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## Sailing With Florescence -Since 1992



青岛丰一顺橡胶制品有限公司  
QINGDAO FLORESCENCE RUBBER PRODUCTS CO.,LTD

*FLORESCENCE TO BE YOUR BEST PARTNER*



# TO CREATE THE FUTURE



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We wish to  
create a better future  
with you



## Company Brief Introduction

Qingdao Florescence Rubber Products Co., Ltd is a comprehensive marine supply enterprise, integrating the scientific research design, product development with technical services. We specialize in manufacturing pneumatic rubber fenders, foam fenders, various marine rubber fenders and ship launching & salvage rubber airbags. FLORESCENCE products are designed, manufactured, and tested per ISO17357 and ISO9001:2002. And every unit is produced strictly according to the requirements of ship surveyors such as BV, CCS, etc.

Equipped with advanced manufacture, test and R&D equipments, FLORESCENCE becomes a Chinese leading marine supplier with the longest history, fastest development, most abundant capital & technology and the most competitive products. Located in the Port of Qingdao FLORESCENCE can respond effectively to any urgent requirements of fenders and airbags with its comprehensive range of products.

Qingdao Florescence Rubber Products Co., Ltd is fully committed to promoting customers' development and exceeding our customers' expectations in services quality. We expect to cooperate with more customers worldwide and create a better future together.

## 公司介绍

青岛丰一顺橡胶制品有限公司是集科研设计、产品开发、技术服务为一体的高新技术企业，率先通过了ISO9002质量体系认证，CCS中国船级社和法国BV船级社认证，主营船用橡胶气囊，船用橡胶靠球，聚氨酯实心护舷，其他橡胶护舷等符合ISO17357国际标准，拥有全套专业的橡胶生产设备和先进的检测设备，是本地区创立最早，发展最快，资金和技术力量最雄厚，产品性价比最高的生产厂家。

我们的使命是“推动客户持续增长，帮助客户做强做大，为祖国的富强而努力奋斗”，丰一顺人精心做事，诚信待人，期待与更多的客户合作，共建美好明天。

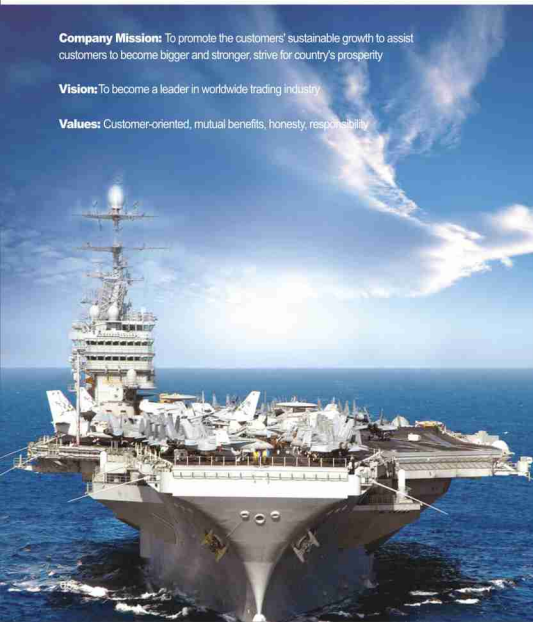
# Be Your Guardian



**Company Mission:** To promote the customers' sustainable growth to assist customers to become bigger and stronger, strive for country's prosperity

**Vision:** To become a leader in worldwide trading industry

**Values:** Customer-oriented, mutual benefits, honesty, responsibility



Ship Rubber Airbag



Pneumatic Rubber Fender



Foam Filled Fender



Cylindrical Rubber Fender



Arch V Fender



D Type Fender



Cell Fender



Tugboat Fender



图1 囊体结构示意图

Picture1. Structure of air bag



图2 密封扣环

Picture2. Griphook of sealed end

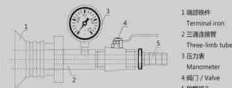


图3 充气软管附件

Picture3. Pipeline accessories of air inflation end

### Structure of The Florescence Ship Rubber Airbag

Please see the picture 1 of "Florescence" inflatable rubber airbag structure. It is composed by airbag body and terminal iron part. The airbag body is composed by natural rubber and strength fiber material through vulcanization processing; The terminal iron part is made of cast iron, it is combined closely with the bag body; One end is for pulling when move the airbag, and the other end is for charging and discharging the air. All the fittings in picture 2 and 3 will be supplied with airbags for free.

