

D - CE series

2 to 500 litres



Polifunctional sanitary vessels with bladder

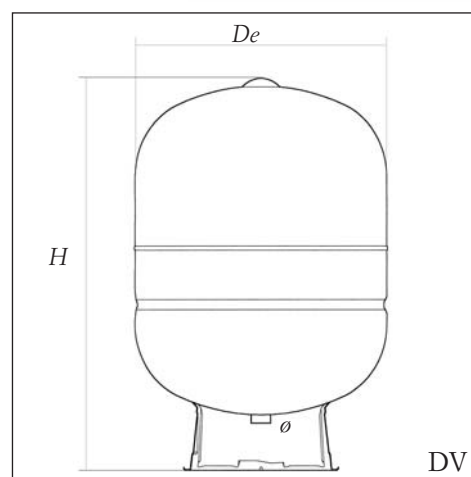
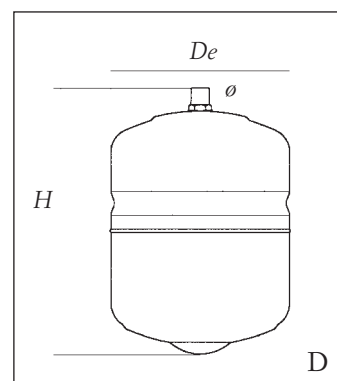
Polifunctional sanitary vessels with fixed bladder are designed to be fitted both into sanitary system as expansion tanks,

suitable to absorb the water expansion volume generated by a changing temperature, as well as tanks for cold water sanitary systems. Both applications are possible thanks to the exclusive Top-Pro® anti-corrosion treatment which ensures the protection against corrosion of the inner surface of the fitness of all parts in contact with water.

Installing a D series sanitary vessel considerably cuts down operating costs, while suppressing the discharge function of the safety valve.

Characteristics:

- Equipped with a fixed alimentary bladder in Butyl that ensures permanent isolation of the air cushion from the water;
- Internal protection of the water connection in Nylon 66;
- Guaranteed for 3 years (all the D series);
- In compliance with essential safety requirements of directive 97/23/EC;
- CE marking.



Model	Capacity litres	Max working pressure (bar)	Precharge pressure (bar)	ø	De mm	H mm	Packaging mm
D 2	2	10	3	1/2"	146	230	150 x 150 x 240
D 5	5	10	3	3/4"	205	225	210 x 210 x 250
D 8	8	10	3	3/4"	205	300	210 x 210 x 320
D 11	11	10	3	3/4"	270	300	280 x 280 x 310
D 18	18	10	3	3/4"	270	410	280 x 280 x 450
D 24	24	10	3	1"	320	355	330 x 330 x 375
D 35	35	10	3	1"	400	390	410 x 410 x 410
DV 50	50	10	3	1"	400	570	410 x 410 x 610
DV 80	80	10	3	1"	400	825	410 x 410 x 860
DV 100	100	10	3	1 1/4"	500	779	510 x 510 x 830
DV 150	150	10	3	1 1/4"	500	1.007	510 x 510 x 1040
DV 200	200	10	3	1 1/4"	600	1.076	610 x 610 x 1110
DV 300	300	10	3	1 1/4"	650	1.251	660 x 660 x 1290
DV 500	500	10	3	1 1/4"	775	1.410	785 x 785 x 1440

Method used for selecting the expansion tank

This table simplifies the choice of the ELBI expansion tank to be installed in the hot sanitary water circuits.

Model	Plant height m	Prech. press. bar	Tank accept. vol. lt	Tank absorbt. cap. %	Plant water content (lt)
D 2	30	3,0	0,9	45	80
	35	3,5	0,7	35	60
	40	4,0	0,6	30	50
D 8	30	3,0	3,4	43	290
	35	3,5	2,9	36	245
	40	4,0	2,3	28	195
D 11	30	3,0	4,7	43	400
	35	3,5	3,9	36	335
	40	4,0	3,2	28	270
D 18	30	3,0	7,7	43	660
	35	3,5	6,4	36	550
	40	4,0	5,1	28	440
D 24	30	3,0	10,3	43	880
	35	3,5	8,6	36	735
	40	4,0	6,9	28	590
D 35	30	3,0	15,0	43	1285
	35	3,5	12,5	36	1070
	40	4,0	10,0	28	860
DV 50	30	3,0	21,4	43	1835
	35	3,5	17,9	36	1530
	40	4,0	14,3	28	1225
DV 80	30	3,0	34,3	43	2935
	35	3,5	28,6	36	2445
	40	4,0	22,8	28	1955
DV 100	30	3,0	42,9	43	3670
	35	3,5	35,7	36	3060
	40	4,0	28,6	28	2445
DV 150	30	3,0	64,3	43	5505
	35	3,5	53,6	36	4585
	40	4,0	42,9	43	3670
DV 200	30	3,0	85,7	43	7340
	35	3,5	71,4	36	6115
	40	4,0	57,1	28	4890
DV 300	30	3,0	128,6	43	11010
	35	3,5	107,2	36	9175
	40	4,0	85,7	28	7340
DV 500	30	3,0	214,3	43	18345
	35	3,5	178,6	36	15290
	40	4,0	142,8	28	12230



Max press. =	6 bar
t inlet =	10°C
t outlet =	50°C

Sizing of an expansion tank with a fixed bladder

Technical data

The expansion tank's useful volume must be calculated according to a maximum working pressure (p_e), corresponding to the safety valve's adjustment pressure, diminished by a quantity equal to the difference value between the expansion tank and the safety valve, if the latter is situated downwards, otherwise increased if the safety valve is located upwards.

