1.

Expansion Vessels

Flamco produces a comprehensive range of diaphragm expansion vessels. Both the steel vessel and the diaphragm are of the highest quality. They are compliant with all prevailing European standards and carry the CE mark of conformity. Flamco vessels are available for both potable, chilled and heated water systems in sizes ranging from 2 litres up to 8,000 litres.

Fixed Diaphragm

Flexcon
- 2 - 1,000 litres.
- Max. operating pressure:
  3.0 bar: 2 - 35 litres,
  6.0 bar: 50 - 1,000 litres,
- For sealed systems.

Flexcon Top
- 2 - 1,000 litres.
- Max. operating pressure:
  6.0 bar: 2 - 80 litres,
  10.0 bar: 110 - 1,000 litres,
- High-pressure alternative.

Flexcon Solar
- 8 - 1,000 litres.
- Max. operating pressure:
  8.0 bar: 8 - 80 litres,
  10.0 bar: 110 - 1,000 litres.
- For sealed solar systems.

Contra-Flex
- 2 - 1,000 litres.
- Max. operating pressure;
  3.0 bar: 2 - 35 litres,
  6.0 bar: 50 - 1,000 litres
- For sealed systems.

Contra-Flex W
- 8 - 80 litres.
- Max. operating pressure;
  3.0 bar: 2 - 35 litres,
  6.0 bar: 50 - 80 litres
- White coated alternative for small sealed systems.

Cubex
- 8 - 600 litres.
- Max. operating pressure;
  3.0 bar: 8 - 35 litres,
  6.0 bar: 50 - 600 litres.
- For sealed systems.

Flexcon P
- 18 - 50 litres.
- Max. operating pressure: 3.0 bar.
- Space-saving alternative for smaller systems.

Cubex R
- 12 - 18 litres.
- Max. operating pressure: 3.0 bar.
- Space-saving alternative for smaller systems.

Cubexpak A & B
- 4 - 80 litres.
- Max. operating pressure: 3.0 bar
- For small systems.

Vesselpak A & B
- 2 - 80 litres.
- Max. operating pressure: 6.0 bar
- For small systems.

Combi Repair Kit
- 8 - 18 litres.
- Max. operating pressure: 6.0 bar
- For small systems.

Replaceable Bladder

Flexcon M
- 100 - 8,000 litres.
- Max. operating pressure: 6.0/10.0 bar.
- High-quality industrial tank.
- Larger dimensions and operating pressures available on request.

Flexcon Intermediate Vessels

Flexcon VSV
- For central heating systems in which the inlet temperature exceeds 90 °C or the return temperature exceeds 70 °C.
- Max. operating temperature: 110 °C.
- Max. operating pressure: 6.0/10.0 bar.

Flexcon V-B
- For central heating systems in which the inlet temperature exceeds 90 °C or the return temperature exceeds 70 °C.
- Max. operating temperature: 160 °C.
- Max. operating pressure: 10.0 bar.

Flexcon Pressure Expansion Vessels

The decision to select a quality Flamco diaphragm expansion vessel is justified by a long and problem-free service life.

Flamco has long stood head and shoulders above other producers of diaphragm pressure expansion vessels. However, a good brand reputation alone is not enough for sustained success in a competitive market.

Flamco's standard programme covers a wide range of expansion vessels from 2 - 8,000 liters with a wide choice of pre-charge pressures and maximum operating pressures.
All models are characterised by their construction, superior quality diaphragms or bladders, high quality coating on the expansion vessel itself and efficient production methods.

The two halves of the vessel are coated prior to assembly, not afterwards. Therefore there is no risk of corrosion on the clamp ring.

Flexcon expansion vessels are delivered in a stackable cardboard packaging with hand grip and each box contains clear assembly instructions.

Flexcon expansion vessels are always in stock at our wholesalers and our own warehouses.

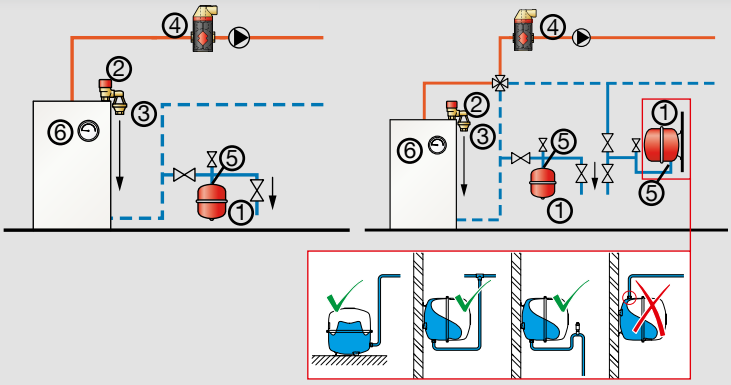
Qualified Flamco employees will be happy to give you advice and support. By phone or on location.

The extremely low permeability of the diaphragm ensures that pre-charge pressure is maintained for a long time and ensures a long service life.

FLEXCON 8 - 25

FLEXCON 2 - 4

FLEXCON 35 - 80



Systems with Flexcon expansion vessels
1. Flexcon expansion vessel.
2. Prescor safety valve.
3. Flamco tundish.
4. Flamcovent air separator.
5. Flexfast quick-release coupling or Flexcontrol.
6. Flexcon pressure gauge.

FLEXCON 110 - 1000

Flexcon diaphragm expansion vessels are made from top-quality steel and finished with a gleaming red epoxy-powder coating. The expansion vessels have a high quality diaphragm. The clamp ring is made from heavy duty, thermally galvanized steel (sendzimir).

Flexcon 35 – 80 expansion vessels are suitable for fitting to wall or floor mounting. From Flexcon 35 upwards, the diaphragm and the gas valve are protected during storage and transport by a special protection cap and a mounting kit is included.

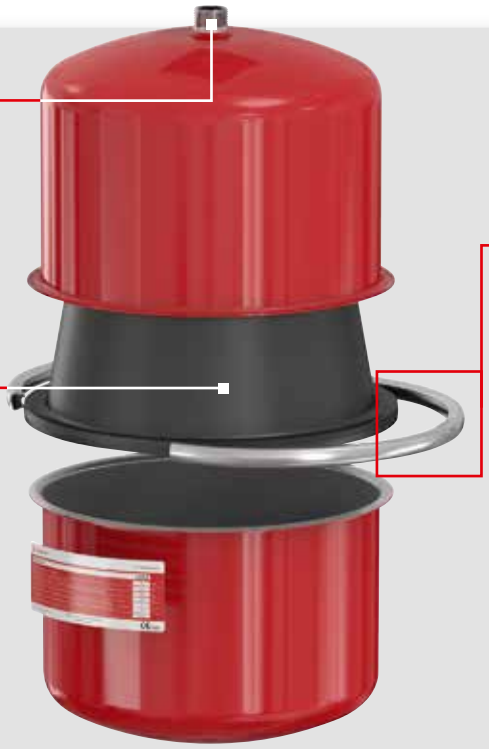
The benefits of Flexcon

- The best expansion vessels thanks to our groundbreaking technology.
- Every single expansion vessel is tested for leakage and pre-charge pressure before leaving the factory.
- Our diaphragms are suitable for use with anti-freeze.
- High quality diaphragms (SBR or butyl rubber).
- The gas side is filled with nitrogen, and not with air, so that corrosion is prevented and the pressure loss is even more limited.

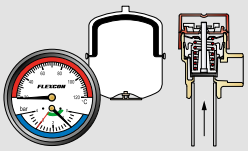
The thread of the water connection is uncoated to ensure easy and water tight installation.

The rolling action of the diaphragm prevents stretching. This has a significant impact on its service life.

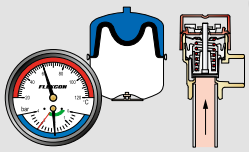
The nitrogen air valve of Flexcon 8 - 80 litre expansion vessels is countersunk on the vessel to protect it from damage, it is in turn further protected by a plastic cover plate.



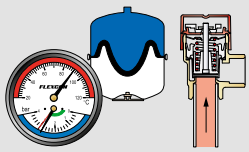
The unique clamp ring construction damages neither the diaphragm nor the two halves of the expansion vessel.



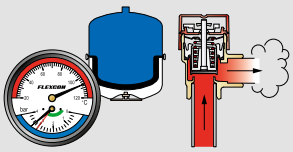
When cold, the nitrogen cushion presses the diaphragm against the wall of the Flexcon expansion vessel.



When heated, the expansion vessel partially fills with water and the nitrogen gas is compressed.



When heated further, the expansion vessel portion fully fills with water and the nitrogen gas is fully compressed.



If the pressure rises too high, the Prescor valve opens. The excess water/steam is discharged.

Sizing of expansion vessels

Calculating the size of a Flexcon expansion vessel with diaphragm or replaceable bladder in accordance with EN12828 for central heating and cooling systems, with additional information from Flamco from practical experience.

Basic concepts for calculating the size of a Flexcon expansion vessel

Expansion volume V_e
The system liquid will expand on being heated. In closed systems this leads to an increase in pressure. This increase in volume is called the expansion volume. An increase in pressure is prevented by capturing this volume in an expansion vessel. The reduction in volume on cooling is called contraction. This volume also has to be calculated with cooled water systems.

Water reserve V_v
Pressure loss resulting from leaks or degassing is compensated for by including a water reserve in the expansion vessel.

Remarks from Flamco:
- Leaks are caused for instance by sweating connections or diffusion through the pipes.

Maximum (or net) acceptance volume V_{net}
This is the maximum quantity of water that the expansion vessel can contain on the water supply side of the diaphragm or bladder.

Gross vessel volume V_{gross}
This is the total capacity of the Flexcon expansion vessel.

Static pressure P_{ST}
This is the pressure created by the static height H_{st} of the system, between the connection point of the Flexcon expansion vessel and the highest point, in metres of water column (1 metre water column = 0.1 bar).

Vapour pressure P_D
The system liquid may reach boiling point during operation as a result of the high temperatures in combination with additives. In this event, vapour pressure will also be a factor in the operation of the expansion vessel.

Pressure allowance P_Z
Pressure allowance serves to compensate for differences in tolerance in gas charges and to ensure overpressure at all times and locations in the system. Maintaining a pressure allowance of at least 0.2 bar is recommended.

Pressure difference in circulation pump ΔP_{pump}
It may be the case that system designs do not permit optimal positioning of the vessel in the return pipe. The pressure differences caused by the circulation pump may then influence the water intake of the expansion vessel positively or negatively.

Gas charge of the Flexcon expansion vessel P_0
This is the pressure, measured at the nitrogen filler valve in the unpressurised state and at ambient temperature. This pressure is determined as follows:

$$P_0 = P_{ST} + P_D + P_Z + \Delta P_{pump} \; (\geq 0.5 \text{ bar}, P_z=0.2)$$
(round up to a multiple of 0.5 bar)

Remarks from Flamco:
- As Flamco supplies standard gas charges of 0.5/1.0/1.5/2.0/2.5/3.0 bar, the gas charge calculated should be rounded up to a multiple of 0.5 bar.
- A correction ($+\Delta P_{pump}$) may be necessary if required by the hydraulic situation at the expansion vessel (e.g. placing the vessel on the pressure side of the pump).
- If a minimum operating pressure is required at the expansion vessel that is higher than the gas charge calculated (by for instance a circulation pump), this determines the gas charge instead.

Safety valve set pressure P_{SV}
The set pressure of the safety valve is the pressure that causes the valve to open to protect the system against excessive pressure. Consult the manufacturer for the accuracy tolerances of this set pressure, which may have an impact on the end pressure.

