

## EN - INSTRUCTIONS FOR THE USER

### 1. DESCRIPTIONS AND USE

ZILMET expansion vessels with fixed and interchangeable membrane are manufactured according to the safety essential requirements of 2014/68/EU Directive (PED). These instructions for use have been prepared in accordance with the purpose of the article 3.4 of Annex 1 of 2014/68/EU Directive and are enclosed with the product when placed on the market. All the expansion vessels incorporate a flexible synthetic diaphragm to prevent the contact between the system water or fluid and the sealed air cushion in the tank. The expansion vessels which these instructions refer to have been designed and manufactured for the purposes listed in the table at page 2.

### 2. TECHNICAL CHARACTERISTICS

The technical characteristics of the expansion vessel are written on the identifying label applied to each product; among them, the most important information are: product identification, expansion vessel volume, maximum working pressure and temperature (please, see the table at page 2), pre-charge pressure (factory set or user set), production year, serial number. The table shows the general technical characteristics of expansion vessels: in particular, the values of the maximum working temperature and the maximum working pressure shown in this table must be intended as maximum working parameters for the systems in which the expansion vessels are installed.

Any use at sustained or instantaneous pressure and temperatures exceeding the prescribed limits is **UNSAFE** and can cause reduced expansion vessel life, property damage, serious scalding and/or bodily injuries or result in death. The expansion vessel may be utilised in systems having a maximum working temperature as in the table, providing all the means that ensure the temperature on the expansion vessel is 70 °C (100 °C for solar vessels only) at maximum (installation in the coldest part of the system, thermostatic control and so on). About the minimum temperature, the expansion vessels may work, using proper antifreeze as ethylene glycol (with a percentage up to 50%), at a temperature not lower than -10 °C. Due to the toxicity of such substances, these expansion vessels cannot be used for the production and storage of sanitary/potable water. Moreover, all the proper means and precautions for avoiding dispersion in the environment and possible poisoning must be adopted. Please, refer to local safety, occupational, health and environmental codes and standards.

**ATTENTION - Before the installation, it is mandatory to calculate and to choose the correct type of expansion vessel according to the system design, specifications, instructions and operation requirements. Only qualified and licensed technicians may perform the calculation and the choice of the expansion vessel according to local codes and standards. Only qualified and licensed personnel may install, commission and service this equipment in accordance with system design, specifications and instructions, operation requirements and local thermal, plumbing, and electrical codes and standards. Moreover, all local safety, occupational, health environmental and whatever other applicable codes and standards must be followed. Please, pass these instructions onto the personnel in charge for installation, operation and service. All instructions must be carefully read before installing this expansion vessel. After the installation, these instructions must be kept for future reference.**

### 3. WARNINGS

- **The system in which the expansion vessel is installed must have a pressure-limiting device (pressure relief valve).**
- The label is firmly applied to the expansion vessel and must not be removed, tampered or changed.
- If the label on the ZILMET expansion vessel is missing or the technical characteristics on the ZILMET label are not readable, please do not install the expansion vessel: please contact directly ZILMET by phone at +39 049 7664901 or by e-mail at [zilmet@zilmet.it](mailto:zilmet@zilmet.it)
- To prevent corrosion due to stray and galvanic currents, the system must be grounded properly according to local electrical and plumbing codes and standards and, if needed, the expansion vessel may be provided with dielectric joints after evaluating carefully the characteristics of the installation.
- Other possible causes for pin holing and corrosion phenomena must be considered, for instance, water characteristics (included its temperature), presence of oxygen, melted salts, the use in the same system of devices made of different materials (e.g. carbon steel and stainless steel, carbon steel and copper). All these factors must be considered by the manufacturer of the complete system and by the personnel in charge for the installation and maintenance, taking into account also all the local plumbing, electrical and safety standards and regulations.
- Do not use the expansion tank with the following substances or mixtures:
  - chemicals, solvents, petroleum, acids, bases, sea water, thermal water or any other substance that could damage the expansion vessel,
  - classified according to Table 1.1, part 1.1.2 of Annex VI in Regulation (EC) N° 1272/2008, especially with fluids classified as explosive, extremely flammable, flammable, highly toxic, toxic and oxidising.
- Do not use this expansion vessel with water containing sand, clay or other solid substances that may damage the expansion vessel (particularly the internal coating) and/or clog its connection.
- Proper means must be provided for preventing the air from accumulating, during the working of the plant, in the chamber of the expansion vessel (water side) connected to the system.
- The expansion vessel and the connected system must be protected against below freezing temperatures, for instance using proper antifreeze or installing the expansion vessel in suitable areas.
- Do not use this expansion vessel for any other purpose that it has been intended for.
- **The expansion vessel, piping and connections may in time leak. Therefore, it is necessary to install the expansion vessel in a suitable technical room, which must be provided with adequate system to drain and discharge so that any leakage will not damage the surrounding area and will not cause scalding injuries. The manufacturer shall not be responsible for any water damage to people and/or things and properties in connection with this expansion vessel.**
- The manufacturer of this expansion vessel shall not be responsible for any possible damage to things and property and/or injuries to persons due to improper transport and/or handling of the tank itself.
- As in all plumbing products, bacteria and/or other harmful microorganisms can grow in this expansion vessel, especially during not-use times. The local plumbing official and the competent authorities must be consulted regarding any step the personnel in charge for service and maintenance takes to safely disinfect the plumbing system.
- It is forbidden to drill, open, heat with flames or tamper with the expansion vessel in any way.
- Attention, for the pressure tanks which have the upper connection, please note this is opened to allow for the installation of a three-way connection on which a manometer and a pressure relief valve may be installed.
- Should it be necessary to change the factory pre-charge, only specialised technical personnel should calculate or determine the new pre-charge. The calculation must ensure that, for all foreseeable working conditions, the specified limits (particularly the maximum working pressure) are never exceeded and local codes and standards are observed. In any case it is advisable the pre-charge does not exceed 50% of the maximum working pressure: the new value of the pre-charge pressure (user set) must be written on the fit space on the label.
- Make sure that the system layout allows for future maintenance and provides sufficient working space around the system to allow for replacement of components whenever necessary.
- The disposal of the expansion vessel must be done only at selective waste collection authorised centres, according to the local codes and standards.
- If vibration is likely to occur in the vicinity, proper means must be provided to insulate the expansion vessel from vibrations (e.g. installation on a resilient mount).

