air vents (see RICA 01).
Too high a pre-pressure is just as wrong as too low, and even a correct pre-pressure can quickly become too low due to pre-pressure loss.
The loss of pre-pressure is often compensated for by unnecessarily adding water instead of correcting the gas fill pressure. In practice, it is by far the most common cause of corrosion damage.

OPERATION

Variable pressure expansion vessels (with a fixed gas charge) must maintain the pressure within predetermined limits by taking in and returning the system water due to thermal expansion and contraction.

If the pre-pressure is not correct, the system pressure will increase too much and the safety valve opens. After cooling (and contraction) the pressure drops too low and the automatic air vents will start drawing in air at the highest point (Risycard01). To ensure correct operation, the pre-pressure of the expansion vessel must therefore be set correctly. Too low is as wrong, as too high.

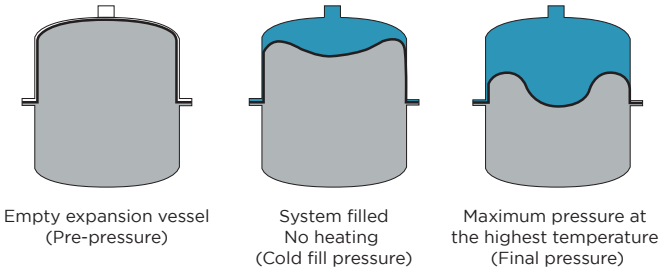
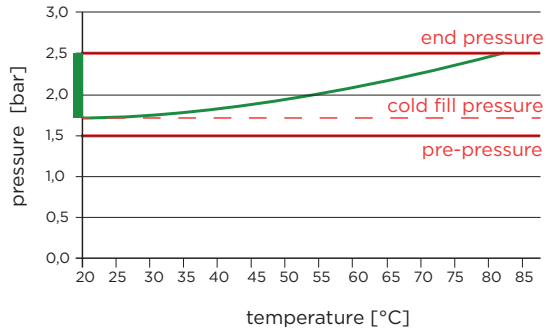
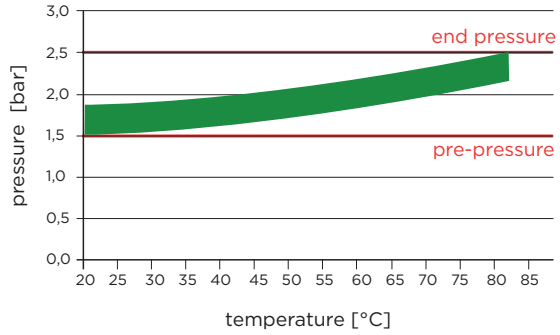


Fig. Various conditions of a variable pressure expansion vessel

The green zone of the pressure gauge and the TP graph indicate the limits within which the gas cushion of the expansion vessel will accommodate the expansion of the system water (see also RICA 02).



An oversized expansion vessel offers a lot of safety margin, because of the extra water reserve, but especially because the TP graph becomes a wide zone instead of a narrow line:



In order to be able to measure the pre-pressure, the vessel must be empty, for example before it is installed. Once connected, or in a working system, the expansion vessel must first be emptied on the water side using the shut-off and drain valve or the lock shield valve specifically intended for this purpose. Nitrogen or dry compressed air can be added or vented as required. The correct pre-pressure (P0) is:

P0 = Hst/10 + 0.2 bar, where Hst is the static height.
The static height is the height of the installation, between the connection point of the expansion vessel and the highest point, measured in meters of water column.

RISK OF OXYGEN ENTRY

If the pre-pressure is too low, the expansion vessel can no longer keep the installation completely filled with water after cooling. **As a result, air will be drawn in at the highest point.** In such a case, adding water to pressurize the installation sufficiently will cause the expansion vessel to absorb such a large amount of water that, when heated, there is insufficient space for expansion. The pressure in the installation will rise too much and the safety valve will open.

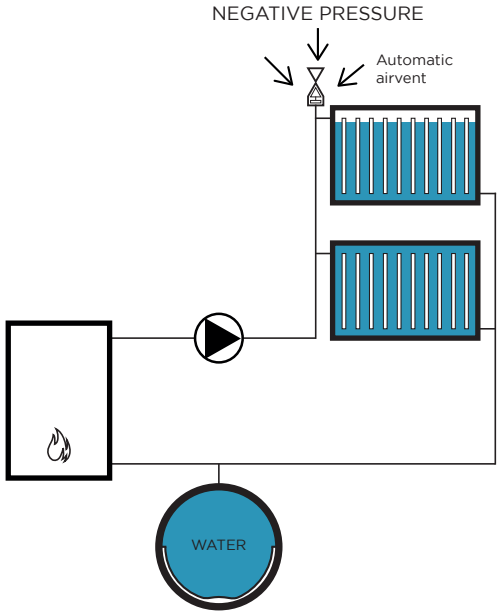


Fig. pre-pressure too low

Too high a pre-pressure causes a similar effect: the required compression of the gas cushion by the expanding water can no longer occur sufficiently, which could open the safety valve. Or, after cooling, the expansion vessel will no longer contain water and will therefore not be able to maintain the minimum required system pressure:

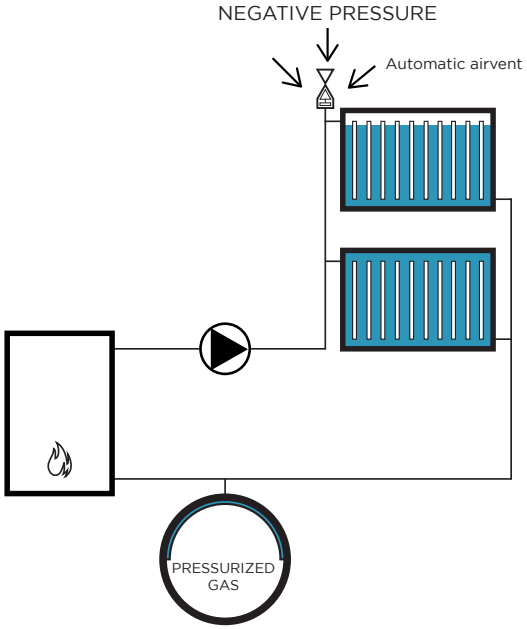


Fig. pre-pressure too low

DID YOU KNOW

Expansion vessels lose their pre-pressure over time, comparable to a car or bicycle tire, because the rubber membrane is slightly permeable to gas (permeation). That is why an annual check of the gas pressure is necessary, since the expansion vessel protects against the intake of air at the highest point (see Risycard 01).

With some expansion vessels, the gas pressure loss is so high (up to 75% per year!), that even an annual check is not sufficient. Some manufacturers even prescribe that the pre-pressure must be checked every 6 months. The use of such expansion vessels is strongly discouraged. If you want reliable, trouble-free operation for a long time, then choose high-quality expansion vessels with low pre-pressure loss.

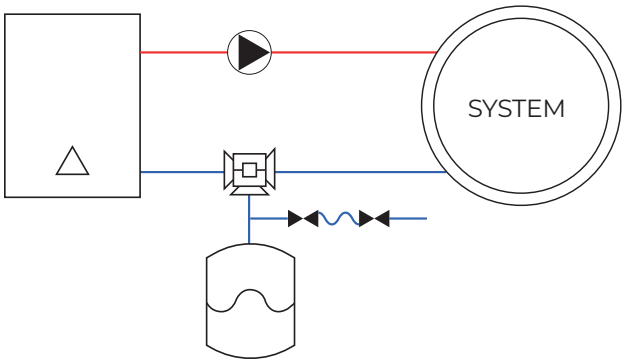
There are several case studies available from Resus that illustrate the Risks covered in the Risycard series.

THE IMPORTANCE OF RISYCOR

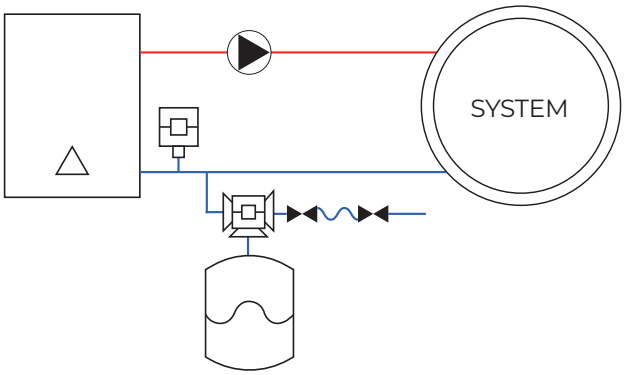
For the correct installation of a Risycor, please refer to the Application Guideline.

For a good follow-up of the entire installation, the recorded data should be checked using the Resus dashboard at least once a year.

≤ 70 kW



> 70 kW



ABOUT US

Resus is the manufacturer of Risycor, a system for continuous corrosion monitoring in closed heating and cooling systems. Like a smoke detector, a Risycor is an early warning system that prevents problems by providing an early warning.

Corrosion is ALWAYS the result of oxygen ingress, which in 90% of the cases
Is the result of poor pressure control. The remainder of the cases are often the result of failing risk components. Read more about this in our Risycards and Risybasics.
The application of Risycor is explained in the Risycor Application Guidelines.

READ ALSO

RICA 01 - automatic air vents
RICA 02 - green zone
RICA 03 - neutral point
RICA 04 - failing air non return valve
RICA 05 - oxygen diffusion open bladder
RICA 06 - breakdown of PWH water
RICA 07 - oxygen diffusion
RICA 08 - content indication constant pressure
RICA 09 - clopen systems
RICA 10 - pre-pressure

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