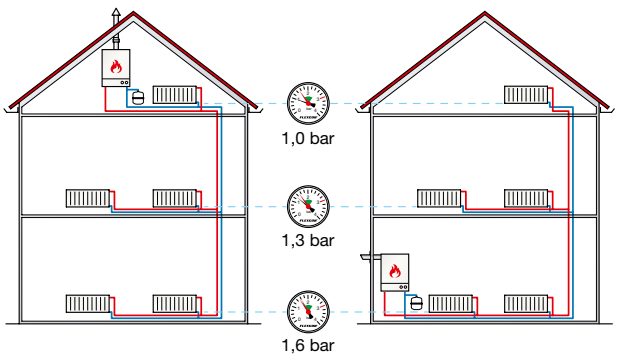
Final pressure P_e
This is the maximum permissible pressure of the system at the location of the Flexcon expansion vessel. It is determined as follows:

$P_e = P_{Sv} * 0.9$ (≥ 0.3 bar, valve type D/G/H)

Remarks from Flamco:
- If the Prescor safety valve is not installed at the same height as the Flexcon expansion vessel, or if there is a pump between the Flexcon expansion vessel and the Prescor safety valve, the final pressure should be corrected.
- The final pressure may never exceed the maximum value shown on the expansion vessel.

Acceptance factor η_G
This is the relationship between gross and net vessel capacity. The acceptance factor is determined by the relationship between gas charge and final pressure, in bar absolute.

Total system volume V_A
This is the sum of the contents of:
- Generators (boilers, heat exchangers, etc.).
- Buffer vessels.
- Manifolds.
- Transport pipes.
- Emitters (radiators, underfloor heating, air heaters, etc.).



Calculation and choice of expansion equipment

An expansion calculation consists of a number of fixed steps.

1) Collect the data required
- Volume of the system components V_a
- Output of the system $Q_{n,tot}$
- Static height above the vessel H_{st}
- Maximum system temperature t_{max}
- Minimum system temperature t_{min} (Standard 4 °C)
- Return temperature t_R

2) Determine expansion factor n
Water expansion as a result of temperature change can be calculated using the density:

$n = 1- (\rho_{t,\,max} / \rho_{t,\,min}$) => (see the tables later in the book as well)

Remark from Flamco:
- With central heating systems, take the average heating temperature to determine $\rho_{t,\,max}$.
- As in modern systems multiple temperature variations occur (e.g. underfloor heating in combination with radiators), it is advisable to calculate the expansion factor per sub system.
- The density of the water in the system changes as soon as anti-freeze is added. Consult the manufacturer's for exact data.

3) Determine the expansion volume V_e
This is determined by multiplying the system capacity by the expansion factor:

$V_e = V_a \times n$

4) Water reserve V_{wr}

A volume equivalent to 0.5% of the total system volume is needed as standard to compensate losses. However, with smaller systems, the effect of a small loss on the pressure is much greater. For this reason, a minimum of 3 litres is observed.

Remarks from Flamco:
- Maintain a minimum of 6 litres. Increasing the water reserve means that the maintenance interval in smaller systems can be extended considerably.

5) Determine the acceptance factor η_G

Shown as a formula (derived from Boyle's Law):

$\eta_G = (P_e - P_0)/P_e$ (Pressures in bar absolute.)

6) Gross volume of Flexcon expansion vessel V_{gross}

The gross volume of the Flexcon expansion vessel is calculated by dividing the net volume by the acceptance factor:

$V_{gross} = (V_e + V_{wr}) / \eta_G$

Remark from Flamco:

- If the maximum acceptance factor of an expansion vessel is exceeded, the diaphragm or bladder may be subjected to tensile stress. This could lead to damage or even rupture of the diaphragm or bladder.

Maximum useful effect for Flexcon vessels:

- Flexcon expansion vessel fixed diaphragm: 0.63.
- Flexcon 800 and 1,000 litres expansion vessel: 0.50.
- Flexcon M: 0.72.

Temperature in the Flexcon expansion vessel

The maximum continuous permissible temperature in the Flexcon expansion vessel is 70 °C. At higher temperatures, an intermediate vessel will have to be provided when designing the system. The permissible temperature in the Flexcon expansion vessel is -10 °C.

Thermal expansion of water in %

The following table and graph show data on the increase in the volume of water in per cent at temperature increases in water of 4 °C to 105 °C.
Source: George S. Kell (1975), Åke Melinder

Calculating Cooling Systems

In the case of cooling calculations, the same method may be used, but there are a number of factors that should be taken into account:

- The supply temperature t_V is the lowest temperature in the system.
- The return temperature t_R should not be used as the highest temperature, but rather the maximum ambient temperature $t_{max, amb}$, so that the safety valve is not activated needlessly when the system is not in operation.

Thermal expansion of system liquids

Temperature Min - Max [°C]	Water	Water + 10% Ethylene glycol	Water + 20% Ethylene glycol	Water + 30% Ethylene glycol	Water + 40% Ethylene glycol	Water +50% Ethylene glycol
4 - 5	0.00	0.01	0.02	0.03	0.04	0.04
4 - 10	0.03	0.08	0.13	0.19	0.23	0.26
4 - 15	0.09	0.16	0.26	0.36	0.44	0.49
4 - 20	0.18	0.27	0.41	0.55	0.66	0.74
4 - 25	0.29	0.39	0.57	0.75	0.89	0.99
4 - 30	0.43	0.54	0.75	0.97	1.13	1.25
4 - 35	0.59	0.70	0.95	1.19	1.39	1.53
4 - 40	0.78	0.88	1.16	1.44	1.65	1.81
4 - 45	0.98	1.08	1.38	1.69	1.93	2.10
4 - 50	1.19	1.30	1.62	1.95	2.21	2.40
4 - 55	1.43	1.53	1.88	2.23	2.51	2.70
4 - 60	1.68	1.78	2.15	2.52	2.81	3.02
4 - 65	1.94	2.05	2.43	2.82	3.12	3.34
4 - 70	2.22	2.33	2.73	3.13	3.44	3.66
4 - 75	2.51	2.62	3.04	3.45	3.77	3.99
4 - 80	2.82	2.93	3.36	3.79	4.10	4.33
4 - 85	3.14	3.26	3.69	4.13	4.45	4.67
4 - 90	3.47	3.60	4.04	4.48	4.80	5.01
4 - 95	3.81	3.95	4.40	4.84	5.15	5.36
4 - 100	4.16	4.31	4.76	5.21	5.52	5.72
4 - 105	4.53	4.68	5.14	5.59	5.88	6.07

source: G. Kell 1975, Åke Melinder, 2007.

- Antifreeze additives may increase thermal expansion. For this, check the supplier's data. At the bottom of the page there is a table with indicative values for water with ethylene glycol.

Sizing of Flexcon expansion automat

With expansion automats, the compensation volume flow resulting from expansion and contraction is regulated by a pump or compressor regulated control unit.

With compressor automats the air-side filling is dynamically controlled, and with pump automats the air side is totally open to the atmosphere. As a result there is no need for an acceptance factor calculation. The vessels are filled to the maximum acceptance volume where necessary.

The difference between gross and net vessel volume is determined here by the maximum acceptance factor:

$$V_{gross} = (V_e + V_{vr}) / \eta_{max}$$

Expansion automats can thus become somewhat smaller in relation to diaphragm pressure expansion vessels.

Maximum acceptance factor of Flexcon automats: $\eta_{max} = 0.85$.

Selecting Pump or Compressor based on the volume flow.

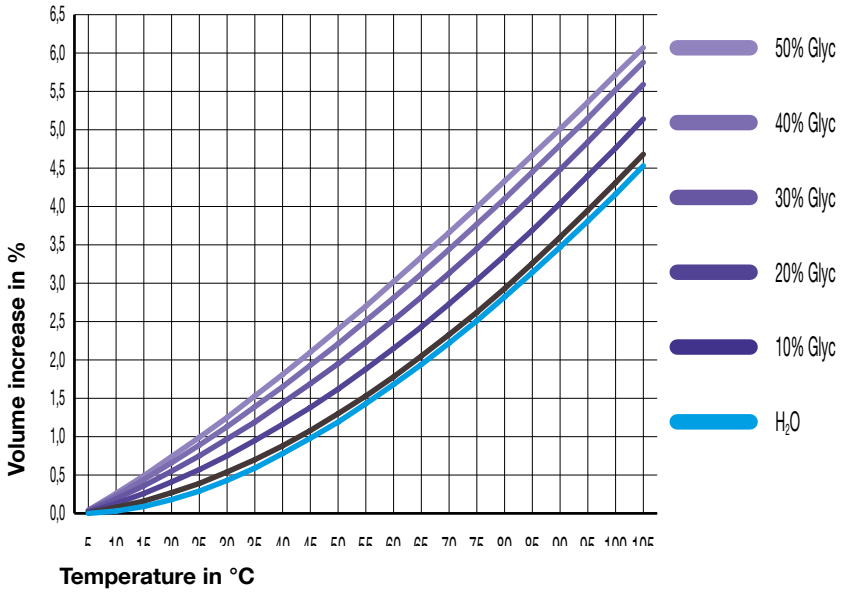
The capacity of the pump or compressor must be properly aligned with the expected volume flows. All parameters and logarithms are included in our calculation program on the website. For manual selection, the graphs at the start of Chapter 2 should be consulted.

The increase in volume for other temperatures can be read off from the graph.

Additives to the water, such as antifreeze, may have a positive effect on the thermal expansion.

For this, see the technical data of the suppliers of the additives. The graphs later in the book may also be consulted for an indication.

Thermal expansion of system liquid



Estimating the total system volume

In order to determine the Flexcon expansion vessel required, the total volume of the system must be calculated. If it is not possible to calculate the size of the system, then this content can be estimated with the aid of the empirical figures alongside, up to and including 'Column radiators' based on a supply/return temperature of 90/70 °C.

The water content of the system can be estimated by multiplying the system's output by the values shown in the table. The table refers to new systems. It is recommended that higher values are selected for older systems.
This method is indicative and does not provide a guarantee that the Flexcon expansion vessel needed has been correctly determined.

In modern systems, not all subsystems systems (e.g. underfloor heating or buffer vessel) are exposed to the same minimum and maximum temperatures. In a case of this kind, it is advisable to calculate the expansion volume per subsystem and then to sum them.

central heating system with	Water capacity in litres per 1 kW (860 kcal/h)
Convectors and/or air heaters	5.2
Induction units	5.5
Air conditioning systems	6.9
Panel radiators	8.8
Central heating commercial mix	10.0
Column radiators	12.0
Cooled water commercial mix	15.0
Radiant ceilings and/or underfloor heating	18.5
Extensive piping systems (district heating)	25.8

Useful effect

This table shows the useful effect that applies at the different initial and end pressures.
Keeping at least 1.5 bar between the initial pressure and the end pressure is recommended.

Static height [m]	Initial pressure [bar]	Safety valve set pressure / End pressure [bar]			
		3 / 2.7	6 / 5.4	8 / 7.2	10 / 9
3	0.5	0.59	-	-	-
8	1	0.46	0.69	-	-
13	1.5	0.32	0.61	0.70	-
18	2	0.19	0.53	0.63	-
23	2.5	0.05	0.45	0.57	0.65
28	3	-	0.38	0.51	0.60
33	3.5	-	0.30	0.45	0.55
38	4	-	0.22	0.39	0.50
43	4.5	-	0.14	0.33	0.45
48	5	-	-	0.27	0.40
53	5.5	-	-	0.21	0.35
58	6	-	-	0.15	0.30
63	6.5	-	-	0.09	0.25
68	7	-	-	-	0.20
73	7.5	-	-	-	0.15
78	8	-	-	-	0.10

Filling pressure in your system

Theory
Correct filling is an important part of a properly calculated expansion vessel. By adding the correct amount of water to the closed system, a minimum water reserve and as a result operating pressure is ensured, and unnecessary activation of the safety valve is avoided.

If the system is incorrectly filled, the following problems may arise:

- If there is too much water in the system, the final pressure of the system is reached too quickly and the safety valve is activated needlessly, with the result that the boiler will show a fault and shut down by loss of pressure.

- Inadequate filling of the system may result in the expansion vessel running dry when the system cools down. The result is that pressure falls off suddenly, causing the boiler to show a fault and shut down. Under-pressure may occur with resulting air problems in the system.