### 4. GENERAL INSTRUCTIONS FOR INSTALLATION

- Make sure that all the suitable and required lifting and transport means are used and all the precautions are adopted when positioning and installing this expansion tank.
- Do not install this expansion vessel outdoors, but only in closed and well aerated areas, far from heat sources, electric generators and any other source that may be detrimental to the expansion vessel itself.
- Depending on the model, the weight of the expansion vessel filled with water is supported by the system piping. Therefore, it is important that, where appropriate, the piping has suitable bracing (strapping, hanger, brackets). Moreover, if the expansion vessel has not a support base and is installed horizontally, it must be properly supported.
- Shut off the electric power and the water supply to the system. **Make sure the system is cooled and not pressurised for avoiding scalding and/or serious bodily injuries.**
- Before the installation, remove the plastic cap on the air valve of the expansion vessel and check for the correct factory set pre-charge (with a tolerance of  $\pm 20\%$ ) with a controlled manometer. Adjust the tank pre-charge to the required value; replace and tighten the plastic cap on the air valve.
- Install the expansion vessel at the point specified by the system design, specifications and instructions, preferably in vertical position and with the connection in downward direction (please, see the diagram) and in the following positions:
  - in closed hydraulic heating systems (fig. 1) and refrigeration systems (fig. 4), on the return piping
  - in systems for the production of sanitary hot water, on the cold side at a point between the water heater and the back-flow preventer, check valve or pressure reducing valve (fig. 2)
  - in pump systems for storage and lifting of sanitary/potable water, after the back-flow preventer at the exit of the pump (fig. 3)
- After the installation of the expansion vessel and the re-start of the plant, check it for leakage and remove all air from the system. Check to make sure that the system pressure and temperature are within a safe operating range; if necessary, remove system water to bring the system pressure within safe limits and/or adjust the temperature control up to the desired ending temperature.
- Do not over-tighten the threaded connection.

**Please, note the above-described installation is just a reference procedure and for this reason must be used taking into account the specifications and instructions of the system on which the expansion vessel is installed, the system design, the operation requirements and the local codes and standards.**

### 5. MAINTENANCE - Please, note that only qualified and licensed personnel may perform service and maintenance.

- To perform maintenance and control, make sure the system is off, cooled and not pressurised, all the electric parts are not energised, and the expansion vessel is completely empty
- At least once every six months the expansion vessel must be checked, verifying that:
  - the pre-charge is within the value indicated on the label (factory pre-charge or customer set pre-charge) with a tolerance of  $\pm 20\%$ , if not otherwise stated
  - no leaks, corrosion phenomena, or other types of damage (such as damage to the connection and/or the pre-charge valve, deformations, swellings, dents in the vessel body, damage to the external coating, scratches, etc.) are present; in this regard, the technician in charge shall perform a thorough visual inspection of the entire vessel.

