Pressure tanks















fiorini



P.E.D. tested pressure tanks

A broad range of pressurized tank, with CE mark, in accordance with the P.E.D. directive (Directive 2014/68/UE)

The products are manufactured as prescribed by the P.E.D. directive, which applies to storage tanks that have to contain dangerous fluids or fluids under high pressure and/or temperatures. The tanks are designed to meet the specific requirements for several applications: autoclaves, compressed air tanks, expansion vessels, steam accumulators and expansion vessels for heat transfer oil. They are made of carbon steel sheets, welded in an automatic process, accurately refinished and controlled and tested on the grounds of the operative circumstances of the project.

On demand, we also manufacture:

- products with customized dimensions;
- inspection holes;
- external protective treatments;
- specific insulation;
- internal protective treatments (hot dip galvanizing UNI EN1179) suited for contact with water for human consumption, external anti-rust coating, internal Teflon coating for alimentary use;
- external coatings, such as PVC finish, embossed aluminum, smooth aluminum or particular materials to be evaluated according to specifications.





P.E.D. directive

The PED directive (Directive 2014/68/UE) regulates the design, manufacturing and conformity valuation of pressure vessels and products submitted to a maximum allowable pressure "PS" over 0.5 bar. The CE directive aims to harmonize the nationals laws in the member states that relate to the valuation of the project, the production, the testing and the conformity of the pressurized vessels and products.

The directive concerns pressure vessels, heat exchangers, steam generators, heaters, industrial piping and safety equipment, used in residential and industrial settings (oil & gas, chemical, pharmaceutics, plastic and rubber, alimentary, paper).

Hazard category of the devices

This is an indication of the danger level of the pressure vessels which can be divided in the following categories: Article 4 section 3, I, II, III, IV. The category is determined on the grounds of numerous factors: typology of the fluid, (dangerous and not dangerous), max allowable temperature, pressure and capacity.

According to the PED, fluids are divided in 2 categories:

GROUP 1:
includes dangerous fluids
- Explosives
- Extremely flammable fluids
- Easily flammable fluid
- Flammable fluids (where the allowed maximum temperature is above flashpoint)
- Highly toxic fluids
- Toxic fluids
- Reactive fluids

GROUP 2: includes all fluids not listed in group 1 and therefore not considered dangerous.
The following chart illustrates the typology of our products, in function of the used fluid and the temperature values. First you individuate the table which applies to the device in question, then you determine the hazard category of the device under the tested pressure.

Note
- The five tables should be consulted per line.
- The pressure vessels which are not subject to Article 4 section 3 and belong to the ≥ I category have to have the CE label in accordance with the PED directive
- **WATER, ETHYLENE GLYCOL AND PROPYLENE GLYCOL BELONG TO GROUP 2.**

P.E.D. directive

Category	PED	CE label	Intervention by notified body	Additional costs
PS ≤ 0,5	Not applicable	No	No	No
Article 4 paragraph 3	Applicable	No	No	No
I	Applicable	Yes	No	Yes
II	Applicable	Yes	Project delivery without approval	Inspection visit
III	Applicable	Yes	Inspection visit + project approval	Inspection visit + project approval
IV	Applicable	Yes	Inspection visit + project approval	Inspection visit + project approval

PS: is the maximum allowed pressure, the maximum pressure for which the equipment is designed, specified by the manufacturer.

V: is the internal volume of a chamber, including the volume of nozzles to the first connection and excluding the volume of permanent internal parts.

ARTICLE 4 PARAGRAPH 3: the pressure equipment belongs to category <I and therefore should not bear the CE mark according to PED.

Note: please consult the technical department
- If a vessel is composed of several compartments, or if one compartment contains several fluids.
- If the fluid is different from those listed in NOTE 1.
- If the equipment belongs to a category ≥ I.
- If a vessel contains pressure equipment which belongs to a category ≥ I.
- In case of doubt or uncertainty.