Determining the filling pressure in cold state
The correct filling pressure in the cold state is simple to calculate. The following formula is presented in EN 12828 Annex D:

P_0 = initial pressure: gas pressure in the vessel in inoperative state.
P_{ini} = filling pressure: system pressure after filling the system
$P_{ini} = P_0 + 0.3 (\geq 0.5)$

Remarks from Flamco:
- If smaller systems are topped up directly from the water mains in the cold state, it is sometimes difficult to top up to precisely 0.1 bar accuracy. For that reason, it is much more practical to work from a maximum and minimum filling pressure.
- Ensure a filling pressure tolerance ΔP_{ini} of at least 0.25. If this is not possible, select a larger vessel.
- If a larger water reserve is required (such as e.g. at least 6 litres instead of 3 litres), then this will have to be included in the filling pressure calculation. That is to say: to have more water in the vessel, it will have to be topped up to a higher pressure.
- If a central heating system is already at temperature when setting the filling pressure, then different values apply that can also be called up in our calculation program.

Minimum and maximum filling pressure in your system

The following approach takes into account all the remarks made above.
The minimum filling pressure required may best be calculated in relation to the temperature obtaining in the system at the time of filling. Calculating the maximum permissible filling pressure provides a good picture of the tolerances available on filling.

Definitions

$P_{ini,min}$ = minimum filling pressure
P_0 = initial pressure of the vessel
V_{vessel} = nominal vessel volume
V_v = water reserve
$V_{e,fill}$ = expansion volume at filling temperature
ΔV_e = Difference in expansion volume between the maximum and the filling temperature.

Minimum filling pressure

$$P_{ini,\,min} = \frac{V_{vessel} \times (P_0 + 1)}{(V_{vessel} - V_v - V_{e,fill})} - 1 \; (\geq P_0 + 0.3)$$

Maximum permissible filling pressure

$$P_{ini,\,max} = \frac{V_{vessel} \times (P_0 + 1)}{[V_{vessel} \times (P_0 + 1) / (P_e + 1) + \Delta V_e]} - 1$$

Operational pressure in automats
In general, a working pressure is set in automats that ensures a minimum pressure of 1 bar at the highest point. Depending naturally on the system's limiting conditions.

Calculation examples for Flexcon expansion vessels

Example 1: central heating system

Data
- System volume V_A = 340 litres
- Maximum heating temp. (90/70 °C) t_{max} = 80 °C
- System height = 8 m
- Pressure set on safety valve P_{sv} = 3.0 bar
- Expansion vessel and boiler installed **above**.
- So: static height H_{st} = 3 m.

Calculation
Expansion factor n = 2.82%

Expansion volume V_e= 340 x 2.82 % ≈ 9.59 litres

Water reserve V_{wr}= 340 litres x 0.5% (≥ 6) = 6 litres

H_{st}: As the expansion vessel has been installed above in the system, the static height does not exceed 3 m.

Gas charge $P_0 = (H_{st}/10) + 0.2 = 0.5$ bar

Final pressure P_e = 3.0 - 10% = 2.7 bar

$$\text{Acceptance factor } \eta_G = \frac{(2.7 + 1) - (0.5 + 1)}{(2.7 + 1)} = 0.5945$$

$$\text{Required gross capacity } V_{gross} \text{ of the Flexcon expansion vessel} = \frac{(9.59 + 6)}{0.5945} \approx 26.22 \text{ litres}$$

Select: a Flexcon 35/0.5.

Determine filling pressure tolerances at 20 °C:

$$\text{Expansion volume } V_e = \frac{340 \times 0.18}{100} \approx 0.6 \text{ litres}$$

$$P_{ini,min} = \frac{35 \times (0.5 + 1)}{(35 - 0.6 - 6)} - 1 \approx 0.9 \text{ bar}$$

$$P_{ini,max} = \frac{35 \times (0.5+1)}{[35 \times (0.5 + 1) / (2.7 + 1) + (9.59 - 0.6)]} - 1$$

≈ 1.3 bar.

Example 2: central heating system

Data
- System volume unknown
- Output of the boiler = 280 kW
- Maximum heating temperature (80/60 °C) = 80 °C
- System height = 12 m
- Pressure set on safety valve P_{sv} = 3.0 bar
- Expansion vessel and boiler installed **below**.
- System components: 100% panel radiators

Calculation
Total system volume = 280 x 8.8 = 2,464 litres
Expansion factor n = 2.22%

Expansion volume V_e = 2,464 x 2.22% = 54.7 litres

Water reserve V_{wr}= 2,464 x 0.5% (≥ 6) = 12.32 litres
Static height H_{st} =12 m
Gas charge P_0 = (12/10) + 0.2 = 1.4 bar
=> rounded to 1.5 bar
Final pressure P_e = 3.0 - 10% = 2.7 bar

$$\text{Acceptance factor } \eta_G = \frac{(2.7 + 1) - (1.5 + 1)}{(2.7 + 1)} = 0.324$$

$$\text{Required gross capacity } V_{gross} \text{ of the Flexcon expansion vessel} = \frac{(54.7 + 12.32)}{0.324} \approx 206.9 \text{ litres}$$

Select: a Flexcon 300/1.5.

Determine filling pressure tolerances at 20 °C:

$$\text{Expansion volume } V_e = \frac{2{,}464 \times 0.18}{100} \approx 4.4352 \text{ litres}$$

$$P_{ini,min} = \frac{300 \times (1.5 + 1)}{(300 - 4.4352 - 12.32)} - 1 \approx 1.65 \text{ bar}$$

Note: 1.65 ≥ P_0 + 0.3 => take P_0 + 0.3 = 1.8 bar

$$P_{ini,max} = \frac{300 \times (1.5 + 1)}{[300 \times (1.5 + 1) / (2.7 + 1) + (54.7 - 4.4352)]} - 1$$

≈ 1.96 bar.

Note: the tolerance is too low between $P_{ini,min}$ and $P_{ini,max}$ (min. 0.25 bar).

Conclusion: select 425/1.5 and calculate the maximum filling pressure again (= 2.15 bar).

Example 3: Cooled water system

Data
- Total system volume V_a = 13.889 litres
- System fluid: water with 30% Glycol
- Requirement: **vessel with replaceable bladder**
- Output of the cooled water system = 1,000 kW
- Lowest cooling temperature (6/12 °C) = 6 °C
- Maximum ambient temperature = 35 °C
- System height = 30 m
- Pressure set on safety valve P_{sv} = 4.0 bar
- Flexcon expansion vessel installed **above**.
- So: Static height H_{st} = 3 m.

Calculation

Expansion factor n = 1.19% (4 - 35 °C)

Expansion volume V_e= 13.889 x 1.19 % ≈ 165.3 litres

Water reserve V_{wr}= 13,889 x 0.5% (≥ 6) = 69.445 litres

Gas charge pressure $P_0 = (H_{st}/10) + 0.2 = 0.5$ bar

Final pressure P_e = 4.0 - 10% = 3.6 bar

$$\text{Acceptance factor } \eta_G = \frac{(3.6 + 1) - (0.5 + 1)}{(3.6 + 1)} = 0.6739$$

Required gross capacity V_{gross} of the Flexcon

$$\text{expansion vessel} = \frac{165.3 + 69.445}{0.6739} \approx 348.3 \text{ litres}$$

Select: a Flexcon M 400/0.5

Determine filling pressure tolerances at 20 °C:

$$\text{Expansion volume } V_e = \frac{13{,}889 \times 0.55}{100} \approx 76.4 \text{ litres}$$

$P_{ini,min}$ = 400x (0.5 + 1) / (400 - 76.4 - 69.445) - 1
≈ 1.4 bar (≥ P_0 + 0.3)

$P_{ini,max}$ = 400 x (0.5+1) / [400 x (0.5 + 1) / (3.6 + 1)
+ (165.3 - 76.4)] - 1
≈ 1.7 bar

Example 4: Expansion automat for central heating system

Data
- Total system volume V_a = 130 m³.
- Output of the system = 13 MW
- Maximum heating temperature (90/70 °C) = 90 °C
- Height of building = 53 m
- Pressure set on safety valve P_{sv} = 8.0 bar
- Flexcon expansion vessel and boiler installed **below**.

Calculation

Expansion factor n = 2.82%
Expansion volume V_e = 130,000 x 2.82% = 3,666 litres
Water reserve V_{wr}= 130,000 x 0.5% (≥ 6) = 650 litres
Minimum operating pressure = (53/10) + 0.8 = 6.1 bar
Final pressure P_e = 8.0 - 10% = 7.2 bar

NOTE: We select a pump expansion automat on account of the functionality.

Required gross capacity V_{gross} of the Flamcomat

$$\text{expansion automat} = \frac{3{,}666 + 650}{0.85} \approx 5{,}078 \text{ litres}$$

Select:
1 x FG 2,800 main vessel
1 x FB 2,800 intermediate vessel

Volume flow calculation: $V_{DH} = f_v \times Q_{n,tot}$

V_{DH} = volume flow needed
f_v = volume flow factor in m³/h.MW
$Q_{n,tot}$ = total output of the system

$$f_v = \frac{(1{,}000 / 965.304) - (1{,}000 / 977.759)}{4.21058 \times 20} \times 3{,}600$$

≈ 0.5655

V_{DH} = 0.5655 x 13 MW ≈ 7.4 m³/h

This calculation is in the online calculation program as standard. Also consult the pump graphs later in the book,
Select: Pump set D60 or D80 (load-dependent)

FLEXCON

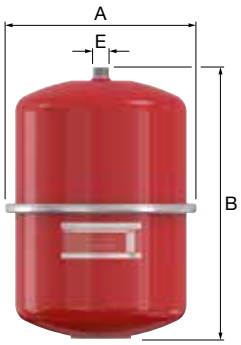
For sealed heating and chilled water (cooling) installations according to EN12828.

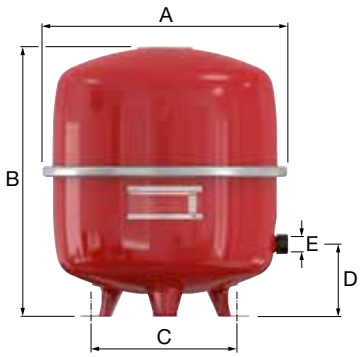
- Nitrogen gas filling for longer maintenance of pre-pressure.
- Each vessel is factory tested.
- Diaphragm: Flexible rubber with rolling action.
- Suitable for addition of glycol-based anti-freeze up to 50%.
- Red (RAL 3002) epoxy powder coating (18 litre also available in white (RAL 9010).
- Vessels in accordance with EN13831.
- Suitable for systems with a maximum flow temperature of 120 °C.
- Max. temperature diaphragm: 70 °C.
- In accordance with Pressure Equipment Directive 2014/68/EU.

Flexcon 2 - 80

- Maximum operating pressure: 3.0 or 6.0 bar.
- Deep drawn zinc-plated steel clench ring.
- Flexcon 35 - 80: With feet and including mounting kit.

Not available on stock in the U.K.





Type	Capacity [l]	Pre-charge [bar]	Max. working pressure [bar]	Dimensions A [mm]	B [mm]	Ø C [mm]	D [mm]	Syst. conn. (E)	Weight [kg]		Order Code
Flexcon 2	2	0.5	3.0	216	144	-	-	G ¾" M	1.5	120	13221
Flexcon 4	4	0.5	3.0	216	194	-	-	G ¾" M	1.8	90	13421
Flexcon 4	4	1.0	3.0	216	194	-	-	G ¾" M	1.8	90	13423
Flexcon 8	8	0.5	3.0	245	280	-	-	R ¾"	2.2	77	26085
Flexcon 12	12	0.5	3.0	286	313	-	-	R ¾"	2.7	60	26125
Flexcon 12	12	1.0	3.0	286	313	-	-	R ¾"	2.7	60	26126
Flexcon 18	18	0.5	3.0	286	405	-	-	R ¾"	3.7	48	26185
Flexcon 18 white	18	0.5	3.0	286	405	-	-	R ¾"	3.7	48	26181
Flexcon 18	18	1.0	3.0	286	405	-	-	R ¾"	3.7	48	26186
Flexcon 18 white	18	1.0	3.0	286	405	-	-	R ¾"	3.7	48	26182
Flexcon 18	18	1,5	3.0	286	405	-	-	R ¾"	3.7	48	26188
Flexcon 18	18	*	3.0	286	405	-	-	R ¾"	3.7	48	26189
Flexcon 25	25	0.5	3.0	327	419	-	-	R ¾"	4.5	25	26255
Flexcon 25	25	1.0	3.0	327	419	-	-	R ¾"	4.5	25	26256
Flexcon 25	25	1.5	3.0	327	419	-	-	R ¾"	4.5	25	26258
Flexcon 35	35	0.5	3.0	396	435	263	117	R ¾"	5.4	24	26355
Flexcon 35	35	1.0	3.0	396	435	263	117	R ¾"	5.4	24	26356
Flexcon 35	35	1.5	3.0	396	435	263	117	R ¾"	5.4	24	26357
Flexcon 35	35	*	3.0	396	436	263	117	R ¾"	5.4	24	26358
Flexcon 50	50	0.5	6.0	435	492	263	132	R ¾"	11.2	12	26505
Flexcon 50	50	1.0	6.0	435	492	263	132	R ¾"	11.2	12	26506
Flexcon 50	50	1.5	6.0	435	492	263	132	R ¾"	11.2	12	26507
Flexcon 50	50	*	6.0	435	493	263	132	R ¾"	11.2	12	26508
Flexcon 80	80	0.5	6.0	519	540	360	142	R 1"	15.0	12	26805
Flexcon 80	80	1.0	6.0	519	540	360	142	R 1"	15.0	12	26806
Flexcon 80	80	1.5	6.0	519	540	360	142	R 1"	15.0	12	26807
Flexcon 80	80	2.0	6.0	519	540	360	142	R 1"	15.2	12	26804
Flexcon 80	80	*	6.0	519	540	360	142	R 1"	15.0	12	26808

* Specify pre-charge pressure when ordering.

