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Pneumatic Fenders

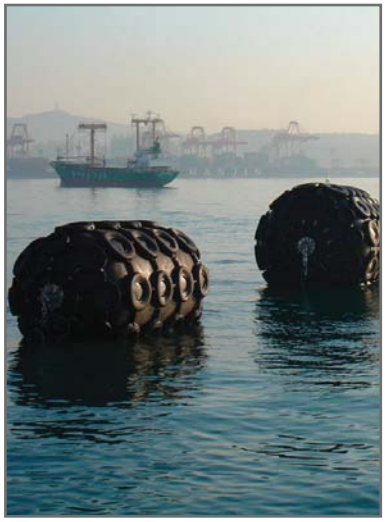
Pneumatic rubber fenders have a long and successful history of protecting vessels in mooring operations. They are ideal for permanent and semi-permanent port applications and for offshore ship-to-ship transfers. Tough and resilient, PsG fenders are fast and easy to deploy, maintaining large clearances between the hull and the jetty or other vessel. This serves to minimize damage potential during mooring.

Critical properties of rubber fenders are energy absorption, hull pressure and reaction force. In both cases, PsG products score very highly, with low reaction force and low hull pressure.

This means the fender absorbs significant energy, reducing the forces on both the vessel hull and jetty structures.

With the development of ship technology, fenders have evolved to suit newer vessel types such as ULCCs, LNG carriers, bulk carriers, FSOs and FPSOs. As a result, PsG supplies a wide range of pneumatic fenders from the large 4.5 x 12 meter down to the 1,0 x 0,5 m small fenders.

With Port Suppliers Group´s experience in rubber technology, the quality and performance equates to the best available on the market.



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Pneumatic Fenders

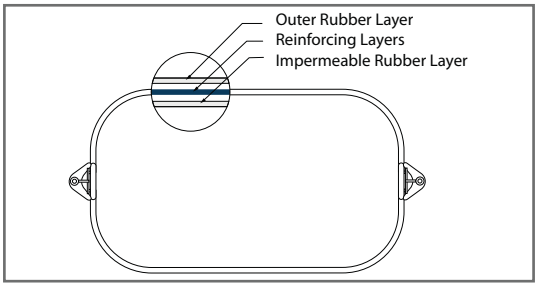
Safety Performance In Reaction Force and Energy Absorption

The purpose of a fender is to absorb the kinetic energy of the ship for protection of hull. In this aspect, PsG PN Fenders shows off low reaction force and high energy absorption and it makes it possible for fender to perform well under any condition and to protect ships and any mooring facilties.

No Deformation Under Harsh Condition

PsG PN Fenders utilizes the compressibility and elasticity of the air, for this reason, performance deterioration and deformation of external shape due to fatigue are absolutely absent.

Heavy - Duty Readability



PsG PN Fenders are composed of several rubber layers as well as strong reinforcement cord layer and this enable fender to be extremely resistant to pressure and cutting, other external impact.

In addition, Fenders with Dia 2.5 m upward are equipped with safety valves to protect fender against over pressure by releasing over-pressurized air outward.

Simple Installation and Repair

Because of superior buoyancy of fender supported by seawater, fender can be moored to the ships and jetty with guy rope or chain, and even if fender seriously get damaged by ship' s hull, It can be easily removed from the quay or jetty and repaired in safe.

Thus maintenance and repairing cost will be tremendously reduced.

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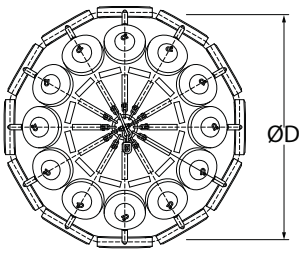
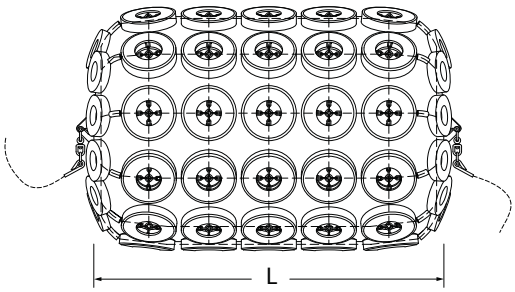
Pneumatic Fenders PN 50





PsG-PN 50

Internal initial pressure: 50 kPa (5,1 kgf/cm²)