Tables for classification of pressure vessels

According to the Pressure Equipment Directive 2014/68/UE

Index

Type of pressure equipment	Fluid	Temperature	Table to consult
Tanks and plate heat exchangers	Water	≤110	4
Tanks and plate heat exchangers	Steam or superheated water	>110	2
Tube bundle exchangers	Water	≤110	4
Tube bundle exchangers	Steam or superheated water	>110	2
Steam generators	Steam or superheated water	>110	5
Tanks and plate heat exchangers	Water, ethylene and propylene glycol	≤110	4
Tanks and plate heat exchangers	Water, ethylene and propylene glycol	>110	2
Tanks and plate heat exchangers	Freon and dangerous gases		1
Autoclaves	Nitrogen or other non-dangerous gases		2
Autoclaves	Dangerous gases		1

Table 1 – Pressure vessels

V l	PS bar	PS x V	Category
0,1 < V ≤ 1	0,5 < PS < 200		Article 4 paragraph 3
0,1 < V < 1	200 < PS ≤ 1000		III
0,1 < V < 1	PS > 1000		IV
1 < V ≤ 50	PS > 0,5	PS x V ≤ 25	Article 4 paragraph 3
1 < V < 100	PS > 0,5	25 < PS x V ≤ 50	I
1 < V < 400	PS > 0,5	50 < PS x V ≤ 200	II
1 < V < 2000	0,5 < PS < 1000	200 < PS x V ≤ 1000	III
V > 1	PS > 0,5	PS x V > 1000	IV

Table 2 – Pressure vessels

V l	PS bar	PS x V	Category
0,1 < V ≤ 1	0,5 < PS < 1000		Article 4 paragraph 3
0,1 < V ≤ 1	1000 < PS < 3000		III
0,1 < V ≤ 1	PS > 3000		IV
1 < V ≤ 100	PS > 0,5	PS x V ≤ 50	Article 4 paragraph 3
1 < V ≤ 400	PS > 0,5	50 < PS x V ≤ 200	I
1 < V < 750	PS > 0,5	1000 < PS x V ≤ 3000	III
1 < V ≤ 750	PS > 0,5	PS x V > 3000	IV
V > 750	0,5 < PS < 4		III
V > 750	PS > 4		IV
1 < V ≤ 2000	PS > 0,5	200 ≤ PS x V ≤ 1000	II

Tables for classification of pressure vessels

According to the Pressure Equipment Directive 2014/68/UE

Table 3 – Pressure vessels

V l	PS bar	PS x V	Category
0,1 < V ≤ 1	0,5 < PS < 500		Article 4 paragraph 3
0,1 < V ≤ 1	PS > 500		II
V > 1	200 < PS ≤ 500		II
V > 1	PS > 500		III
V > 20	0,5 < PS ≤ 10	PS x V > 200	I
1 < V ≤ 400	PS > 0,5	PS x V ≤ 200	Article 4 paragraph 3
V > 1	10 < PS ≤ 200	PS x V > 200	II

Table 4 – Pressure vessels

V l	PS bar	PS x V	Category
0,1 < V ≤ 10	10 < PS < 1000		Article 4 paragraph 3
0,1 < V < 10	PS > 1000		I
V > 0,1	0,5 < PS ≤ 10		Article 4 paragraph 3
V ≥ 10	PS > 1000		II
10 < V < 20	500 < PS ≤ 1000	PS x V > 10000	II
10 < V < 1000	PS > 10	PS x V ≤ 10000	Article 4 paragraph 3
V > 20	10 < PS ≤ 500	PS x V > 10000	I

Table 5 – Steam or superheated water at temperatures above 110°C

V l	PS bar	PS x V	Category
0,1 < V ≤ 2	PS > 0,5		Article 4 paragraph 3
2 < V < 100	0,5 < PS < 25	PS x V ≤ 50	I
V > 2	25 < PS < 32	PS x V ≤ 200	II
V > 2	PS > 32		IV
	0,5 < PS < 25	50 < PS x V ≤ 200	II
	3 ≤ PS ≤ 32	PS x V > 3000	IV
V < 1000	0,5 < PS < 32	200 < PS x V ≤ 3000	III
V > 1000	0,5 < PS < 3		IV

P.E.D. tested autoclaves 6/8/12 bar AC series

Fiorini autoclaves are designed for lifting and distributing water under pressure. They are intended to form a lung of pressurized water which, if properly sized, serves to limit the number of start-ups of the pump. They are used to ensure perfect water distribution in the upper floors of buildings making up possible shortcomings of water aqueducts.