CE

Flexcon 110 - 1000

- Max. working pressure: 6.0 bar.
- All welded construction.
- Flexcon 110 - 300: including mounting kit.

Type	Capacity [l]	Pre-charge [bar]	Dimensions A [mm]	B [mm]	Ø C [mm]	Syst. conn. (D)	Weight [kg]		Order Code
Flexcon 110	110	0.5	484	784	360	R 1"	19.1	8	16115
Flexcon 110	110	1.0	484	784	360	R 1"	19.1	8	16116
Flexcon 110	110	1.5	484	784	360	R 1"	19.1	8	16117
Flexcon 110	110	2.0	484	784	360	R 1"	19.1	8	16119
Flexcon 110	110	2.5	484	784	360	R 1"	19.1	8	16120
Flexcon 110	110	3.0	484	784	360	R 1"	19.1	8	16110
Flexcon 110	110	*	484	784	360	R 1"	19.1	8	16111
Flexcon 140	140	0.5	484	950	360	R 1"	20.0	8	16145
Flexcon 140	140	1.0	484	950	360	R 1"	20.0	8	16146
Flexcon 140	140	1.5	484	950	360	R 1"	20.0	8	16147
Flexcon 140	140	2.0	484	950	360	R 1"	20.0	8	16141
Flexcon 140	140	2.5	484	950	360	R 1"	20.0	8	16142
Flexcon 140	140	3.0	484	950	360	R 1"	20.0	8	16143
Flexcon 140	140	*	484	950	360	R 1"	20.0	8	16140
Flexcon 200	200	0.5	484	1300	450	R 1"	27.5	8	16205
Flexcon 200	200	1.0	484	1300	450	R 1"	27.5	8	16206
Flexcon 200	200	1.5	484	1300	450	R 1"	27.5	8	16207
Flexcon 200	200	2.0	484	1300	450	R 1"	27.5	8	16208
Flexcon 200	200	2.5	484	1300	450	R 1"	27.5	8	16209
Flexcon 200	200	3.0	484	1300	450	R 1"	27.5	8	16210
Flexcon 200	200	*	484	1300	450	R 1"	27.5	8	16200
Flexcon 300	300	0.5	600	1330	450	R 1"	43.9	6	16301
Flexcon 300	300	1.0	600	1330	450	R 1"	43.9	6	16302
Flexcon 300	300	1.5	600	1330	450	R 1"	43.9	6	16303
Flexcon 300	300	2.0	600	1330	450	R 1"	43.9	6	16304
Flexcon 300	300	2.5	600	1330	450	R 1"	43.9	6	16305
Flexcon 300	300	3.0	600	1330	450	R 1"	43.9	6	16306
Flexcon 300	300	*	600	1330	450	R 1"	43.9	6	16300
Flexcon 425	425	0.5	790	1180	610	R 1"	57.4	1	16421
Flexcon 425	425	1.0	790	1180	610	R 1"	57.4	1	16422
Flexcon 425	425	1.5	790	1180	610	R 1"	57.4	1	16423
Flexcon 425	425	2.0	790	1180	610	R 1"	57.4	1	16424
Flexcon 425	425	2.5	790	1180	610	R 1"	57.4	1	16425
Flexcon 425	425	3.0	790	1180	610	R 1"	57.4	1	16426
Flexcon 425	425	*	790	1180	610	R 1"	57.4	1	16420
Flexcon 600	600	0.5	790	1540	610	R 1"	69.7	1	16601
Flexcon 600	600	1.0	790	1540	610	R 1"	69.7	1	16602
Flexcon 600	600	1.5	790	1540	610	R 1"	69.7	1	16603
Flexcon 600	600	2.0	790	1540	610	R 1"	69.7	1	16604
Flexcon 600	600	2.5	790	1540	610	R 1"	69.7	1	16605
Flexcon 600	600	3.0	790	1540	610	R 1"	69.7	1	16606
Flexcon 600	600	*	790	1540	610	R 1"	69.7	1	16600
Flexcon 800	800	0.5	790	1888	610	R 1"	87.5	1	16801
Flexcon 800	800	1.0	790	1888	610	R 1"	87.5	1	16802
Flexcon 800	800	1.5	790	1888	610	R 1"	87.5	1	16803
Flexcon 800	800	2.0	790	1888	610	R 1"	87.5	1	16804
Flexcon 800	800	2.5	790	1888	610	R 1"	87.5	1	16805
Flexcon 800	800	3.0	790	1888	610	R 1"	87.5	1	16806
Flexcon 800	800	*	790	1888	610	R 1"	87.5	1	16800
Flexcon 1000	1000	0.5	790	2268	610	R 1"	100.9	1	16901
Flexcon 1000	1000	1.0	790	2268	610	R 1"	100.9	1	16902
Flexcon 1000	1000	1.5	790	2268	610	R 1"	100.9	1	16903
Flexcon 1000	1000	2.0	790	2268	610	R 1"	100.9	1	16904
Flexcon 1000	1000	2.5	790	2268	610	R 1"	100.9	1	16905
Flexcon 1000	1000	3.0	790	2268	610	R 1"	100.9	1	16906
Flexcon 1000	1000	*	790	2268	610	R 1"	100.9	1	16900

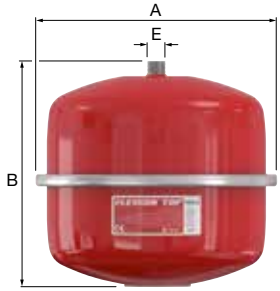
FLEXCON TOP

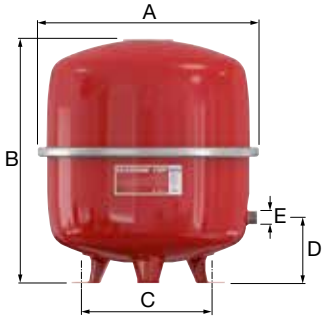
For sealed heating and chilled water (cooling) installations according to EN12828.

- Nitrogen gas filling for longer maintenance of pre-pressure.
- Each vessel is factory tested.
- Suitable for addition of glycol-based anti-freeze up to 50%.
- Red (RAL 3002) epoxy powder coating.
- Diaphragm: butyl rubber.
- Vessels in accordance with EN13831.
- Suitable for systems with a maximum flow temperature of 120 °C.
- Max. temperature diaphragm: 90 °C.
- In accordance with Pressure Equipment Directive 2014/68/EU.

Flexcon Top 2 - 80

- Maximum operating pressure: 6.0 bar.
- Deep drawn zinc-plated steel clench ring.
- Flexcon Top 35 - 80: With feet and including mounting kit.



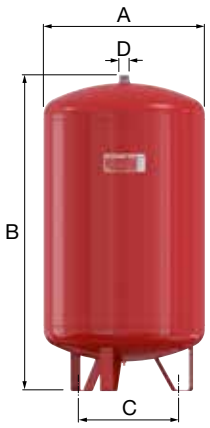


Type	Capacity [l]	Pre-charge [bar]	Dimensions A [mm]	B [mm]	Ø C [mm]	D [mm]	Syst. conn. (E)	Weight [kg]		Order Code
Flexcon Top 2	2	0.5	216	144	-	-	R ¾"	1.7	120	13202
Flexcon Top 2	2	2.5	216	144	-	-	R ¾"	1.7	120	13203
Flexcon Top 2	2	*	216	144	-	-	R ¾"	1.7	120	13204
Flexcon Top 4	4	0.5	216	194	-	-	R ¾"	2.1	90	13404
Flexcon Top 4	4	2.5	216	194	-	-	R ¾"	2.1	90	13405
Flexcon Top 4	4	*	216	194	-	-	R ¾"	2.1	90	13406
Flexcon Top 8	8	0.5	245	280	-	-	R ¾"	3.2	50	16008
Flexcon Top 8	8	1.0	245	280	-	-	R ¾"	3.2	50	16009
Flexcon Top 8	8	2.5	245	280	-	-	R ¾"	3.2	50	16010
Flexcon Top 8	8	*	245	280	-	-	R ¾"	3.2	50	16011
Flexcon Top 12	12	0.5	286	313	-	-	R ¾"	4.5	36	16012
Flexcon Top 12	12	1.0	286	313	-	-	R ¾"	4.5	36	16013
Flexcon Top 12	12	2.5	286	313	-	-	R ¾"	4.5	36	16014
Flexcon Top 12	12	*	286	313	-	-	R ¾"	4.5	36	16015
Flexcon Top 18	18	0.5	328	306	-	-	R ¾"	5.7	24	16018
Flexcon Top 18	18	1.0	328	306	-	-	R ¾"	5.7	24	16019
Flexcon Top 18	18	2.5	328	306	-	-	R ¾"	5.7	24	16020
Flexcon Top 18	18	*	328	306	-	-	R ¾"	5.7	24	16017
Flexcon Top 25	25	0.5	358	359	-	-	R ¾"	7.3	24	16025
Flexcon Top 25	25	1.0	358	359	-	-	R ¾"	7.3	18	16026
Flexcon Top 25	25	1.5	358	359	-	-	R ¾"	7.3	18	16029
Flexcon Top 25	25	2.5	358	359	-	-	R ¾"	7.3	18	16027
Flexcon Top 25	25	*	358	359	-	-	R ¾"	7.3	18	16030
Flexcon Top 35	35	0.5	396	435	263	117	R ¾"	9.0	18	16035
Flexcon Top 35	35	1.0	396	435	263	117	R ¾"	9.0	18	16036
Flexcon Top 35	35	1.5	396	435	263	117	R ¾"	9.0	18	16039
Flexcon Top 35	35	2.5	396	435	263	117	R ¾"	9.0	18	16037
Flexcon Top 35	35	*	396	436	263	117	R ¾"	9.0	18	16038
Flexcon Top 50	50	0.5	437	492	263	132	R ¾"	11.4	12	16051
Flexcon Top 50	50	1.0	437	492	263	132	R ¾"	11.4	12	16052
Flexcon Top 50	50	1.5	437	492	263	132	R ¾"	11.4	12	16050
Flexcon Top 50	50	2.5	437	492	263	132	R ¾"	11.4	12	16053
Flexcon Top 50	50	*	437	493	263	132	R ¾"	11.4	12	16054
Flexcon Top 80	80	0.5	519	540	360	142	R 1"	15.0	12	16081
Flexcon Top 80	80	1.0	519	540	360	142	R 1"	15.0	12	16082
Flexcon Top 80	80	2.5	519	540	360	142	R 1"	15.0	12	16083
Flexcon Top 80	80	*	519	540	360	142	R 1"	15.0	12	16084

* Specify pre-charge pressure when ordering.

Flexcon Top 110 - 1000

- Maximum operating pressure: 10.0 bar.
- All welded construction.
- Flexcon Top 110 - 300: including mounting kit.