### Rubber Airbag Safety Precautions

#### Airbag Usage Notes:

##### • Overpressure Control:

Strictly control the operating pressure, overpressure is forbidden

##### • The Landing Slipway Requirements:

The landing ground should be ground or cement concrete, according to the tonnage of different ships.

##### • Avoid Sharp Objects:

Make sure no objects on the slipway and make sure the slipway is smooth and clean during operation, in case of airbag damage.

##### • Avoid Distortion And Overweight:

Avoid distortion in the length direction during rolling and avoid overweight load after gas charging.

### Storage of Rubber Airbag

- The airbags should be maintained in a dry ventilated room and be protected from light.
- The airbags should be in a relaxed condition free from tension, compression or other deformation.
- The airbags should be kept away from any heat source.
- The airbags should be protected from acids, alkalis, oils or organic solvents.

## Main Application Of Airbags



### Floreance Ship Rubber Airbags Advantages:

- Different size airbag stock available, quick delivery
- Provide repair kit and on site instruction
- Long time-service life can be reused many times
- Wear resistance and anti aging
- Good raw material and cord fabric
- Harmless to the environment. Time & money saving
- Need no more than air compressors, winches and ropes
- Using marine airbags are much cheaper and portable than other methods

### The Guaranteed Working Pressure of Floreance Rubber Airbag

TYPE	Ship Rubber Airbag Maximum Safety Pressure					
	D=0.8m (D=2.62ft)	D=1.0m (D=3.28ft)	D=1.2m (D=3.94ft)	D=1.5m (D=4.92ft)	D=1.8m (D=5.90ft)	D=2.0m (D=6.56ft)
FL-3 Type	0.13MPa (18.85psi)	0.10MPa (14.50psi)	0.09MPa (13.05psi)	0.07MPa (10.15psi)	0.06MPa (8.70psi)	0.05MPa (7.25psi)
	0.17MPa (24.66psi)	0.13MPa (18.85psi)	0.11MPa (15.95psi)	0.09MPa (13.05psi)	0.08MPa (11.60psi)	0.07MPa (10.15psi)
FL-4 Type	0.21MPa (30.46psi)	0.17MPa (24.66psi)	0.14MPa (20.31psi)	0.11MPa (15.95psi)	0.09MPa (13.05psi)	0.08MPa (11.60psi)
	0.25MPa (36.26psi)	0.20MPa (29.01psi)	0.17MPa (24.66psi)	0.13MPa (18.85psi)	0.11MPa (15.95psi)	0.10MPa (14.50psi)