The results of the above checks, along with those performed upon installation and commissioning of the system, must be recorded by the technician; in the absence or incompleteness of such records, Zilmet will not accept any liability and no type of charge may be attributed to Zilmet in the event of disputes, including legal/insurance disputes.

If the above controls have a negative outcome, the technician in charge must take immediately appropriate measures, including the replacement of the vessel.

The replacement of the vessel is also required if the periodic controls provided by legislation, regulations and norms, valid in the place of installation, have not been carried out.

- For a longer life of the expansion tank external protection, a periodical external cleaning shall be performed, only using water and soap.
- This expansion vessel includes components which undergo stresses; in the case such components should deteriorate in time, the expansion vessel must be replaced.
- Use only ZILMET original spare parts.

ZILMET shall not be responsible for any damage to things, property and/or injuries to persons due to not observing all the above instructions and, particularly, to improper calculation and choice, installation, operation and maintenance of the tank itself and/or the connected system.

### TECHNICAL CHARACTERISTICS

Drawing	Family	V (L) / Pmax (bar)	Tmem (1)	Tmax (2)	Application (3)
521 / 521 XL / 531 / 522 / 541	521 / 521 XL / 531 / 522 / 541	3 bar	70 °C	90 °C	H - R
537 / 537 XL	537 / 537 XL	3 bar	70 °C	90 °C	H - R
539 / 539 XL	539 / 539 XL	3 bar	70 °C	90 °C	H - R
637/L	637/L	3-4 bar	70 °C	90 °C	H - R
564	564	8 / 10 bar	70 °C	99 °C	SW - H
20013	CAL-PRO	4 - 8 L / 5 bar 12 - 50 L / 4 bar 80 - 900 L / 6 bar	70 °C	99 °C	H - R
20014	ULTRA-PRO	8 - 500 L / 10 bar 24 L / 8-10 bar 750 L / 8-10 bar 1000 L / 6-8-10 bar	70 °C	99 °C	P - SW - H
20015	ULTRA INOX-PRO	10 bar	70 °C	99 °C	P - SW - H
20016	HYDRO-PLUS E / HYDRO-PRO / HYDRO-PLUS / EASY-PRO	10 bar	70 °C	99 °C	SW - P - H - R
20016	SOLAR	10 bar	100 °C	110 °C	S - H
20018	INOX-PRO	0.16 L / 15 bar 0,5 - 18 L / 10 bar	70 °C	99 °C	SW - P - H
20020	ULTRA-PRO 16bar	16 bar	70 °C	99 °C	P - SW - H

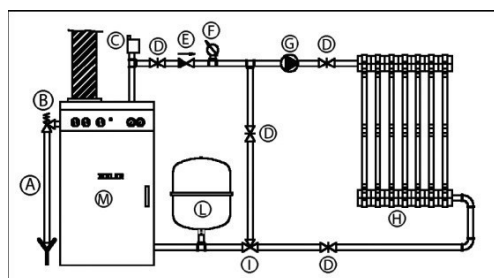
(1) Maximum operating temperature of the membrane

(2) Maximum operating temperature of the system

(3) H = heating, R = refrigeration, S = solar, SW = sanitary/potable water, P = pumps/water lifting

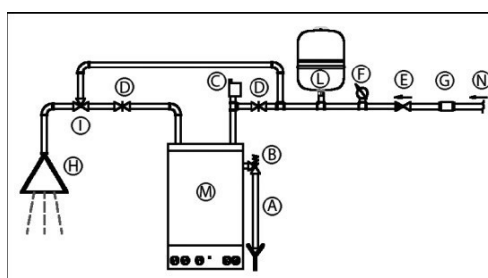
Note: for updated technical characteristics, please refer to the label on the vessel.

FIGURE 1 - INSTALLATION H



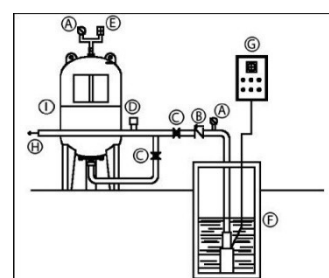
- A Draining
- B Safety valve
- C Air bleed valve
- D Gate valve
- E Backflow preventer
- F Manometer
- G Pump
- H Utilities
- I Mixing valve
- L Expansion vessel
- M Boiler