Type	Capacity [l]	Pre-charge [bar]	Dimensions A [mm]	B [mm]	Ø C [mm]	Syst. conn. (D)	Weight [kg]		Order Code
Flexcon Top 110	110	1.5	484	784	360	R 1"	27.3	8	16103
Flexcon Top 110	110	3.0	484	784	360	R 1"	27.3	8	16106
Flexcon Top 110	110	3.5	484	784	360	R 1"	27.3	8	16090
Flexcon Top 110	110	*	484	784	360	R 1"	27.3	8	16100
Flexcon Top 140	140	1.5	484	950	360	R 1"	31.6	8	16133
Flexcon Top 140	140	3.0	484	950	360	R 1"	31.6	8	16136
Flexcon Top 140	140	3.5	484	950	360	R 1"	31.6	8	16091
Flexcon Top 140	140	*	484	950	360	R 1"	31.6	8	16130
Flexcon Top 200	200	1.5	600	960	450	R 1"	35.4	8	16193
Flexcon Top 200	200	3.0	600	960	450	R 1"	35.4	8	16196
Flexcon Top 200	200	3.5	600	960	450	R 1"	35.4	8	16092
Flexcon Top 200	200	*	600	960	450	R 1"	35.4	8	16190
Flexcon Top 300	300	1.5	600	1330	450	R 1"	57.1	6	16293
Flexcon Top 300	300	3.0	600	1330	450	R 1"	57.1	6	16296
Flexcon Top 300	300	3.5	600	1330	450	R 1"	57.1	6	16093
Flexcon Top 300	300	*	600	1330	450	R 1"	57.1	6	16290
Flexcon Top 425	425	1.5	790	1180	610	R 1"	84.9	1	16413
Flexcon Top 425	425	3.0	790	1180	610	R 1"	84.9	1	16416
Flexcon Top 425	425	3.5	790	1180	610	R 1"	84.9	1	16094
Flexcon Top 425	425	*	790	1180	610	R 1"	84.9	1	16410
Flexcon Top 600	600	1.5	790	1540	610	R 1"	105.8	1	16593
Flexcon Top 600	600	3.0	790	1540	610	R 1"	105.8	1	16596
Flexcon Top 600	600	3.5	790	1540	610	R 1"	105.8	1	16096
Flexcon Top 600	600	*	790	1540	610	R 1"	105.8	1	16590
Flexcon Top 800	800	1.5	790	1888	610	R 1"	133.7	1	16793
Flexcon Top 800	800	3.0	790	1888	610	R 1"	133.7	1	16796
Flexcon Top 800	800	3.5	790	1888	610	R 1"	133.7	1	16098
Flexcon Top 800	800	*	790	1888	610	R 1"	133.7	1	16790
Flexcon Top 1000	1000	1.5	790	2268	610	R 1"	155.1	1	16893
Flexcon Top 1000	1000	3.0	790	2268	610	R 1"	155.1	1	16896
Flexcon Top 1000	1000	3.5	790	2268	610	R 1"	155.1	1	16099
Flexcon Top 1000	1000	*	790	2268	610	R 1"	155.1	1	17294

* Specify pre-charge pressure when ordering.

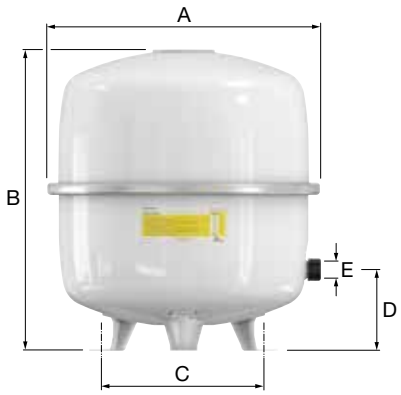
FLEXCON SOLAR

Expansion vessels for solar powered installations.

- Nitrogen gas filling for longer maintenance of pre-pressure.
- Each vessel is factory tested.
- Diaphragm: butyl rubber.
- Suitable for addition of glycol-based anti-freeze up to 50%.
- Vessels in accordance with EN13831.
- Suitable for systems with a maximum flow temperature of 120 °C.
- Max. temperature diaphragm: 110 °C.
- In accordance with Pressure Equipment Directive 2014/68/EU.

Flexcon Solar 8 - 80

- Maximum operating pressure: 8.0 bar.
- Deep drawn zinc-plated steel clench ring.
- White (RAL 9010) epoxy powder coating.
- Flexcon Solar 35 - 80: With feet and including mounting kit.



Type	Capacity [l]	Pre-charge [bar]	Dimensions A [mm]	B [mm]	Ø C [mm]	D [mm]	Syst. conn. (E)	Weight [kg]		Order Code
Flexcon Solar 8	8	2.5	245	280	-	-	R ¾"	3.2	50	16060
Flexcon Solar 12	12	2.5	286	313	-	-	R ¾"	4.3	36	16061
Flexcon Solar 18	18	2.5	328	306	-	-	R ¾"	5.7	24	16062
Flexcon Solar 25	25	2.5	358	359	-	-	R ¾"	7.3	18	16063
Flexcon Solar 35	35	2.5	396	435	263	117	R ¾"	8.8	18	16064
Flexcon Solar 50	50	2.5	435	492	263	132	R ¾"	11.2	12	16065
Flexcon Solar 80	80	2.5	519	540	360	142	R 1"	15.0	12	16066

Flexcon Solar 110 - 1000

- Maximum operating pressure: 10.0 bar.
- All welded construction.
- Red (RAL 3002) epoxy powder coating.
- Flexcon Solar 110 - 300: including mounting kit.

Type	Capacity [l]	Pre-charge [bar]	Dimensions A [mm]	Dimensions B [mm]	Dimensions Ø C [mm]	Syst. conn. (D)	Weight [kg]		Order Code
Flexcon Solar 110	110	3.0	484	784	360	R 1"	27.3	8	16067
Flexcon Solar 140	140	3.0	484	950	360	R 1"	31.6	8	16068
Flexcon Solar 200	200	3.0	600	960	450	R 1"	35.4	8	16069
Flexcon Solar 300	300	3.0	600	1330	450	R 1"	57.1	6	16070
Flexcon Solar 425	425	3.0	790	1180	610	R 1"	84.9	1	16071
Flexcon Solar 600	600	3.0	790	1540	610	R 1"	105.8	1	16072
Flexcon Solar 800	800	3.0	790	1888	610	R 1"	133.7	1	16073
Flexcon Solar 1000	1000	3.0	790	2268	610	R 1"	155.1	1	16074

CE

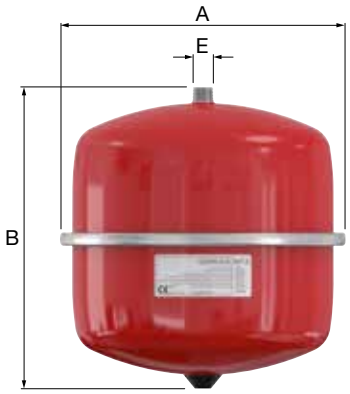
CONTRA-FLEX

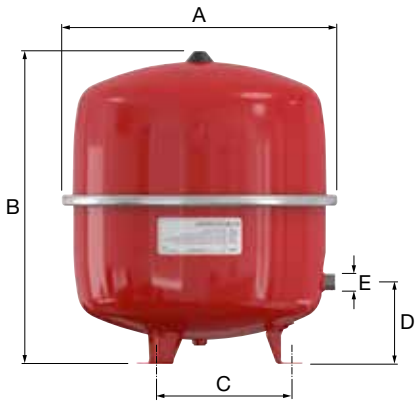
For sealed heating and chilled water (cooling) installations according to EN12828.

- Nitrogen gas filling for longer maintenance of pre-pressure.
- Each vessel is factory tested.
- Diaphragm: Flexible rubber with rolling action.
- Suitable for addition of glycol-based anti-freeze up to 50%.
- Vessels in accordance with EN13831.
- Suitable for systems with a maximum flow temperature of 120 °C.
- Max. temperature diaphragm: 70 °C.
- In accordance with Pressure Equipment Directive 2014/68/EU.

Contra-Flex 2 - 80

- Maximum operating pressure: 3.0 or 6.0 bar.
- Deep drawn zinc-plated steel clench ring.
- Red (RAL 3002) or white (RAL 9010) epoxy powder coating. **(Contra-Flex white: Not available on stock in the U.K.)**





Type	Capacity [l]	Pre-charge [bar]	Max. working pressure [bar]	Dimensions A [mm]	B [mm]	Ø C [mm]	D [mm]	Syst. conn. (E)	Weight [kg]		Order Code
Contra-Flex 2	2	0.5	3.0	194	152	-	-	G ¾" M	1.1	120	13211
Contra-Flex 2	2	1.5	3.0	194	152	-	-	G ¾" M	1.1	120	13213
Contra-Flex 4	4	0.5	3.0	194	257	-	-	G ¾" M	1.6	90	13411
Contra-Flex 4	4	1.5	3.0	194	257	-	-	G ¾" M	1.6	90	13413
Contra-Flex 8	8	0.5	3.0	245	304	-	-	R ¾"	2.2	50	26074
Contra-Flex 8	8	1.5	3.0	245	304	-	-	R ¾"	2.2	50	26073
Contra-Flex 8 white	8	1.5	3.0	245	304	-	-	R ¾"	2.2	50	26063
Contra-Flex 12	12	0.5	3.0	286	336	-	-	R ¾"	2.1	36	26136
Contra-Flex 12	12	1.5	3.0	286	336	-	-	R ¾"	2.1	36	26133
Contra-Flex 12 white	12	1.5	3.0	286	336	-	-	R ¾"	3.2	36	26153
Contra-Flex 18	17	1.0	3.0	286	387	-	-	R ¾"	3.7	48	26192
Contra-Flex 18 white	17	1.0	3.0	286	387	-	-	R ¾"	3.7	48	26193
Contra-Flex 18	18	0.5	3.0	328	328	-	-	R ¾"	3.7	24	26171
Contra-Flex 18	18	1.0	3.0	328	328	-	-	R ¾"	3.7	24	26172
Contra-Flex 18	18	1.5	3.0	328	328	-	-	R ¾"	3.7	24	26173
Contra-Flex 18 white	18	1.0	3.0	328	328	-	-	R ¾"	3.4	24	26162
Contra-Flex 18 white	18	1.5	3.0	328	328	-	-	R ¾"	3.4	24	26163
Contra-Flex 25	25	0.5	3.0	358	380	-	-	R ¾"	4.5	18	26241
Contra-Flex 25	25	1.5	3.0	358	380	-	-	R ¾"	4.5	18	26243
Contra-Flex 25 white	25	1.5	3.0	358	380	-	-	R ¾"	4.5	18	26233
Contra-Flex 35	35	0.5	3.0	396	450	263	117	R ¾"	5.6	18	26341
Contra-Flex 35	35	1.5	3.0	396	450	263	117	R ¾"	5.6	18	26343
Contra-Flex 35 white	35	1.5	6.0	396	450	263	117	R ¾"	5.6	18	26333
Contra-Flex 50	50	0.5	6.0	437	507	263	132	R ¾"	11.4	12	26491
Contra-Flex 50	50	1.5	6.0	437	507	263	132	R ¾"	11.4	12	26493
Contra-Flex 50 white	50	1.5	6.0	437	507	263	132	R ¾"	11.4	12	26483
Contra-Flex 80	80	0.5	6.0	519	551	360	142	R 1"	15.0	12	26791
Contra-Flex 80	80	1.5	6.0	519	551	360	142	R 1"	15.0	12	26793
Contra-Flex 80 white	80	1.5	6.0	519	551	360	142	R 1"	15.0	12	26783

CE

Contra-Flex 100 - 1000

- Maximum operating pressure: 6.0 bar.
- All welded construction.
- Red (RAL 3002) epoxy powder coating.