### The Surface Area of Floreance Rubber Airbag

LENGTH	Surface Area of An Airbag(Theoretical Value)					
	D=0.8m	D=1.0m	D=1.2m	D=1.5m	D=1.8m	D=2.0m
5m	14.58m <sup>2</sup>	18.85m <sup>2</sup>	23.37m <sup>2</sup>	30.63m <sup>2</sup>	38.45m <sup>2</sup>	43.98m <sup>2</sup>
6m	17.09m <sup>2</sup>	21.99m <sup>2</sup>	27.14m <sup>2</sup>	35.34m <sup>2</sup>	44.11m <sup>2</sup>	50.27m <sup>2</sup>
7m	19.60m <sup>2</sup>	25.13m <sup>2</sup>	30.91m <sup>2</sup>	40.06m <sup>2</sup>	49.76m <sup>2</sup>	56.52m <sup>2</sup>
8m	22.12m <sup>2</sup>	28.27m <sup>2</sup>	34.68m <sup>2</sup>	44.77m <sup>2</sup>	55.42m <sup>2</sup>	62.83m <sup>2</sup>
9m	24.68m <sup>2</sup>	31.42m <sup>2</sup>	38.45m <sup>2</sup>	49.48m <sup>2</sup>	61.07m <sup>2</sup>	69.12m <sup>2</sup>
10m	27.14m <sup>2</sup>	34.56m <sup>2</sup>	42.22m <sup>2</sup>	54.19m <sup>2</sup>	66.73m <sup>2</sup>	75.40m <sup>2</sup>
11m	29.66m <sup>2</sup>	37.70m <sup>2</sup>	45.99m <sup>2</sup>	58.90m <sup>2</sup>	72.38m <sup>2</sup>	81.68m <sup>2</sup>
12m	32.17m <sup>2</sup>	40.84m <sup>2</sup>	49.76m <sup>2</sup>	63.62m <sup>2</sup>	78.04m <sup>2</sup>	87.96m <sup>2</sup>
13m	34.68m <sup>2</sup>	43.98m <sup>2</sup>	53.53m <sup>2</sup>	68.33m <sup>2</sup>	83.69m <sup>2</sup>	94.25m <sup>2</sup>
14m	37.20m <sup>2</sup>	47.12m <sup>2</sup>	57.30m <sup>2</sup>	73.04m <sup>2</sup>	89.35m <sup>2</sup>	100.53m <sup>2</sup>
15m	39.71m <sup>2</sup>	50.27m <sup>2</sup>	61.07m <sup>2</sup>	77.75m <sup>2</sup>	95.00m <sup>2</sup>	106.81m <sup>2</sup>
16m	42.22m <sup>2</sup>	53.41m <sup>2</sup>	64.84m <sup>2</sup>	82.47m <sup>2</sup>	100.66m <sup>2</sup>	113.10m <sup>2</sup>
17m	44.74m <sup>2</sup>	56.55m <sup>2</sup>	68.61m <sup>2</sup>	87.18m <sup>2</sup>	106.31m <sup>2</sup>	119.38m <sup>2</sup>
18m	47.25m <sup>2</sup>	59.69m <sup>2</sup>	72.38m <sup>2</sup>	91.89m <sup>2</sup>	111.97m <sup>2</sup>	125.66m <sup>2</sup>

Remark : We can customize many different airbags sizes according to clients' requests.

FL-airbags size range: Diameter 0.6-2.8m, effective length 5-24m.



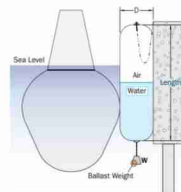
## Hydro Pneumatic Fender



The hydro-pneumatic fender is a special configuration of the pneumatic fender developed for submarine, catamarans, semi-submersible platforms and drilling rigs. They contact fenders below waterline, require a unique solution. Hydro-pneumatic fenders are specially adapted to this application. The fender body is partially water-filled, then pressurized with air and ballasted to make it stand vertically, fender draft and performance can be tuned by altering the water: air ratio and inflation pressure.

### Hydro Pneumatic Fenders Key Attributes :

- Versatile
- Wide variety of sizes
- Low hull pressure
- Low maintenance
- Fast deployment and instalment
- Sub-surface contact face



The fenders are manufactured with a water tight bladder inside that has external access points for ballasting and trimming.

The bottom end of the fender is fitted with an additional ballast weight to prevent the fender from flipping.

The fenders can be installed on most quay structures and come in a range of sizes to suit the application and a range of vessels.

Hydro-pneumatic fenders being installed vertically should be fixed to the top of the quay structure where ever possible.

Restraint chains fixed to the collar of the fender should be installed back to the quay structure for maximum stability.



## Our Airbags Applications Worldwide:



1200 tons barge was launched by 25 pieces D1.5m\*L16m 6 layers ship rubber airbags in concrete ramp. Engineers and workmen are checking and doing the preparation on site in advance.



Brazil client's boat needs docking and launching for repair. In the process, we avoid the large tidal change and bad ramp conditions problem, making a successful landing.

