

SOLAR EXPANSION TANK SAG



Product description SAG

SAG tanks are used in solar heating systems to keep system pressure constant. Before starting up the system, adjust the tanks to align with system pressure.

After delivery (as soon as the SAG has been filled with 2 bar), the tank should be installed as soon as possible. Storing any SAG at a pressure of more than 2 bar for an extended period is not recommended. Transporting tanks filled with 200 litres at a pressure over 2 bar for long distances is not recommended! Tanks are available for solar systems with areas of 6 to 200 m². SAG tanks are mounted in either a hanging or standing position, depending on size. Tank connection couplings and a variety of mountings and corrugated connecting hoses are available as accessories.

General information

| | |
|---|--|
| Max. supply system forward flow temperature | 120°C |
| Min. operating temperature (with appropriate anti-freeze) | -10°C |
| Max. continuous operating temperature at the membrane | 70 °C for DIN version, 99 °C for non-DIN versions |
| Max. operating pressure | 6-10 bar |
| Proportion of glycol in water | Max. 50% |
| Membrane | Butyl or EPDM, cannot be replaced, in accordance with DIN 4807 from the SAG-50 half membrane at tank centre to the SAG-33 full membrane on the flange above the connection |
| Gas chamber | Nitrogen (fluid group 2 in accordance with RL97/23/EU) |
| Water chamber | Powder-coated steel plate |
| Colour | Red |
| Inner coating | None |
| Type of connection | Male |
| Initial pressure on delivery | 2 bar |
| Protective caps | On connection and valve |

MAINTENANCE AND DISASSEMBLY OF SOLAR EXPANSION TANK SAG

Maintenance

Yearly maintenance is required. External check: Is there visible damage (e.g. corrosion) on the SAG? When in doubt, call SAG service for large tanks and exchange small tanks. Membrane check: actuate the nitrogen valve; if water leaks out, replace the SAG.

Water quality check

Requirements for closed heating and cooling circuits must be met.

Pressure setting

Run the system at a constant temperature and monitor it.

1. If the pressure in the SAG is > 4 bar, shut off the water side. Then reduce the pressure at the gas valve to 4 bar.
2. Empty the tank on the water side and set initial pressure p_0 (see start up for gas filling valve) and, if a gas pressure gauge is installed, check it for leak tightness. When performing maintenance on the gas filling valve, also empty the tank on the gas side. Set fill pressure p_F (see start up information); set final pressure (see start up information).
3. The SAG is now ready for operation.

Disassembly

Depressurise the SAG before checking or disassembling either the tank or parts that are under pressure.

1. If the pressure in the SAG is > 4 bar, shut off the water side. Then reduce the pressure at the gas valve to 4 bar.
2. Empty the tank on the water side
3. Depressurise the tank on the gas side using the gas valve. Refill (see start up information). If these instructions are not followed, the membrane can be destroyed.

Check before start up

Always follow the respective national regulations for operating pressurised devices. In Germany follow § 14 of the Ordinance on Industrial Safety [Betriebssicherheitsverordnung] and in particular, § 14 (3) no. 6.

Time periods for performing required checks

The SAG is classified under Diagram 2 in Appendix II of Directive 97/23/EU and the recommended maximum time periods for performing required checks (in Germany, § 15 of the Ordinance on Industrial Safety is taken into consideration): This applies when the SAG assembly, operation and maintenance instructions are strictly observed and when operating the tank with pressure and forward flow temperature fluctuations is comparable to weather-compensating operation. External checks: not required under § 15 (6); internal checks:

- **Within the maximum period in accordance with § 15 (5) for 'SAG N, S, F' appropriate measures in terms of replacement must be taken (e.g. measurement of wall thickness and comparison with design specifications, which can be requested from the manufacturer) or**
- **Within the maximum period in accordance with § 15 (5) for 'SAG A, E, G' with bladder membrane, documentation of annual maintenance work.**

Rigidity test: Maximum period in accordance with § 15 (5) and, if applicable, in connection with § 15 (10). The operator must set the actual periods based on an analysis of technical safety and in consideration of actual operating conditions, experience with operating methods and filling material(s) and in accordance with the applicable national regulations for operating pressurised devices.

SAFETY INFORMATION FOR SOLAR EXPANSION TANKS, SAG

General safety information

SAG membrane-pressure expansion tanks are pressurised devices. A membrane separates the tank into a water chamber and a gas chamber with a pressure buffer. The conformity declaration in the appendix confirms compliance with Directive 97/23/EU.

The scope of the assembly group can be found in the conformity declaration. The technical specifications selected for compliance with the basic safety requirements in Appendix I of Directive 97/23/EU can be found on the type plate or the conformity declaration.

Assembly, operation, check before start up, recurring checks

in accordance with national regulations; in Germany, in accordance with the Ordinance on Industrial Safety. Accordingly, assembly and operation are to be carried out according to state-of-the-art methods by technical specialists and specially trained staff.