Type	Capacity [l]	Pre-charge [bar]	Dimensions A [mm]	B [mm]	Ø C [mm]	Syst. conn. (D)	Weight [kg]		Order Code
Contra-Flex 100	100	1.5	484	784	360	R 1"	19.0	8	26103
Contra-Flex 100	100	2.5	484	784	360	R 1"	19.0	8	26105
Contra-Flex 100	100	*	484	784	360	R 1"	19.0	8	26100
Contra-Flex 150	150	1.5	484	1024	360	R 1"	23.6	8	16153
Contra-Flex 150	150	2.5	484	1024	360	R 1"	23.6	8	26155
Contra-Flex 150	150	*	484	1024	360	R 1"	23.6	8	26150
Contra-Flex 200	200	1.5	484	1300	360	R 1"	27.5	8	26213
Contra-Flex 200	200	2.5	484	1300	360	R 1"	27.5	8	26215
Contra-Flex 200	200	*	484	1300	360	R 1"	27.5	8	26214
Contra-Flex 250	250	1.5	600	1153	450	R 1"	39.9	6	16253
Contra-Flex 250	250	2.5	600	1153	450	R 1"	39.9	6	26225
Contra-Flex 250	250	*	600	1153	450	R 1"	39.9	6	16250
Contra-Flex 300	300	1.5	600	1330	450	R 1"	43.9	6	26303
Contra-Flex 300	300	2.5	600	1330	450	R 1"	43.9	6	26305
Contra-Flex 300	300	*	600	1330	450	R 1"	43.9	6	26300
Contra-Flex 400	400	1.5	790	1180	610	R 1"	57.1	1	26413
Contra-Flex 400	400	2.5	790	1180	610	R 1"	57.1	1	26415
Contra-Flex 400	400	*	790	1180	610	R 1"	57.1	1	26414
Contra-Flex 500	500	1.5	790	1330	610	R 1"	62.9	1	26523
Contra-Flex 500	500	2.5	790	1330	610	R 1"	62.9	1	26525
Contra-Flex 500	500	*	790	1330	610	R 1"	62.9	1	26524
Contra-Flex 600	600	1.5	790	1538	610	R 1"	69.7	1	17162
Contra-Flex 600	600	2.5	790	1538	610	R 1"	69.7	1	26625
Contra-Flex 600	600	*	790	1538	610	R 1"	69.7	1	26624
Contra-Flex 800	800	1.5	790	1888	610	R 1"	87.5	1	17181
Contra-Flex 800	800	2.5	790	1888	610	R 1"	87.5	1	26825
Contra-Flex 800	800	*	790	1888	610	R 1"	87.5	1	26824
Contra-Flex 1000	1000	1.5	790	2268	610	R 1"	100.9	1	17190
Contra-Flex 1000	1000	2.5	790	2268	610	R 1"	100.9	1	26925
Contra-Flex 1000	1000	*	790	2268	610	R 1"	100.9	1	26920

* Specify pre-charge pressure when ordering.

CUBEX

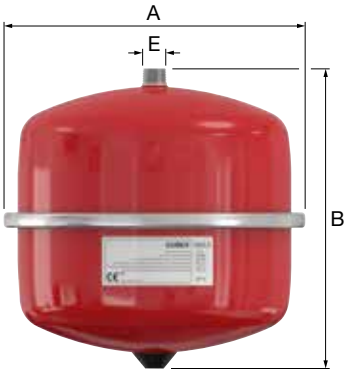
For sealed heating and chilled water (cooling) installations according to EN12828.

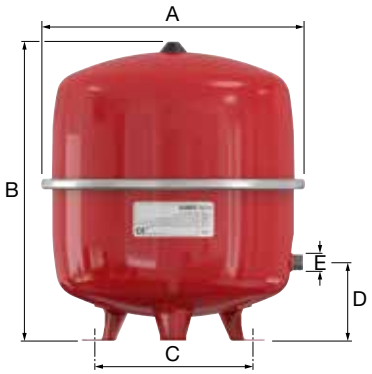
When the temperature in the installation rises, the system water will expand. The expansion water is stored temporarily in the expansion vessel to keep the pressure in the installation at the correct level. Each vessel is factory tested.

- Nitrogen gas filling for longer maintenance of pre-pressure.
- Diaphragm: Flexible rubber with rolling action.
- Red (RAL 3002) epoxy powder coating.
- Suitable for addition of glycol-based anti-freeze up to 50%.
- Vessels in accordance with EN13831.
- Suitable for systems with a maximum flow temperature of 120 °C.
- Max. temperature diaphragm: 70 °C.
- In accordance with Pressure Equipment Directive 2014/68/EU.

Cubex 8 - 80

- Maximum operating pressure: 3.0 or 6.0 bar.
- Deep drawn zinc-plated steel clench ring.
- Red (RAL 3002) epoxy powder coating.





Type	Capacity [l]	Pre-charge [bar]	Max. working pressure [bar]	Dimensions A [mm]	B [mm]	Ø C [mm]	D [mm]	Syst. conn. (E)	Weight [kg]		Order Code
Cubex 8	8	0.5	3.0	245	304	-	-	R ¾"	2.2	60	26075
Cubex 18	18	0.5	3.0	328	328	-	-	R ¾"	3.7	30	26175
Cubex 18	18	1.0	3.0	328	328	-	-	R ¾"	3.7	30	26176
Cubex 25	25	0.5	3.0	358	380	-	-	R ¾"	4.5	24	26245
Cubex 25	25	1.0	3.0	358	380	-	-	R ¾"	4.5	24	26246
Cubex 35	35	0.5	6.0	396	450	263	117	R ¾"	5.4	24	26345
Cubex 35	35	1.0	6.0	396	450	263	117	R ¾"	5.4	24	26346
Cubex 50	50	1.0	6.0	437	495	263	132	R ¾"	11.2	12	26515
Cubex 50	50	1.5	6.0	437	495	263	132	R ¾"	11.2	12	26516
Cubex 80	80	1.0	6.0	519	551	360	142	R 1"	15.0	12	26815
Cubex 80	80	1.5	6.0	519	551	360	142	R 1"	15.0	12	26816

Cubex 100 - 600

- Maximum operating pressure: 6.0 bar.
- All welded construction.
- Red (RAL 3002) epoxy powder coating.

Type	Capacity [l]	Pre-charge [bar]	Dimensions A [mm]	Dimensions B [mm]	Dimensions Ø C [mm]	Conn. (D)	Weight [kg]		Order Code
Cubex 100	100	2.5	484	784	360	R 1"	19.0	8	16700
Cubex 150	150	2.5	484	1024	360	R 1"	23.6	1	16701
Cubex 200	200	2.5	484	1300	360	R 1"	27.5	8	16702
Cubex 250	250	2.5	600	1153	450	R 1"	39.9	1	16703
Cubex 300	300	2.5	600	1330	450	R 1"	43.9	6	16704
Cubex 400	400	2.5	790	1180	610	R 1"	57.1	1	16705
Cubex 600	600	2.5	790	1538	610	R 1"	69.7	1	16706

CE

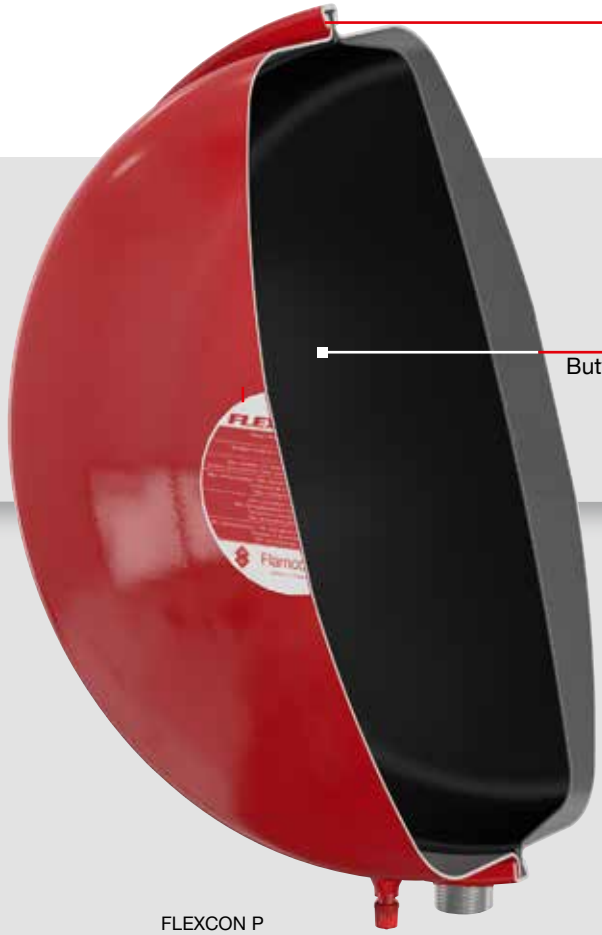
Flexcon P: Space Saving Expansion Vessels of Superior Quality

Space-saving discus shaped Flexcon diaphragm expansion vessels for use in closed heating systems with temperatures up to 120 °C and closed cooling and air conditioning systems.

Advantages

- The proven Flamco clamp ring construction permits the use of a butyl rubber diaphragm that is approximately half the size of a full diaphragm in a comparable vessel. This ensures reduced permeability, excellent pre-charge gas pressure maintenance and a long service life.
- Heavy-duty galvanized steel (sendzimir) external clamping ring.
- Quick, easy and space saving installation using the wall mounting bracket.
- The thread of the system connection is uncoated, ensuring problem free connection.

Clamp ring.



Butyl rubber diaphragm.

FLEXCON P

FLEXCON P 18

FLEXCON P 25

FLEXCON P 35

FLEXCON P 50

FLEXCON P

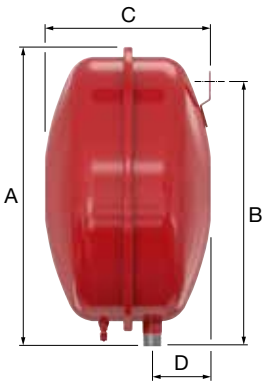
Expansion vessel with reduced height and suspension eye for use in sealed heating and chilled water (cooling) installations according to EN12828.

- The oval shape combined with the practical suspension eye enables quick and easy mounting, optimising the use of space.
- Thanks to the design no rest water remains in the vessel.
- Nitrogen gas filling for longer maintenance of pre-pressure.

Flexcon P 18 - 50

- Deep drawn zinc-plated steel clench ring.
- Diaphragm: butyl rubber.
- Suitable for addition of glycol based anti freeze up to 50%.
- Red (RAL 3002) epoxy powder coating.
- Maximum operating pressure: 3.0 bar.
- Vessels in accordance with EN13831.
- Suitable for systems with a maximum flow temperature of 120 °C.
- Max. temperature diaphragm: 90 °C.
- In accordance with Pressure Equipment Directive 2014/68/EU.

Not available on stock in the U.K.



Type	Capacity [l]	Pre-charge [bar]	Dimensions A [mm]	B [mm]	C [mm]	D [mm]	Syst. conn.	Weight [kg]		Order Code
Flexcon P 18	18	1.0	387	365	226	80	G ¾" M	5.7	30	13316
Flexcon P 25	25	1.0	435	415	256	90	G ¾" M	7.7	20	13326
Flexcon P 35	35	1.0	435	450	333	110	G ¾" M	8.9	20	13336
Flexcon P 50	50	1.5	515	505	344	125	G ¾" M	11.8	12	13357

CUBEX R

For sealed heating and chilled water (cooling) installations according to EN12828.

- Nitrogen gas filling for longer maintenance of pre-pressure.
- Diaphragm: Flexible rubber with rolling action.

Cubex R 12 - 18

- Red (RAL 3002) epoxy powder coating.
- Suitable for addition of glycol-based anti-freeze up to 50%.
- Maximum operating pressure: 3.0 bar.
- Vessels in accordance with EN13831.
- Suitable for systems with a maximum flow temperature of 120 °C.
- Max. temperature diaphragm: 70 °C.

Type	Capa-city [l]	Pre-charge [bar]	Dimensions Ø [mm]	H. [mm]	Syst. conn.	Weight [kg]		Order Code
Cubex R 12	12	0.5	387	133	G ¾" M	5.1	48	13212
Cubex R 14	14	0.5	387	153	G ¾" M	5.3	48	13214
Cubex R 18	18	0.5	387	183	G ¾" M	6.4	48	13218

INSTALLATION PACKAGES

Cubexpak Type A - 3.0 bar

A most convenient package ensuring all the correct fittings are supplied with a Cubex expansion vessel. This results in a compact and neat assembly for a domestic sealed system. Cubexpaks are sized in the same way as standard expansion vessels.