The models, with CE label, have capacities of 300 up to 20.000 litres in both the vertical and horizontal version with 6, 8 or 12 bar.

✔ **Materials:** carbon steel
✔ **Protective treatment:** hot dip galvanizing and external coating
✔ **Operative conditions:** the storage tanks have a max pressure of 6,8 or 12 bar and operating temperatures from -10°C to 50°C

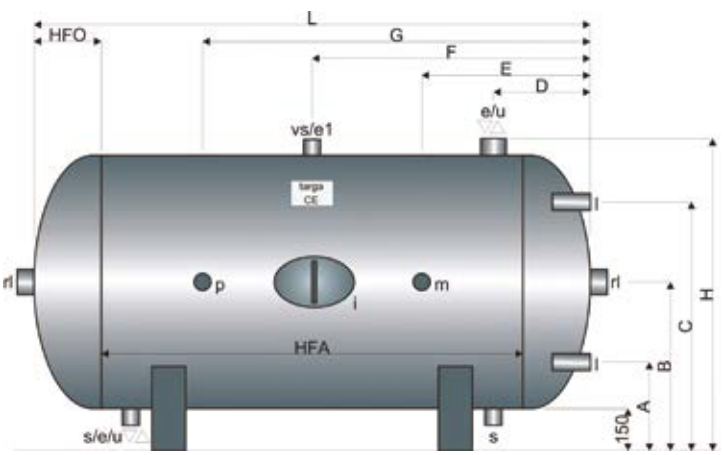
Special versions: the AC storage tanks can be modified on demand in order to meet your specific requirements

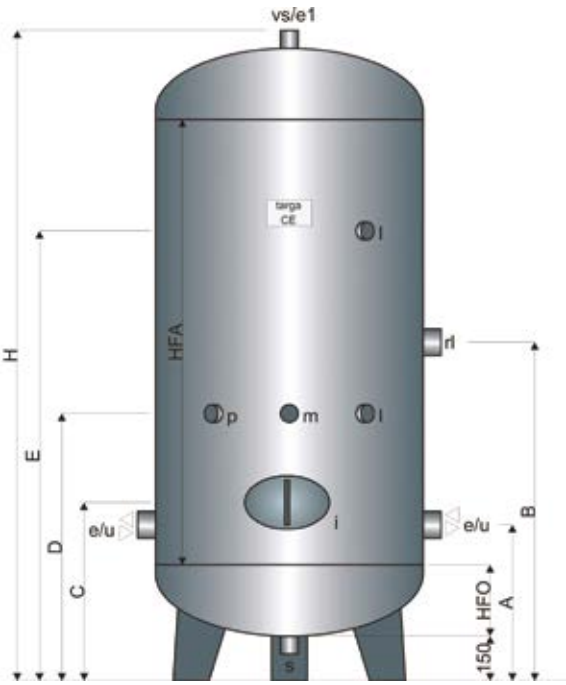


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Connections

s	Drain
vs	Safety valve
m	Pressure gauge
p	Pressure controller
i	Inspection hole
e	Water inlet
u	Water outlet
e1	Air inlet
l	Level
rl	Level regulator





P.E.D. tested autoclaves 6/8/12 bar AC series

Vertical

Capacity l	Ø mm	HFO mm	HFA mm	A mm	B mm	C mm	D mm	E mm	H mm	peso kg	e/u (*) inch	l/m/p (*) inch	rl/vs/s/e1 (*) inch	i mm
300	500	165	1250	415	940	465	715	1415	1760	75	1	1/2	1 1/4	*
500	650	200	1250	450	975	500	750	1450	1830	101	1 1/2	1/2	1 1/4	*
800	800	240	1250	490	1015	540	790	1490	1910	136	2	1/2	1 1/4	*
1000	800	240	1650	490	1215	540	990	1890	2310	162	2	1/2	1 1/4	*
1500	950	280	1750	530	1305	580	1030	2030	2490	232	2	1/2	1 1/4	*
2000	1100	310	1750	560	1335	610	1060	2060	2550	274	2	1/2	1 1/4	*/**
3000	1250	350	2000	620	1500	650	1200	2200	2880	466	2 1/2	1/2	1 1/4	*/**
4000	1400	390	2000	740	1540	690	1240	2240	2960	541	3	1/2	1 1/4	*/**/***
5000	1450	410	2500	760	1810	710	1360	2360	3500	646	3	1/2	1 1/4	*/**/***
6000	1450	410	3000	760	2060	710	1360	2860	4000	767	3	1/2	1 1/4	*/**/***
8000	1650	460	3000	830	2110	860	1410	2910	4100	1090	4	1/2	1 1/4	*/**/***
10000	1650	460	4000	830	2610	860	1610	3110	5100	1318	4	1/2	1 1/4	*/**/***
15000	2000	550	4000	920	2700	1000	1700	3200	5280	2016	4	1/2	1 1/4	300x400
20000	2000	550	5500	920	3450	1000	1700	3700	6780	2513	4	1/2	1 1/4	300x400