Fender size	Energy absorption	Reaction force	Hull pressure at 60 % deflection.	Safety valve pressure setting.	Testing pressure
mm(Ø) X mm(L)	kNm	kN	kN/m²	kPa	kPa
300 X 600	0,5	24	134	--	147
500 X 800	4,9	52	130	--	147
500 X 1000	6,3	67	134	--	147
600 X 1000	8,8	78	130	--	147
600 X 1200	10,7	95	132	--	147
700 X 1500	18,7	142	136	--	147
800 X 1500	23,7	158	132	--	147
1000 X 1500	35,5	189	126	--	147
1000 X 2000	50,1	267	134	--	147
1200 X 2000	69,4	308	129	--	147
1200 X 3000	109	482	134	--	147
1350 X 2500	111	439	130	--	147
1500 X 2500	135	479	128	--	147
1500 X 3000	168	596	133	--	147
1500 X 4000	229	815	136	--	147
1700 X 3000	210	658	129	--	147
1700 X 7200	516	1621	133	--	147
2000 X 3000	282	752	126	--	147
2000 X 3500	336	896	128	--	147
2000 X 6000	611	1631	136	--	147
2500 X 4000	660	1409	141	177	196
2500 X 5500	961	2051	149	177	196
2500 X 9100	1631	3482	153	177	196
3000 X 5000	1136	2021	135	177	196
3300 X 4500	1188	1921	130	177	245
3300 X 6500	1915	3097	145	177	245
3300 X 10600	3338	5398	155	177	245
4500 X 7000	3792	4497	143	177	245
4500 X 9000	4960	5883	146	177	245
4500 X 12000	6987	8284	154	177	245

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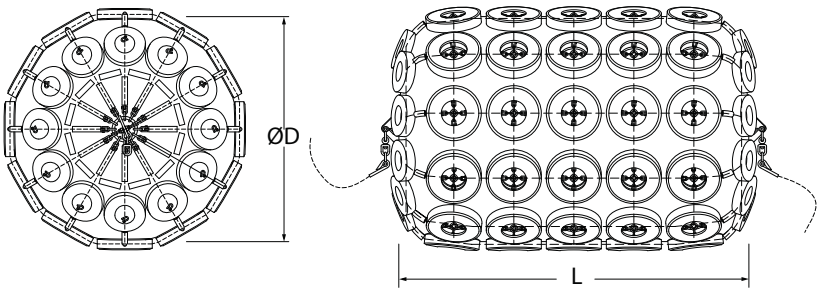
Pneumatic Fenders PN 80



PsG-PN 80

Internal initial pressure: 80 kPa (8,2 kgf/cm²)

Fender size	Energy absorption	Reaction force	Hull pressure at 60 % deflection.	Safety valve pressure setting.	Testing pressure
mm(Ø) X mm(L)	kNm	kN	kN/m²	kPa	kPa
300 X 600	0,6	31	173	--	196
500 X 800	6,3	67	168	--	196
500 X 1000	8,2	87	174	--	196
600 X 1000	11,2	100	167	--	196
600 X 1200	13,8	123	171	--	196
700 X 1500	24,1	184	176	--	196
800 X 1500	30,6	204	170	--	196
1000 X 1500	45,7	244	163	--	196
1000 X 2000	64,7	345	173	--	196
1200 X 2000	89,5	398	166	--	196
1200 X 3000	140	623	173	--	196
1350 X 2500	149	572	170	--	196
1500 X 2500	174	620	166	--	196
1500 X 3000	218	776	173	--	196
1500 X 4000	296	1053	176	--	196
1700 X 3000	272	853	168	--	196
1700 X 7200	668	2096	172	--	196
2000 X 3000	386	1030	172	--	196
2000 X 3500	440	1174	168	--	196
2000 X 6000	790	2109	176	--	196
2500 X 4000	931	1831	184	225	245
2500 X 5500	1353	2659	194	225	245
2500 X 9100	2293	4505	199	225	245
3000 X 5000	1593	2608	174	225	245
3300 X 4500	1673	2491	168	225	245
3300 X 6500	2707	4029	188	225	245
3300 X 10600	4677	6959	199	225	245
4500 X 7000	5337	5823	185	225	245
4500 X 9000	6948	7581	188	225	245
4500 X 12000	9667	10548	196	225	245