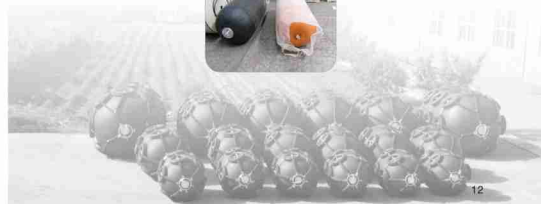


Airbags are used to transport a reinforced concrete caisson weight up to 2600 tons at site. we use 8 layers airbags to ensure the safety. When heavy duty moving, long distance moving is the the best check of airbag wear-resisting.



The Navy needs to salvage submarine weight 3000 tons. Using first balance then floating methods, salvage it successfully.

## FL Pneumatic Fender Loading Pictures



## Pneumatic Rubber Fender For Ship

### Padding for better hull protection

Rubber hoses used to protect chains in order to avoid any damage to fender's and the ship's hull

### Internal initial pressure

standard: 50kpa and 80kpa

### Towing ring and swivel

The fenders are fitted with a towing ring and swivel in galvanized steel  
Optional: also available with stainless steel chain

### ISO17357 complied

Our fenders comply with the requirements of ISO17357, ensuring good performance and high quality floating pneumatic fenders for safe berthing operations

### Tire and Chain net for protection

Tire and chain net is optional



## Pneumatic Rubber Fender

### Pneumatic Rubber Fender

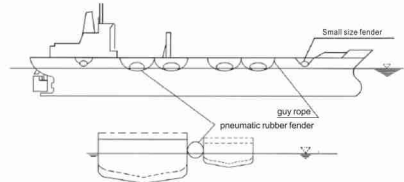
Pneumatic Rubber Fenders have been in use for around 50 years. It is the leading anti-collision device for marine application in the world. This compressed air filled rubber fender is used as a protective medium for ship-to-ship contact (STS), ship to quay (STQ) and ship-to-berthing (STB).

Pneumatic fenders can be delivered in various sizes and types. Chain and tyre net (CTN) type is usually recommended to protect the fender body, but sling type or body only is also available.

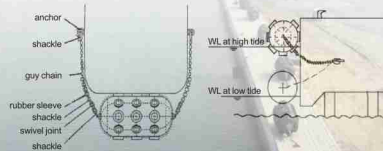


### Pneumatic Rubber Fender Key Attributes:

- High energy absorption with a low reaction force
- Light weight, portable and floatable, can be installed and replaced easily
- Heavy duty and long service life- over 10 years
- Supplied as sling type (body only) or with chain and tire net for protection of the fender body
- Sizes from 0.3m diameter x 0.6m length up to 4.5m diameter x 12m length
- Suitable for locations with large and small tidal differences



FL-Pneumatic Rubber Fender Installation For STS



FL-Pneumatic Rubber Fender Installation For STD

## Fender Parameters

## Fender Recommend

Specification D*L(mm)	Initial pneumatic pressure 50KPa			Initial pneumatic pressure 80KPa			Applicable ships tonnage (T)
	Body Weight (Kg)	R (kN)	GEA (KJ)	Body Weight (Kg)	R (kN)	GEA (KJ)	
500x100	25	64	6	25	83	8	50
600x100	32	74	8	32	96	11	50
1000x1500	80	182	32	80	235	44	100
1000x2000	100	257	45	125	335	63	200
1200x2000	120	297	63	165	386	86	300-500
1350x2500	165	427	102	226	554	140	300-500
1500x3000	315	597	153	370	751	211	1000
1700x3000	405	639	191	436	830	263	1000
2000x3500	590	875	308	632	1138	424	3000
2500x4000	1050	1381	663	1110	1815	925	10000
2500x5500	1333	2019	943	1410	2653	1317	10000
3000x5000	1880	2104	1210	2155	2709	1571	10000above
3000x6000	2160	2583	1485	2470	3292	1888	10000above
3300x4500	2020	1884	1175	2300	2476	1640	10000above
3300x6500	2700	3015	1814	3080	3961	2532	10000above