The operator is to arrange for the required checks before start up and after significant modifications to the system as well as the recurring checks in accordance with the requirements of the Ordinance on Industrial Safety. See the "Inspections" section for the recommended times for performing required checks. Only SAG tanks without visible external damage on the pressure hull may be installed and operated.

Modifications to SAG tanks

e.g. welding or mechanical reshaping are not permitted. When replacing parts, only original parts from the manufacturer may be used.

Complying with parameters

Information regarding the manufacturer, year of manufacture and manufacturer number as well as specifications can be found on the type plate. Appropriate technical safety measures must be taken to ensure that operating values do not exceed or fall below the specified maximum and minimum operation parameters (pressure, temperature).

Measures must be taken to ensure that the permissible operating overpressure on both the water and gas sides is not exceeded during operation or during filling on the gas side. The initial pressure p_0 may never exceed the permissible operating overpressure. When filling the tank, an inert gas, e.g. nitrogen, must be used.

Corrosion, incrustation

SAG tanks are made of steel, coated on the outside and rough on the inside. Wear allowance (addition material for corrosion allowance) is not included. The tank may only be used in atmospherically closed systems with water that is not corrosive and does not contain aggressive chemicals or poisons. During operation, ensure that the entry of oxygen into the entire heating and cooling water system by way of permeation, refill water, etc. is minimised. Water treatment systems must be designed, installed and operated according to state-of-the-art technology and methods.

Heat protection

The operator must post a warning sign near the SAG in case of risk or harm to persons due to excessive surface temperatures in hot water systems.

Installation location

The installation location must have sufficient load bearing capacity to accommodate the weight of the SAG when it is completely filled with water.

A drain must be provided for drainage water; if required, the addition of cold water must be provided for (see also the "Assembly" section). The tank may not be installed in areas prone to earthquakes.

Not following these instructions, and in particular, the safety instructions, can cause the SAG to be damaged or destroyed, can place people at risk and can affect its ability to function properly. If these instructions are not followed, all warranty and liability claims are excluded.

Calculating the initial pressure

Never exceed the permissible operating pressure (see type plate). The tank can burst. If the initial pressure and the system filling pressure are not correctly set, the SAG function cannot be guaranteed. Set initial pressure p_0 at the gas valve to the minimum system operating pressure.

- If necessary, reset the factory-set initial pressure p_0 to the required value (minimum system operating pressure); if the pressure at the gas valve is too high, release some gas; if the pressure is too low, add gas, e.g. from the nitrogen tank.
- Enter the new initial pressure p_0 on the type plate.
- Calculating initial pressure p_0

1. Recommended
2. Vapourising pressure for hot water systems $>100\text{ °C}$
3. Circulation pump differential pressure, **only taken into account if the SAG is installed on the pressure side of the circulation pump.**
 $p_0 \geq 1\text{ bar}$ (recommended even for lower calculated values)

$$p_0 [\text{bar}] = \frac{H [\text{m}]}{10} + 0.2 \text{ bar}^{1)} + p_D^{2)} + \Delta p_p^{3)}$$

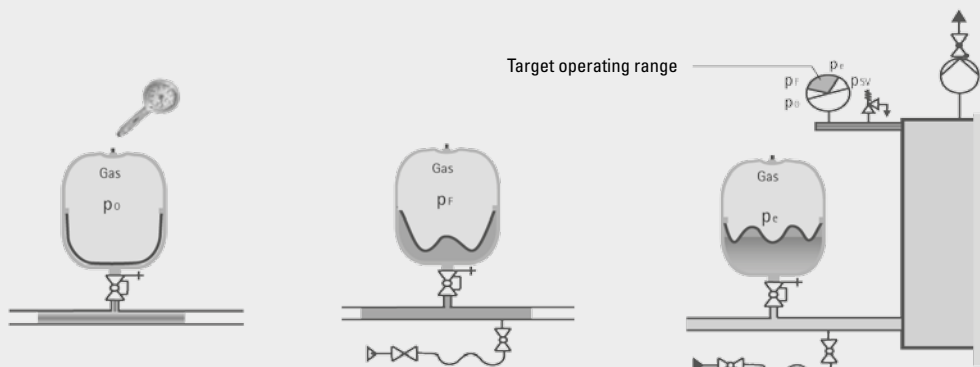
Open the shut-off valve carefully, vent the expansion line carefully and close the drain. Raise filling pressure p_f by filling from the water side. Caution: when filling from drinking water mains, national regulations for drinking water protection must be observed; in Germany, the safety instructions in DIN 1988 Part 4.