- Fixed diaphragm.
- Maximum operating pressure: 3.0 bar.
- Max. temperature diaphragm: 70 °C.
- Cubexpak A includes:
  Cubex expansion vessel.
  Vessel manifold.
  Prescomano combined safety valve and pressure gauge.
  Double check valve with test point.
  Flexible braided hose with quick fit connections and 'O' ring seal.
  Stop valve for connection to water mains.
  Isolation valve.
  MB2 vessel mounting bracket with wall plugs and screws.
  End caps for fitting on the exposed ends of the flexible hose when it is removed.
- Larger Cubexpaks available on request, not including MB2 mounting bracket e.g. 35, 50 and 80 litre.
- Gas charge must be stated on order, e.g. Cubex 8/05 = 8 litre vessel with 0.5 bar(g) gas charge.
- Gas charge will determine the maximum working pressure. Other gas charges supplied to suit.

CE

Type	Output [l]	Pre-charge [bar]	Dimensions Ø [mm]	Dimensions H. [mm]	Syst. conn. (M)	Weight [kg]		Order Code
Cubexpak A 4	4	0.5	245	412	15	2.4	1	16495
Cubexpak A 8	8	0.5	245	412	15	3.4	1	16497
Cubexpak A 12	12	0.5	286	444	15	3.8	1	16499
Cubexpak A 18	18	0.5	328	436	15	4.9	1	16501
Cubexpak A 25	25	0.5	358	485	15	5.7	1	16503
Cubexpak A 35	35	0.5	396	439	15	6.7	1	16505
Cubexpak A 50	50	0.5	437	495	15	7.7	1	16507

Cubexpak Type B - 3.0 bar

Similar to the Cubexpak Type A, but with the safety valve separately to allow for remote installation.

CE

Type	Output [l]	Pre-charge [bar]	Dimensions Ø [mm]	Dimensions H. [mm]	Syst. conn. (M)	Weight [kg]		Order Code
Cubexpak B 8	8	0.5	245	364	15	3.4	1	16498
Cubexpak B 12	12	0.5	286	396	15	3.8	1	16500
Cubexpak B 50	50	0.5	437	495	15	7.7	1	16508
Cubexpak B 80	80	0.5	519	551	15	8.8	1	16510

Vesselpak Type A - 6.0 bar

A convenient package ensuring all the correct fittings are supplied with a Flexcon expansion vessel.This results in a compact and neat assembly for a domestic sealed system. Vesselpaks are sized in the same way as standard expansion vessels.

- Fixed diaphragm.
- Maximum operating pressure: 6.0 bar.
- Max. temperature diaphragm: 70 °C.
- Vesselpak A includes:
  Flexcon expansion vessel.
  Vessel manifold.
  Prescomano combined safety valve and pressure gauge.
  Double check valve with test point.
  Flexible braided hose with quick fit connections and 'O' ring seal.
  Stop valve for connection to water mains.
  Isolation valve.
  MB2 vessel mounting bracket with wall plugs and screws.
  End caps for fitting on the exposed ends of the flexible hose when it is removed.
- Larger Vesselpaks available on request, not including MB2 mounting bracket e.g. 35 and 50 litre.
- Gas charge must be stated on order, e.g. Flexcon 2/05 = 2 litre vessel with 0.5 bar gas charge. Gas charge will determine the maximum working pressure. Other gas charges supplied to suit.

CE

Type	Output [l]	Pre-charge [bar]	Dimensions Ø [mm]	Dimensions Height [mm]	Syst. conn. (M)	Weight [kg]		Order Code
Vesselpak A 2	2	0.5	194	260	15	2.3	1	16685
Vesselpak A 4	4	0.5	194	365	15	2.8	1	16686
Vesselpak A 8	8	0.5	245	388	15	4.4	1	16688
Vesselpak A 18	18	0.5	328	414	15	6.9	1	16692
Vesselpak A 25	25	0.5	358	467	15	8.5	1	16694
Vesselpak A 35	35	0.5	400	450	15	6.7	1	16696
Vesselpak A 50	50	0.5	440	500	15	8.0	1	16698
Vesselpak A 80	80	0.5	530	550	15	9.0	1	16699

Vesselpak Type B - 6.0 bar

Similar to the Vesselpak Type A, but with the safety valve separately to allow for remote installation.

CE

Type	Output [l]	Pre-charge [bar]	Dimensions Ø [mm]	Dimensions Height [mm]	Syst. conn. (M)	Weight [kg]		Order Code
Vesselpak B 4	4	0.5	194	317	15	2.8	1	16687
Vesselpak B 8	8	0.5	245	340	15	4.4	1	16689
Vesselpak B 12	12	0.5	286	373	15	5.5	1	16691
Vesselpak B 18	18	0.5	328	366	15	6.9	1	16693
Vesselpak B 25	25	0.5	358	419	15	8.5	1	16695

Combi Repair Kit - 6.0 bar

An installation kit for the instant fitting of an expansion vessel to a central heating system. Consists of Flexcon expansion vessel, mounting bracket with fixings, vessel adaptor for hose, flexible hose and T-Plus coupling.

- Max. working pressure: 6.0 bar.

Type	Output [l]	Gas Charge [bar]	System Con-nection	Dimensions Ø [mm]	Dimensions Height [mm]	Dry weight [kg]		Order Code
Combi Repair Kit 8	8	0.5	15	245	280	4.9	1	16513
Combi Repair Kit 8	8	0.5	22	245	280	4.9	1	16514
Combi Repair Kit 12	12	0.5	15	286	313	6.3	1	16515
Combi Repair Kit 12	12	0.5	22	286	313	6.3	1	16516
Combi Repair Kit 18	18	0.5	22	328	306	8.0	1	16517

Flexcon M

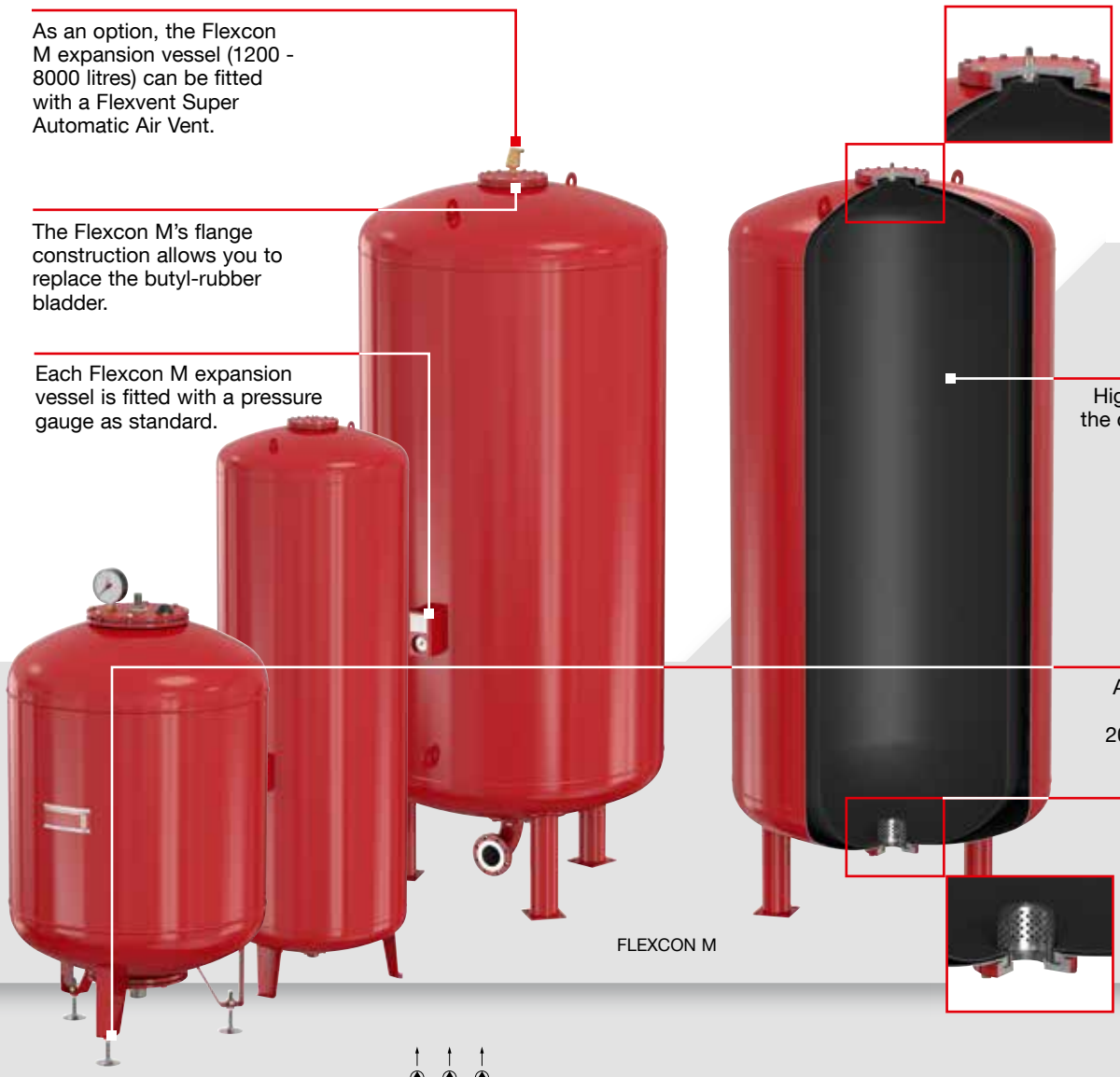
A Flexcon M expansion vessel offers you advantages in installations with big differences in the static pressure and set pressure of the safety valve.

All Flexcon M expansion vessels are fitted with an exchangeable bladder. This bladder forms the separation between the expansion water inside the bladder and the nitrogen cushion.

As an option, the Flexcon M expansion vessel (1200 - 8000 litres) can be fitted with a Flexvent Super Automatic Air Vent.

The Flexcon M's flange construction allows you to replace the butyl-rubber bladder.

Each Flexcon M expansion vessel is fitted with a pressure gauge as standard.

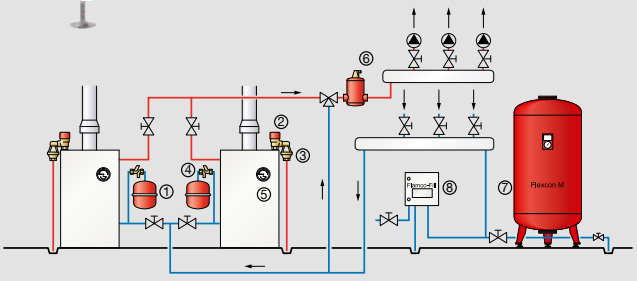


High efficiency means that the capacity of the vessel is used to best effect.

All Flexcon M expansion vessels (except 1200 - 2000 litres) are fitted with an adjustable foot.

Process fitting with cage to protect the membrane when no water is present in the vessel.

FLEXCON M



Systems with more than one boiler:

1. Flexcon expansion vessel (depending on boiler capacity).
2. Prescor safety valve or Prescomano.
3. Flamco tundish.
4. Flexcon Connection Group ½".
5. Flexcon pressure gauge or combined pressure gauge/thermometer.
6. Flamco venting equipment.
7. One or more Flexcon M vessels.
8. Flamco pressurisation unit.

FLEXCON M

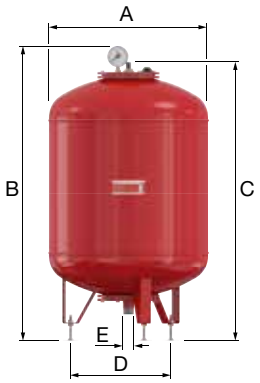
For heating and chilled water (cooling) installations according to EN12828.

The vessel is equipped with a replaceable bladder made from high-quality butyl rubber in compliance with EN13831. Particular benefits of use are achieved in installations with large variations between static pressure and pre-set pressure of the safety valve.