## Rubber Material Test

	Test Item 测试项目	Outer Layer Rubber 外层橡胶	Cord rubber and inner layer rubber 绳索和内层橡胶
	Tensile strength 拉力	Over 180kgf/ cm <sup>2</sup> 以上: 180kgf/ cm <sup>2</sup> 以上	Over 100kgf/ cm <sup>2</sup> 100kgf/ cm <sup>2</sup> 以上
Before aging 老化前	Elongation 伸长率	Over 400% 400% 以上	Over 400% 400% 以上
	Hardness 硬度	Under 70° 70° 以下	Under 65° 65° 以下
	Test resistance 耐力	Over 4kgf/ cm <sup>2</sup> 4kgf/ cm <sup>2</sup> 以上	
Before aging 老化后	Tensile strength 拉力	Over 80% of the value before aging 超过老化前的 80%	
	Elongation 伸长率	Over 80% of the value before aging 超过老化前的 80%	
	Hardness 硬度	Over +80% of the value before aging 低于老化前 80%+	

Pneumatic Rubber Fender for Medium and Small Vessels		
Vessel Tonnage	Size (D*L) mm	Recommend Vessel
50	500*1000	Fishing Vessel
100	700*1500~1000*1500	Fishing Vessel
200	1000*1500~1200*2000	Fishing Vessel, Tugboat
300-500	1200*2000~1500*2500	Fishing Vessel, Tugboat
1000	1500*2500~1500*3000	Tugboat, Transport Ship
3000	2000*3000~2000*3500	Ocean Trawler, Transport Ship
10000	2000*3500~2500*4000	Transport Ship

Pneumatic Rubber Fender for Large Vessels			
Ship (DWT)	Speed (m/s)	Energy (kJ/M)	Fender Size (D*L) mm
200000	0.15	1890	3300*6500
150000	0.15	1417	3300*6500
100000	0.15	945	3000*5000
85000	0.17	1031	3000*6000
50000	0.18	680	2500*5500
40000	0.2	672	2500*5500
30000	0.22	609	2500*4000
20000	0.25	525	2500*4000
15000	0.26	425	2500*4000
10000	0.28	329	2000*4000
5000	0.33	228	2000*3500



## Foam Filled Fender

Foam Filled Fender is a kind of constructive fender with polyurea materials as its outer protective layer and polyurethane foam core forming the resilient inner part.

The Foam Filled Fenders are constructed of three parts each providing an important function in the construction and lifespan of the fender. The three parts are (1) The closed cell polyurethane foam, (2) Outer nylon cord fabrics, (3) Polyurea spraying coat.

### (1) Foam Core

The closed cell polyurethane foam core used inside offers un-sink ability during operation.

### (2) Outer Nylon Cord Fabrics

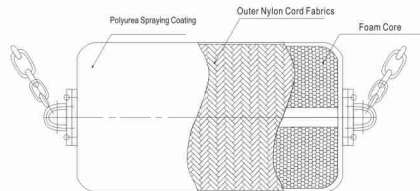
The outer nylon cord fabrics is specifically designed to seal polyurethane foam inside and to prevent any leakage.

### (3) Polyurea Spraying Coating

Polyurea coating is permanent spray on coatings that protect the surface of fender body. It is more durable than rubber and flexible in all weather conditions; no softening in heat or becoming brittle in cold. Dent, scratch and chemical resistant.



## Foam Fender Structure



Foam Fender Size (mm)	Deflection60%		Weight(±3%) (KG)
	Reaction Force(KN)	Energy Absorption(KJ)	
300x500	43	5	5
400x800	54	7	13
500x1000	89	32	26
700x1500	129	24	75
1000x1500	190	62	154
1000x2000	298	80	205
1200x2000	335	110	295
1350x2500	460	173	466
1500x3000	615	263	691
1700x3000	678	330	888
2000x3500	940	535	1433
2000x4000	1095	630	1638
2000x4500	1250	690	1843
2300x4000	1380	735	2166
2300x5500	1860	1133	2979
2500x4000	1455	980	2559
2500x5500	1960	1230	3519
3000x5000	2180	1755	4607
3000x6000	2455	1960	5528
3300x4500	1960	1760	5017
3300x6500	3075	2830	7247
3500x7000	3975	3162	8779

## Foam Filled Fender

Florescence polyurethane foam filled fender is the perfect solution for storm conditions, having the potential to outperform pneumatic units during severe weather. Additionally, since the internal construction consists of a solid foam core, there is no need to maintain air pressure, inflation, valves as pneumatic fenders. They are ideal for existing structures and certain hull types such as catamarans and cruise ships.