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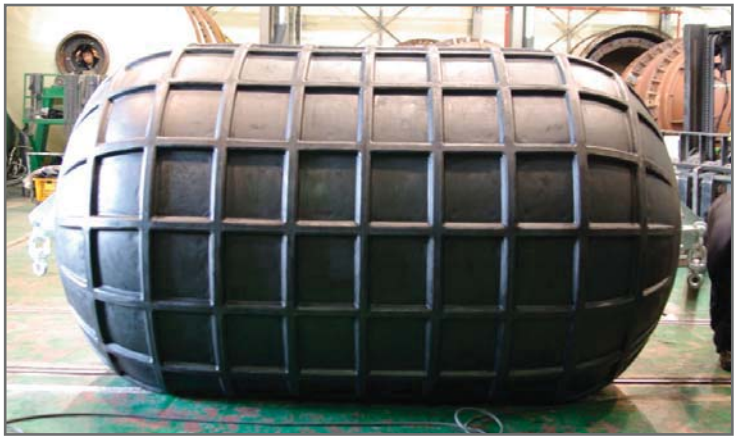
Pneumatic Fenders Rib Type

In the near future, It seems pretty difficult to get used tyre protecting pneumatic fender and this expensive consumable goods require strong durability and anti-abrasion.

But actually, fender can be torn by so many risk factors and its original function can not last as many years as we expect. Pneumatic Fender with complete chain and lyre looks securing sufficient durability but easily give damage to the hull. Thus we developed and recommend PsG Rib Fender as more evolved alternative to solve these matters.

The strong points of Rib Type fender:

- Easy installation and handling than CTN type fender.
- Easy and low cost of maintenance.
- CTN shall replace the chain tire net every 2-3 years.
- Long life than any other pneumatic fenders.



Pneumatic Fenders Rib

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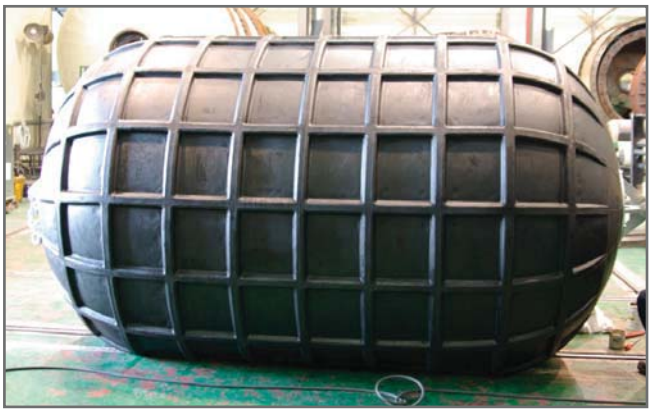
Pneumatic Fenders Rib PN 50



PsG-Rib PN 50

Internal initial pressure: 50 kPa (5,1 kgf/cm²)

Fender size	Energy absorption	Reaction force	Hull pressure at 60 % deflection.	Safety valve pressure setting.	Testing pressure
mm(Ø) X mm(L)	kNm	kN	kN/m²	kPa	kPa
500 X 1000	6,9	73,7	148	--	147
1000 X 1500	39	208	139	--	147
1000 X 2000	55	294	147	--	147
1500 X 2500	148	527	141	--	147
1500 X 3000	184	656	146	--	147
2000 X 3500	370	986	141	--	147
2000 X 6000	672	1794	150	--	147
2500 X 4000	726	1550	155	177	196
2500 X 5500	1057	2256	164	177	196
3300 X 4500	1306	2113	143	177	245
3300 X 6500	2106	3406	159	177	245
3300 X 10600	3671	5938	170	177	245

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Pneumatic Fenders Rib PN 80

PsG-Rib PN 80

Internal initial pressure: 80 kPa (8,2 kgf/cm²)

Fender size	Energy absorption	Reaction force	Hull pressure at 60 % deflection.	Safety valve pressure setting.	Testing pressure
mm(Ø) X mm(L)	kNm	kN	kN/m²	kPa	kPa
500 X 1000	9	95,4	191	--	196
1000 X 1500	50,3	268	179	--	196
1000 X 2000	71,1	378	189	--	196
1500 X 2500	193	684	183	--	196
1500 X 3000	241	857	191	--	196
2000 X 3500	484	1287	184	--	196
2000 X 6000	868	2311	193	--	196
2500 X 4000	942	2004	201	225	245
2500 X 5500	1353	2659	194	225	245
3300 X 4500	1693	2731	184	225	245
3300 X 6500	2732	4415	206	225	245
3300 X 10600	4730	7627	219	225	245

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Pneumatic Fenders

QUALITY MANAGEMENT

Compression Test to comply with ISO 17357

- Compression Test
- Parallel Compression Test
- Angular Compression Test
- Curve-Surface Compression Test
- Angular Compression Test

Rubber Specimen Lab Test

- NormalTest
- Tensile Strength
- Elongation
- Durometer Hardness(A-type) Tear Strength

Heat Aging Test

- Tensile Strength
- Elongation
- Durometer Hardness(A-type) Static Ozone Aging Test

Hydrostatic-Pressure Test