Horizontal

Cap. l	Ø mm	HFO mm	HFA mm	A mm	B mm	C mm	D mm	E mm	F mm	G mm	H mm	L mm	peso kg	e/u (*) inch	l/m/p (*) inch	rl/vs/s/e1 (*) inch	i mm
300	500	165	1250	220	400	580	265	265	790	1315	680	1580	75	1	1/2	1 1/4	*
500	650	200	1250	250	475	700	300	300	825	1350	830	1650	101	1 1/2	1/2	1 1/4	*
800	800	240	1250	325	550	775	340	340	865	1390	980	1730	136	2	1/2	1 1/4	*
1000	800	240	1650	250	550	850	340	340	1065	1790	980	2130	162	2	1/2	1 1/4	*
1500	950	280	1750	295	625	955	380	380	1155	1930	1130	2310	232	2	1/2	1 1/4	*
2000	1100	310	1750	315	700	1085	410	410	1185	1960	1280	2370	274	2	1/2	1 1/4	*/**
3000	1250	350	2000	338	775	1213	470	470	1350	2230	1430	2700	466	2 1/2	1/2	1 1/4	*/**
4000	1400	390	2000	360	850	1340	590	590	1390	2190	1580	2780	541	3	1/2	1 1/4	*/**/***
5000	1450	410	2500	375	875	1375	610	610	1660	2710	1630	3320	646	3	1/2	1 1/4	*/**/***
6000	1450	410	3000	375	875	1375	610	610	1910	3210	1630	3820	767	3	1/2	1 1/4	*/**/***
8000	1650	460	3000	425	975	1525	680	680	1960	3240	1830	3920	1090	4	1/2	1 1/4	*/**/***
10000	1650	460	4000	425	975	1525	680	680	2460	4240	1830	4920	1318	4	1/2	1 1/4	*/**/***
15000	2000	550	4000	450	1150	1850	770	770	2550	4330	2180	5100	2016	4	1/2	1 1/4	300x400
20000	2000	550	5500	450	1150	1850	770	770	3300	5830	2180	6600	2513	4	1/2	1 1/4	300x400

Inspection hole on request * 100x150; ** 220x320; *** 300x400

P.E.D. tested pressurized autoclaves 16–64 bar - HP series

The “HP” series consists of pressurized autoclaves, used in industrial installations to maintain constant pressure or to absorb water hammering.

The HP gamma is different from the AC series because of the max operating pressure which is higher in the HP series. The models, with CE label, are available in several capacities in function of the max operating pressure:
16 bar version: 100 up to 10.000 litres
18 bar version 100 up to 5.000 litres
20 bar version: 4.000 up to 10.000 litres
25 bar version: 100 up to 9.500 litres
30 bar version: 800 up to 6.000 litres
35 bar version: 100 up to 3.000 litres
64 bar version: 100 up to 1.000 litres



✔ **Material:** carbon steel
✔ **Protective treatment:** hot dip galvanizing and external coating
✔ **Operative conditions:** the storage tanks have a max pressure of 16, 18, 25, 30, 35, 64 bar and operating temperatures from -10°C to 50°C

Special versions: the HP storage tanks can be modified on demand in order to meet your specific requirements





P.E.D. tested pressurized air tanks 8, 11, 12 bar – AK series



The AK pressurized air tanks are indispensable in systems that distribute compressed air. The tanks guarantee a constant flow, reduce the compressor start-ups and ensure a stable pressure in the entire distribution net to compensate consumption peaks (ex. Installations assembled in series). The models, with CE label, are available in capacities of 300 up to 20.000 litres in the vertical, the horizontal, the 8 bar, the 11 bar, the 12 bar, the galvanized and the varnished version.