### Foam Fender Key Attributes:

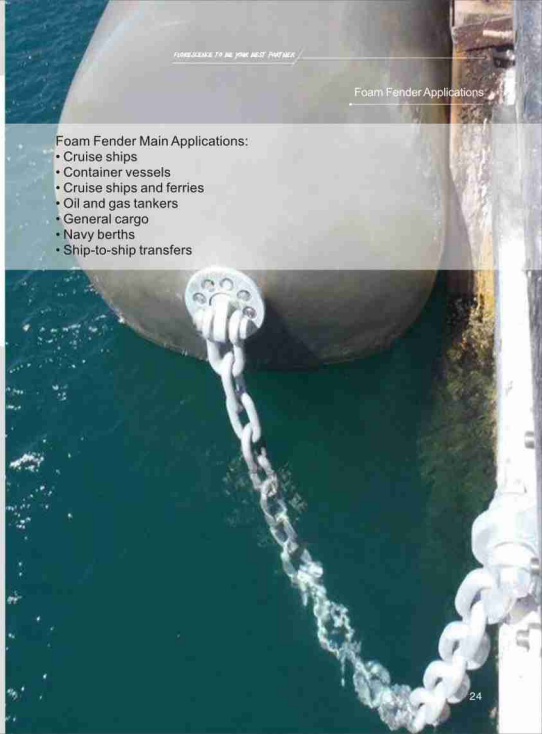
- High energy absorption and low reaction force
- Many bright colors and shape available
- Ultra-tough, unsinkable design
- Remains fully functional even if skin is punctured
- Low maintenance
- Easy installation



## Foam Fender Applications

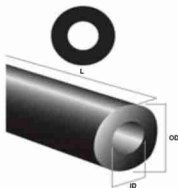
### Foam Fender Main Applications:

- Cruise ships
- Container vessels
- Cruise ships and ferries
- Oil and gas tankers
- General cargo
- Navy berths
- Ship-to-ship transfers



## Cylindrical Rubber Fender

Cylindrical Rubber Fenders are commonly used fenders recommended for all types of applications to ensure a safe and linear berthing to a variety of vessels. Adequate installation is simply achieved by using chains, bars, ropes or specially designed ladder brackets.



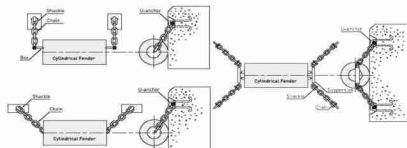
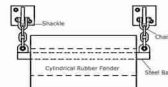
### Specification

Specification	Outer dia. (mm)	Inner dia. (mm)	Length (mm)	Notes
CY150L	150	75	500-30000	Other specifications can be produced on request.
CY200L	200	100		
CY250L	250	125		
CY300L	300	150		
CY350L	350	175		
CY400L	400	200		
CY500L	500	250		
CY600L	600	300		
CY700L	700	350		
CY800L	800	400		
CY900L	900	450		
CY1000L	1000	500	1000-20000	
CY1100L	1100	550		
CY1200L	1200	600		
CY1300L	1300	650		
CY1400L	1400	700		
CY1500L	1500	750		
CY1600L	1600	800		
CY1700L	1700	850		
CY1800L	1800	900		
CY1900L	1900	950		
CY2000L	2000	1000		

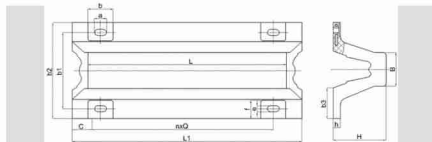
## Fender Installation Drawing

### Core Attributes:

- Simple and economical design, easy to install
- Choice of mounting systems to suit different structures and applications
- Sizes from 100mm to 2700mm diameter in almost any length
- Thick fender wall resists abrasion, even after years of heavy use
- Progressive load-deflection characteristics
- Large track record of installations