- Replaceable bladder.
- Nitrogen gas filling for longer maintenance of pre-pressure.
- Red (RAL 3002) epoxy powder coating.
- Suitable for addition of glycol-based anti-freeze up to 50%.
- Delivered with pressure gauge and height-adjustable feet (except 1200 - 2000 litres).
- As an option, the Flexcon M 1200 - 8000 can be fitted with a Flexvent Super.
- Vessels 100 - 1000 litres: in accordance with EN13831 / 1200 - 8000 litres: in accordance with AD2000.
- Suitable for systems with a flow temperature of 120 °C.
- Max. temperature bladder: 70 °C.
- In accordance with Pressure Equipment Directive 2014/68/EU.

Flexcon M

- Max. operating pressure: 6.0 or 10.0 bar.
- Standard pre-charge: 3.0 or 6.0 bar (unless otherwise indicated).



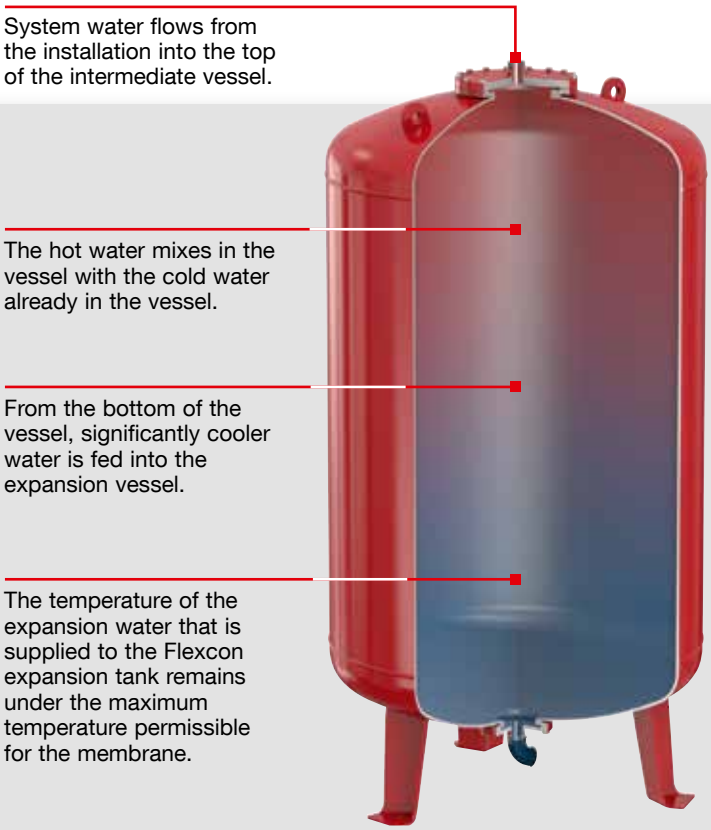
Type	Capacity [l]	Pre-charge [bar]	Max. working pressure [bar]	Dimensions A [mm]	B [mm]	C [mm]	Ø D [mm]	Syst. conn. (E)	Weight [kg]		Order Code
Flexcon M 100	100	3.0	6.0	484	958	928	360	G 1 ¼" M	23	1	22000
Flexcon M 100	100	6.0	10.0	484	958	928	360	G 1 ¼" M	33	1	22010
Flexcon M 200	200	3.0	6.0	484	1500	1470	360	G 1 ¼" M	30	1	22001
Flexcon M 200	200	6.0	10.0	600	1136	1106	450	G 1 ¼" M	46	1	22011
Flexcon M 300	300	3.0	6.0	600	1505	1475	450	G 1 ¼" M	41	1	22002
Flexcon M 300	300	6.0	10.0	600	1505	1475	450	G 1 ¼" M	60	1	22012
Flexcon M 400	400	3.0	6.0	790	1348	1318	610	G 1 ¼" M	55	1	22003
Flexcon M 400	400	6.0	10.0	790	1348	1318	610	G 1 ¼" M	84	1	22013
Flexcon M 500	500	3.0	6.0	790	1498	1468	610	G 1 ¼" M	61	1	22004
Flexcon M 600	600	3.0	6.0	790	1708	1678	610	G 1 ¼" M	68	1	22005
Flexcon M 600	600	6.0	10.0	790	1708	1678	610	G 1 ¼" M	106	1	22014
Flexcon M 800	800	3.0	6.0	790	2055	2025	610	G 1 ¼" M	93	1	22006
Flexcon M 800	800	6.0	10.0	790	2055	2025	610	G 1 ¼" M	145	1	22015
Flexcon M 1000	1000	3.0	6.0	790	2404	2374	610	G 1 ¼" M	105	1	22007
Flexcon M 1000	1000	6.0	10.0	790	2404	2374	610	G 1 ¼" M	167	1	22016
Flexcon M 1200	1200	3.0	6.0	1000	-	1940	850	Rp 1 ½" *	285	1	22108
Flexcon M 1200	1200	6.0	10.0	1000	-	1940	850	Rp 1 ½" *	410	1	22148
Flexcon M 1600	1600	3.0	6.0	1000	-	2440	850	Rp 1 ½" *	340	1	22109
Flexcon M 1600	1600	6.0	10.0	1000	-	2440	850	Rp 1 ½" *	485	1	22149
Flexcon M 2000	2000	3.0	6.0	1200	-	2180	1050	Rp 2" *	425	1	22110
Flexcon M 2000	2000	6.0	10.0	1200	-	2180	1050	Rp 2" *	600	1	22150
Flexcon M 2800	2800	3.0	6.0	1200	-	2780	1050	Rp 2 ½" *	510	1	22118
Flexcon M 2800	2800	6.0	10.0	1200	-	2780	1050	Rp 2 ½" *	725	1	22158
Flexcon M 3500	3500	3.0	6.0	1200	-	3580	1050	Rp 2 ½" *	620	1	22111
Flexcon M 3500	3500	6.0	10.0	1200	-	3580	1050	Rp 2 ½" *	900	1	22151
Flexcon M 5200	5200	6.0	10.0	1500	-	3600	1142	Rp 2 ½" *	1330	1	22152
Flexcon M 6700	6700	6.0	10.0	1500	-	4480	1142	DN 100 **	1690	1	22153
Flexcon M 8000	8000	6.0	10.0	1500	-	5090	1142	DN 100 **	2140	1	22154

* Adapter with flange connection PN 16 available (see Flexcon M-K).
** Flanges as per EN 1092-1 PN 16.

Flexcon VSV and V-B Intermediate Vessels

In sealed heating systems, the supply temperature can reach 120 °C. The maximum permissible continuous temperature load on diaphragms in expansion vessels is 70 °C in compliance with the appropriate standards. That is why Flexcon expansion vessels must be fitted in the return line.

If the temperature in the return line is not capped at 70 °C, a Flexcon intermediate vessel must be fitted. In this intermediate vessel the expansion water is allowed to cool.
The extent to which the expansion water is cooled depends on the volume of the intermediate vessel.



Calculation for an intermediate vessel

The required volume of a Flexcon VSV/VB intermediate vessel depends on the supply temperature and a percentage of the net expansion volume as per the table below.

Supply temperature	Flexcon intermediate vessel volume % of the net expansion volume
90 - 110 °C	15
111 - 125 °C	25
126 - 140 °C	40
141 - 150 °C	60

Example calculation for an intermediate vessel

Data:

- expansion volume = 1.740 litres
- supply temperature (105/95 °C) = 105 °C

Calculation:

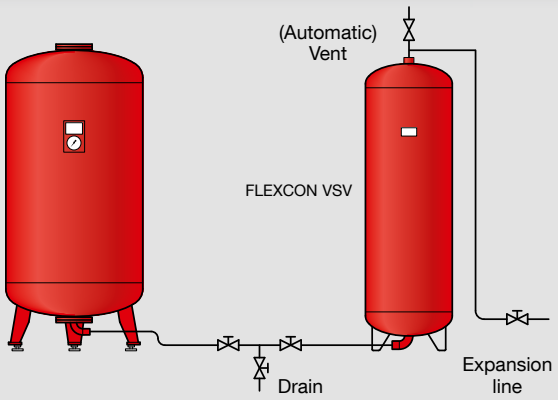
Required vessel volume = 15% of the expansion volume

$$= \frac{15 \times 1.740}{100} = 261 \text{ litres}$$

The ideal intermediate vessel is thus the Flexcon VSV 350.

Flexcon intermediate vessel connection diagram

The intermediate vessel functions according to the principle that hot water is lighter than cold water.
As the intermediate vessel is filled with water from the top, the heat will be concentrated there.
System water that has been allowed to cool will, due to its greater density, fall and this cooler water will naturally be forced towards the connection on the underside of the expansion vessel.



FLEXCON INTERMEDIATE VESSELS

Vessels to protect Flexcon expansion vessels on elevated temperature systems.
The vessels are fitted in between the expansion vessel and the system return.

- Red (RAL 3002) epoxy powder coating.
- Suitable for addition of glycol-based anti-freeze up to 50%.
- Material quality: S235JR.
- In accordance with Pressure Equipment Directive 97/23/EC.

Flexcon VSV - 6.0 bar

- Maximum working temperature: 110 °C.
- This vessel is manufactured in accordance with sound engineering practice and satisfies the essential design requirements of the member state.

Type	Capacity [l]	Dimensions Ø [mm]	Dimensions H. [mm]	Connection to Vessel	Connection to System	Weight [kg]		Order Code
Flexcon VSV 100	100	484	794	Rp 1 ½"	Rp 1 ½"	26.5	1	23386
Flexcon VSV 200	200	484	1304	Rp 1 ½"	Rp 1 ½"	28.8	1	23380
Flexcon VSV 350	350	484	2124	Rp 1 ½"	Rp 1 ½"	55.0	1	23381
Flexcon VSV 500	500	600	2025	Rp 2"	Rp 2"	64.0	1	23382
Flexcon VSV 750	750	790	1904	Rp 2"	Rp 2"	96.0	1	23383
Flexcon VSV 1000	1000	790	2255	Rp 2"	Rp 2"	114.0	1	23384

Flexcon VSV - 10.0 bar

- Maximum working temperature: 110 °C.
- This vessel is manufactured in accordance with sound engineering practice and satisfies the essential design requirements of the member state.

Type	Capacity [l]	Dimensions Ø [mm]	Dimensions H. [mm]	Connection to Vessel	Connection to System	Weight [kg]		Order Code
Flexcon VSV 100	100	484	794	Rp 1 ½"	Rp 1 ½"	31	1	23306
Flexcon VSV 200	200	484	1304	Rp 1 ½"	Rp 1 ½"	51	1	23300
Flexcon VSV 350	350	484	2124	Rp 1 ½"	Rp 1 ½"	80	1	23301
Flexcon VSV 500	500	600	2025	Rp 2"	Rp 2"	96	1	23302
Flexcon VSV 750	750	790	1904	Rp 2"	Rp 2"	142	1	23303
Flexcon VSV 1000	1000	790	2255	Rp 2"	Rp 2"	172	1	23304

Flexcon V-B - 10.0 bar

- Maximum working temperature (design): 160 °C.

Type	Capacity [l]	Dimensions Ø [mm]	Dimensions H. [mm]	Connection Vessel	Connection System	Weight [kg]		Order Code
V-B 50	50	450	640	G 1 ¼" F	R 1 ¼"	62	1	22730
V-B 180	180	550	1235	G 1 ¼" F	R 1 ¼"	133	1	22731
V-B 300	300	550	1735	G 1 ¼" F	R 1 ¼"	182	1	22729
V-B 400	400	750	1470	G 1 ¼" F	R 1 ¼"	255	1	22732
V-B 600	600	750	1860	G 1 ¼" F	R 1 ¼"	293	1	22733
V-B 800	800	750	2250	G 1 ¼" F	R 1 ¼"	344	1	22734
V-B 1000	1000	750	2750	G 1 ½" F	R 1 ½"	409	1	22735
V-B 1200	1200	1000	2200	G 1 ½" F	R 1 ½"	520	1	22736
V-B 1600	1600	1000	2700	G 1 ½" F	R 1 ½"	605	1	22737
V-B 2000	2000	1200	2435	G 2" F	R 2"	675	1	22738