✔ **Material:** carbon steel
✔ **Protective treatment:** hot dip galvanizing and external coating
✔ **Operative conditions:** the storage tanks have a max pressure of 8, 11 and 12 bar and operating temperatures from -10°C to +50°C

Special versions: the AK storage tanks can be modified on demand in order to meet your specific requirements





P.E.D. tested 16-64 bar compressed air tanks, under high pressure – AP series

The AP tanks for compressed air under high pressure are used in all compressed air distribution systems with elevated pressure. The AP series is different from the AK series because of the operating pressure which is superior in the AP series.

The models, with CE label, are available in the vertical and horizontal version, with various capacities in function of the max operating pressure:

16 bar version: 300 up to 10.000 litres
18 bar version: 100 up to 5.000 litres
20 bar version: 4.000 up to 10.000 litres
25 bar version: 300 up to 6.000 litres
30 bar version: 800 up to 6.000 litres
35 bar version: 100 up to 3.000 litres
64 bar version: 100 up to 1.000 litres

✔ **Material:** carbon steel
✔ **Protective treatment:** hot dip galvanizing and external coating
✔ **Operative conditions:** the storage tanks have a max pressure of 16, 18, 20, 25, 30, 35, 64 bar and operating temperatures from -10°C to +50°C



Special versions: the AK storage tanks can be modified on demand in order to meet your specific requirements







P.E.D. tested expansion vessel for pressurized water, 6, 8, 12 bar – VE series



The VE expansion vessels are generally used in industrial installations in order to compensate for the volume variation of the heat transfer fluid caused by temperature variations. They have no membrane, which brings the heat transfer fluid in direct contact with the air cushion in the tank. Because of the absence of the membrane, you do not have to think about replacing it. The models, with the CE label, are available in capacities from 300 to 20.000 litres in the horizontal, vertical, 6 bar, 8 bar and 12 bar versions.

✔ **Material:** carbon steel
✔ **Protective treatment:** hot dip galvanizing and external coating
✔ **Covering:** rock wool insulation with variable thickness and an external bush-hammered aluminium cover
✔ **Operative conditions:** The storage tanks have a max operating temperature from 10°C to the max temperatures, which vary in the versions

Special versions: the VE expansion vessels can be modified on demand in order to meet your specific requirements

Max. pressure	Max. temperature
6 bar	165°C
8 bar	175°C
12 bar	200°C





P.E.D. tested expansion vessel for pressurized heat transfer oil – VO series

The VO series are installed in industrial heaters with heat transfer oil in a closed circuit in order to compensate for the thermal expansion of the heat transfer fluid. The models, with CE label, are available in capacities from 300 up to 15.000 litres in the horizontal, vertical and 6 bar version. It operates with a maximum operating temperature of 350°C.



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✔ **Material:** carbon steel
✔ **Protective treatment:** external painting
✔ **Covering:** on demand rock wool insulation with variable thickness and an external bush-hammered aluminium cover
✔ **Operative conditions:** the storage tanks have a max operating pressure of 6 bar and a max operating temperature of di 350 °C

Special versions: the VO expansion vessels can be modified on demand in order to meet your specific requirements





P.E.D. tested steam accumulator tanks 12 bar 200°C – AV series



The AV steam accumulators are generally installed to support industrial steam generators (fast and with a forced circulation). The accumulator is the lung in applications in which the steam content of the heaters is low and not sufficient to manage the numerous transitions generated by the start-up and shut-down cycles of the heater.
The models, with CE label, are available in capacities from 300 up to 20.000 litres in the vertical and horizontal versions with a max pressure of 12 bar and a max operating temperature of 200°C.

✔ **Material:** carbon steel
✔ **Protective treatment:** external painting
✔ **Covering:** on demand rock wool insulation with variable thickness and an external bush-hammered aluminium cover
✔ **Operative conditions:** the storage tanks have a max operating pressure of 12 bar and a max operating temperature of di 200 °C

Special versions: the AV expansion vessels can be modified on demand in order to meet your specific requirements







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