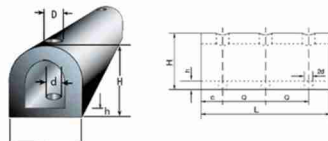
## V&D Rubber Fender



Specifications	Dimension(mm)														
	H	L	L1	C	Q	n	B	B1	B2	B3	h	a	b	e	f
FLA 150 X 1000	150	1000	1075	110	855	2	98	240	300	96	22.5	50	95	25	55
FLA 150 X 3000	150	3000	3075	215	715	5	98	240	300	96	22.5	50	95	25	55
FLA 200 X 1000	200	1000	1100	120	860	1	145	320	400	128	30	58	105	29	75
FLA 200 X 3000	200	3000	3100	120	715	4	145	320	400	128	30	58	105	29	75
FLA 250 X 1000	250	1000	1125	130	865	1	164	410	500	160	30	64	125	32	90
FLA 250 X 3000	250	3000	3125	132.5	715	4	164	410	500	160	30	64	125	32	90
FLA 300 X 1000	300	1000	1150	140	870	1	225	490	600	195	33	70	140	35	105
FLA 300 X 3000	300	3000	3150	145	715	4	225	490	600	195	33	70	140	35	105
FLA 400 X 1000	400	1000	1200	150	900	1	300	670	800	260	40	82	165	41	120
FLA 400 X 3000	400	3000	3200	150	725	4	300	670	800	260	40	82	165	41	120
FLA 500 X 1000	500	1000	1250	160	930	1	375	840	1000	325	45	94	180	47	140
FLA 500 X 3000	500	3000	3250	165	730	4	375	840	1000	325	45	94	180	47	140
FLA 600 X 1000	600	1000	1300	170	960	1	450	1010	1200	390	54	100	195	50	160
FLA 600 X 3000	600	3000	3300	170	740	4	450	1010	1200	390	54	100	195	50	160
FLA 800 X 1000	800	1000	1400	180	1040	1	600	1340	1600	520	72	136	270	68	260
FLA 800 X 3000	800	3000	3400	180	760	4	600	1340	1600	520	72	136	270	68	260
FLA 1000 X 1000	1000	1000	1500	200	1100	1	750	1680	2000	650	90	136	290	68	300
FLA 1000 X 2000	1000	2000	2500	200	700	3	750	1680	2000	650	90	136	290	68	300

Remark: Different size of FLA Type rubber fender can be made according to customers' request

## Specifications of D fender



Specifications	Dimension(mm)								
	H	B	L	Holes	Q	C	h	D	a
FLD 150X150X1000	150	150	1000	3	350	150	25	40	24
FLD 200X200X1000	200	200	1000	3	350	150	35	55	30
FLD 200X200X3000	200	200	3000	8	400	100	35	55	30
FLD 250X250X1000	250	250	1000	3	350	150	35	60	30
FLD 250X250X3000	250	250	3000	8	400	100	35	60	30
FLD 300X300X1000	300	300	1000	3	350	150	40	65	32
FLD 300X300X3000	300	300	3000	8	400	100	40	65	32
FLD 300X360X1000	300	360	1000	3	350	150	40	65	32
FLD 300X360X3000	300	360	3000	8	400	100	40	65	40
FLD 400X400X1000	400	400	1000	3	400	150	55	80	32
FLD 400X400X3000	400	400	3000	8	400	100	55	80	40
FLD 500X500X1000	500	500	1000	3	350	150	90	97	45
FLD 500X500X3000	500	500	3000	8	400	100	90	97	45

Remark: Different size of FLD Type rubber fender can be made according to customers' request



## Other Rubber Fenders



We can also produce other fender types according to your requirements, such as Cone fender, Cell Fender, W fender, Corner Fender, Cubic Fender, Element Fender, Keyhole fender, PVC fender, etc. Florescence is able to offer cost effective and efficient solutions to any marine rubber fendering demands.



## Partners