FIGURE 2 - INSTALLATION SW



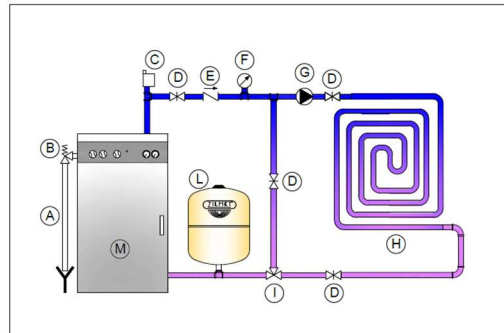
- A Draining
- B Safety valve
- C Air bleed valve
- D Gate valve
- E Backflow preventer
- F Manometer
- G Shutoff valve
- H Utilities
- I Mixing valve
- L Expansion vessel
- M Water heater

FIGURE 3 - INSTALLATION P



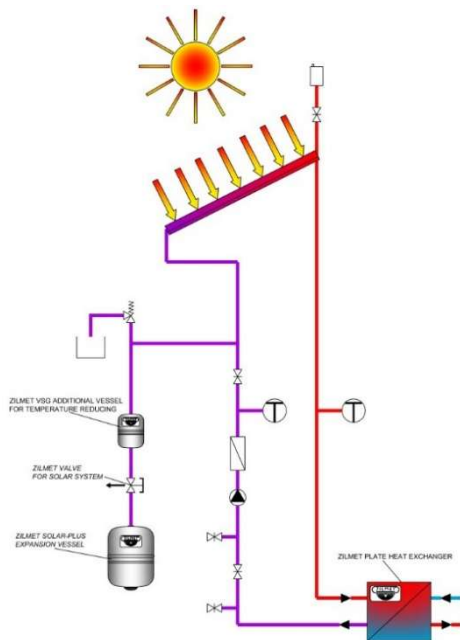
- A Manometer
- B Backflow preventer
- C Ball valve
- D Pressure switch
- E Safety valve
- F Basin with submerged pump
- G Switch board
- H Water system
- I Interchangeable membrane pressure tank

FIGURE 4 - INSTALLATION R



- A - Scarico- Draining
- B - Valvola di sicurezza - Safety valve
- C - Sfiato d'aria - Air bleeder
- D - Valvola a saracinesca - Gate valve
- E - Valvola di ritenuta - Backflow preventer
- F - Manometro - Pressure gauge
- G - Pompa - Pump
- H - Utilizzo - Utilities
- I - Valvola miscelatrice - Mixing valve
- L - Vaso di espansione Zilmet - Zilmet expansion vessel
- M - Chiller / pompa di calore - Chiller / Heat pump

FIGURE 5 - INSTALLATION S



#### INSTALLATION IN SOLAR SYSTEMS

For installation and operation review the system norms. The solar vessel must be installed on the solar collector's feed line using a suitable temperature-resistant solar ball valve with a shut off to the system.

The maximum working temperature in the membrane cannot exceed 100 °C. This can be achieved by installing a temperature control system or using a vessel for compensating temperatures (type ZILMET VSG).

The solar vessel must be installed in frost-free areas and have no direct heat.

During the start-up, the pre-charge of the vessel must be adjusted according to the system data and must be written on the label.

When checking the systems pressure, the maximum working pressure of the solar vessel must be considered and, if necessary, the solar vessel must be separated from the system.

**The use of proper anti-scale and corrosion inhibitors additives is required in solar systems**

#### SPECIAL PRESCRIPTIONS FOR SOLAR VESSELS

Do not insulate the connecting pipe or the solar expansion vessel. Beware: this can get hot. Therefore, precautions should be taken to ensure that access to this equipment is restricted. Do not install where children are present or may be present.

#### Maintenance notes for solar vessels

When the solar expansion vessel is connected to the system using a butterfly solar valve, please follow these instructions before checking the gas pre-charge:

- 1) close the knob and open the drain nipple to completely drain the tank, then check the pre-charge pressure;
- 2) after checking the pre-charge pressure, close the drain nipple and open the knob.

**When opening the drain nipple of the butterfly valve to drain the solar expansion vessel, please note that the solar fluid coming out from the butterfly valve may be hot: therefore, precautions must be taken to avoid property damage, scalding and/or bodily injury.**

When rinsing the solar system, the solar vessel must be separated from the system by closing the ball valve outlet, thereby preventing dirt particles from entering the solar vessel. Dirt particles may cause damage to the membrane or corrosion.

**Pay particular attention to the fact that the solar fluids may undergo to chemical degradation (pH lowering) due to thermal effect, causing corrosion of the tank and of other parts of the system.** This may happen also when the system is not working, due to the stagnation of the fluid in the solar panels. The personnel in charge of installation, commissioning and maintenance must consider this possibility and must follow the instructions of the supplier of the solar fluid regarding periodical substitution of the fluid itself and/or adding proper additives to the system.