The expansion tank's useful volume must correspond to the expansion volume (V_e), in practice the maximum change of the water volume which can occur in the plant is the following one:

$$V_e = C \times (u_2 - u_1) \quad [\text{litres}]$$

where:

u_2 = water specific volume at the maximum operative temperature litres/kg.

u_1 = water specific volume at the minimum operative temperature litres/kg.

C = plant's total capacity (boiler, pipes, charges, etc.) kg.

The V_t total volume of the closed expansion tank with a bladder is calculated according to the following formula:

$$V_t = \frac{V_e}{1 - \frac{P_p}{P_e}} \quad [\text{litres}]$$

In order to avoid calculating $1 - \frac{P_p}{P_e}$ the table 2 reporting the results of these calculations has P_e been drawn up.

where:

V_e = plant's expansion volume litres

P_p = precharge pressure of the expansion tank bar (absolute pressure)

P_e = plant's maximum working pressure or adjustment pressure of the safety valve bar (absolute pressure)

The precharge pressure must correspond to the hydrostatic pressure in the tank's installation place, whereas the difference between the cut in pressure of the safety valve (p_v) and the working pressure (p_e) is usually 10% of the cut in pressure.

A tolerance of 10% of the plant's total volume is allowed in the choice of the tank to be installed.

“water specific volume at different temperatures”

Table 1

T °C	ν litres/Kg	T °C	ν litres/Kg	T °C	ν litres/Kg	T °C	ν litres/Kg
- 10	1,00186	16	1,00103	36	1,00632	80	1,0290
- 5	1,00070	18	1,00138	38	1,00706	85	1,0324
0	1,00013	20	1,00177	40	1,0078	90	1,0359
2	1,00003	22	1,00221	45	1,0099	95	1,0396
4	1,00000	24	1,00268	50	1,0121	100	1,0434
6	1,00003	26	1,00320	55	1,0145	110	1,0515
8	1,00012	28	1,00375	60	1,0171	120	1,0600
10	1,00027	30	1,00435	65	1,0198	130	1,0795
12	1,00048	32	1,00497	70	1,0227	140	1,0795
14	1,00073	34	1,00563	75	1,0258	150	1,0903

Table 2 a

Max working pressure	precharge pressure (bar)								
	1	1,5	2	2,5	3	3,5	4	4,5	5
1,5	0,2								
2	0,333	0,167							
2,5	0,429	0,286	0,143						
3	0,5	0,375	0,25	0,125					
3,5	0,556	0,444	0,333	0,222	0,111				
4	0,6	0,5	0,400	0,3	0,2	0,1			
4,5	0,636	0,545	0,455	0,364	0,273	0,182	0,091		
5	0,667	0,583	0,5	0,417	0,333	0,25	0,167	0,083	
5,5	0,692	0,615	0,538	0,462	0,385	0,308	0,231	0,154	0,07
6	0,714	0,643	0,571	0,5	0,429	0,357	0,286	0,21	0,14
6,5	0,733	0,667	0,60	0,533	0,467	0,4	0,333	0,26	0,2
7	0,75	0,688	0,625	0,563	0,5	0,438	0,375	0,31	0,25
7,5	0,765	0,706	0,647	0,588	0,529	0,471	0,412	0,35	0,29
8	0,778	0,722	0,667	0,611	0,556	0,5	0,444	0,38	0,33
8,5	0,789	0,737	0,684	0,632	0,579	0,526	0,474	0,42	0,36
9	0,8	0,75	0,7	0,65	0,6	0,55	0,5	0,45	0,4
9,5	0,81	0,762	0,714	0,667	0,619	0,571	0,524	0,47	0,43
10	0,818	0,773	0,727	0,682	0,636	0,591	0,545	0,5	0,45

Table 2 b

Max working pressure	precharge pressure (bar)								
	5,5	6	6,5	7	7,5	8	8,5	9	9,5
6	0,07								
6,5	0,13	0,06							
7	0,18	0,12	0,06						
7,5	0,23	0,17	0,11	0,06					
8	0,28	0,22	0,16	0,11	0,06				
8,5	0,31	0,26	0,21	0,16	0,1	0,05			
9	0,35	0,3	0,25	0,21	0,15	0,1	0,05		
9,5	0,38	0,33	0,28	0,24	0,19	0,14	0,1	0,05	
10	0,41	0,36	0,32	0,27	0,23	0,18	0,14	0,09	0,045