$$p_f [\text{bar}] \geq p_0 + 0.3 \text{ bar}$$

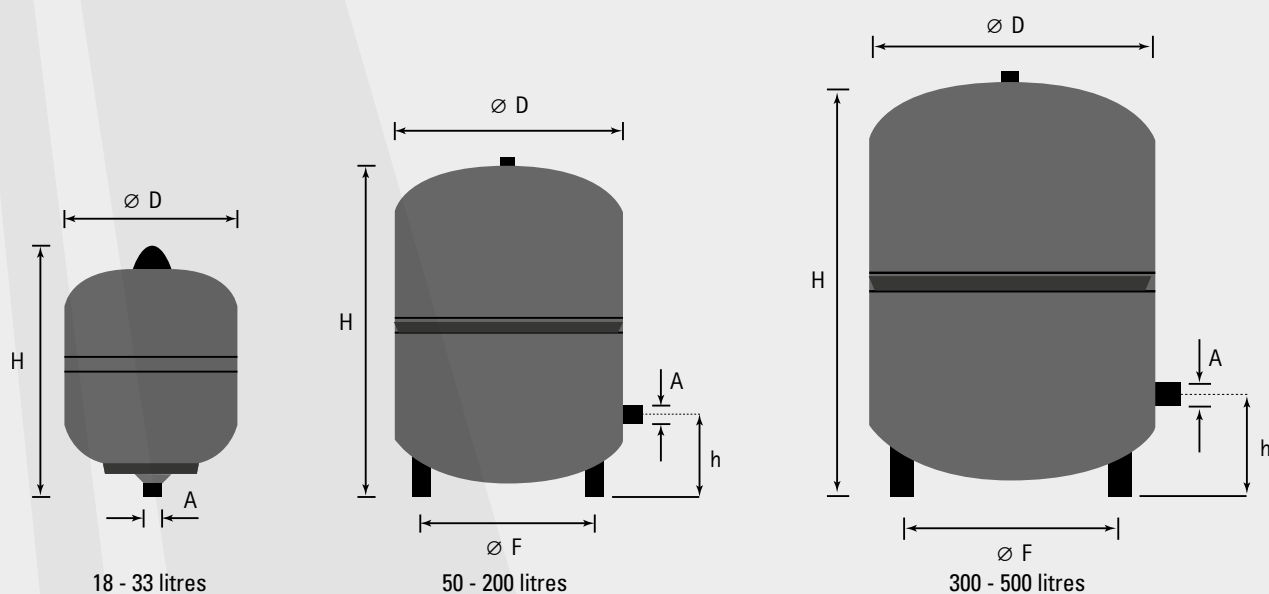
After venting, fill to final pressure p_e from the water side (e.g. heating system)

- Run the system at max. forward flow temperature (thermal degassing)
- Shut off the circulation pump; vent the system again
- Add water until attaining final pressure p_e

$$p_e [\text{bar}] \leq p_{SV} - 0.5 \text{ bar}$$



SOLAR EXPANSION TANK



Specifications

| Type | SAG 12R | SAG 18R | SAG 25R | SAG 33R | SAG 50R |
|---------------------|--------------------------------------|------------------|-------------------|-------------------|-------------------|
| Item no. | 1510733 | 1510040 | 1510041 | 1510042 | 1510334 |
| Max. collector area | 4 m ² | 6 m ² | 10 m ² | 15 m ² | 20 m ² |
| Contents | 12 l | 18 l | 25 l | 33 l | 50 l |
| Connecting size | G 3/4" with KlingerSIL flat seal | | | | R 3/4" |
| Ø D | 280 mm | 280 mm | 280 mm | 354 mm | 409 mm |
| H | 300 mm | 374 mm | 496 mm | 455 mm | 469 mm |
| h | | | | | 158 mm |
| Weight | 2.5 kg | 3.2 kg | 4.5 kg | 6.3 kg | 9.5 kg |
| Installation type | Hanging, connection pointing upwards | | | | Upright |

| Type | SAG 80R | SAG 100R | SAG 140R | SAG 200R | SAG 300R | SAG 500R |
|---------------------|-------------------|-------------------|-------------------|-------------------|--------------------|--------------------|
| Item no. | 1510044 | 1510045 | 1510046 | 1510047 | 1510049 | 1510051 |
| Max. collector area | 30 m ² | 40 m ² | 50 m ² | 70 m ² | 125 m ² | 200 m ² |
| Contents | 80 l | 100 l | 140 l | 200 l | 300 l | 500 l |
| Connecting size | R 1" | | | | | |
| Ø D | 480 mm | 480 mm | 480 mm | 634 mm | 634 mm | 740 mm |
| H | 538 mm | 644 mm | 941 mm | 758 mm | 1092 mm | 1321 mm |
| h | 166 mm | 166 mm | 210 mm | 205 mm | 235 mm | 245 mm |
| Weight | 14.6 kg | 15.5 kg | 17.4 kg | 35.6 kg | 47.0 kg | 72.0 kg |
| Installation type | Upright | | | | | |