

ENGINEERED FOR EXCELLENCE

MARINE FENDERING SYSTEMS

- BUOYS • FENDERS • DREDGE FLOATS •
- PILINGS • PORT SECURITY BARRIERS •
- DONUT FENDERS • CAMELS • MARINE HARDWARE •

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MARINE FENDERS INTERNATIONAL, INC.

ENGINEERED FOR EXCELLENCE

Marine Fenders International, Inc. is on the cutting edge of marine fendering and buoyancy system technologies.. As a driving force in the marine industry, Marine Fenders International's advancements in polyurethane elastomers, a critical components in any composite buoy or fender system, are unparalleled in strength and durability. MFI's staff has over 30 years of experience in the marine and polyurethane industries, which challenges the competition to keep up with our ever increasing standards of excellence through relentless research and technological innovation and application.

Byproducts of MFI's experience are the efficient manufacturing processes and facility. These have been designed to provide the highest quality yet lowest cost products in the world. Additionally, our mechanical and chemical engineering staff's Research and Development programs constantly reevaluate these processes through constant and critical analysis. New products and designs are continuously being developed to meet today's changing marine industrial needs.

Marine Fenders International, Inc. is a member of the American Standard and Testing Methods (ASTM) Fendering Task Group which is responsible for authoring the next generation of marine fendering specification. The ASTM organization has recognized the value of MFI's experience and highly regard its opinion as these standards are being established.



FENDERING SYSTEMS

Our marine fendering systems have been chosen to protect valuable assets by the United States Navy, Foreign Navies and Commercial and Private Ports in some of the worlds harshest and most hazardous berthing environments. Some of these facilities include the DeLong Pier (US Air force Base) in Tulle Greenland, Cruise ships facilities worldwide, container terminals in Pakistan , ferry terminals in Alaska and more.



The Ocean Guard™ Netless foam-filled fenders, Ocean Cushion™ foam-filled fenders with Chain & Aircraft Tire nets and our Ocean Guard™ Monopile Floating Donut Fenders are available in a variety of performance capacities for any size vessel. This is accomplished by engineering the construction of our fenders with foams of different performance characteristics. This provides a more comprehensive set of options to meet specific berthing requirements due to any environmental or berthing scenario.

Our engineering and technical staff is available to assist our clients with the selection and design of the appropriate fendering system for their application.

Marine Fenders International, Inc. would like to express its gratitude to its customers, agents, representatives and the US Navy for the use of various pictures and used in this catalogue.

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MARINE
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OCEAN GUARD™ Netless Foam Filled Fender

The Ocean Guard™ Netless Foam-Filled Marine Fender is a unique and innovative fendering system, providing high-energy absorption with a relatively low reaction force. Its heat laminated foam core allows it to reliably and safely absorb large amounts of energy when its compressed. The closed cell aspect of the energy absorbing foam allow the fender to be fully functional even if the skin has been accidentally punctured.

PERFORMANCE FEATURES

HIGH ENERGY ABSORPTION

Ocean Guard™ Netless Foam Filled Marine Fenders efficiently absorb significant amounts of energy with a low corresponding reaction force. By keeping these forces to a minimum significant structural costs can be reduced when designing a new or upgrade to a berthing facility.

In comparison to equally sized pneumatic fenders Ocean Guard™ Netless Foam-Filled Marine Fenders absorb up to 40% more energy.

The energy dissipation of the foam core construction allows for a gentler recovery after compression. This virtually eliminates the rebound effect vessels experience from other types of fendering systems such as hard rubber fenders, pile fenders, pneumatic fenders and panel fendering systems.

LOW REACTION FORCE

The advantages of utilizing foam-filled Ocean Guard™ Netless Fenders, with its relatively low reaction force for a given energy absorption level, should not be overlooked.

The engineered design and construction of Ocean Guard™ Netless Fenders produces a fendering system which absorbs a greater amount of energy while experiencing a lower reaction force than pneumatic or rubber buckling fender.

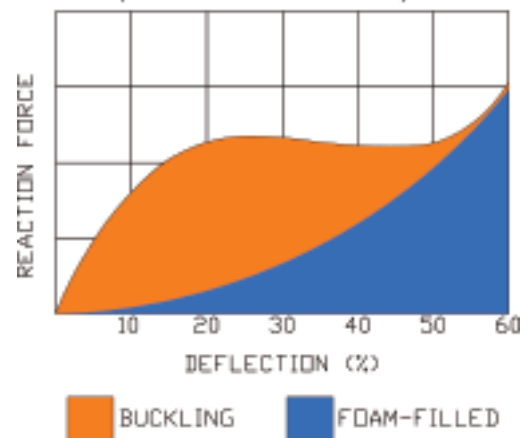
Since the reaction force of a fendering system is the force exerted on a berthing structure and the berthing vessel's hull, pneumatic and buckling type fenders exert greater forces, or pressures, upon these structures. The negative effect of this dynamic could result in higher new construction design costs along with higher maintenance costs, over time, on new and existing structures.



Each type of fendering system has a distinct energy absorption curve with a corresponding reaction force curve. The reaction force curve for foam-filled Ocean Guard™ Netless Fenders is a softer sloping curve, as can be seen by the blue area in the graph. This curve shows that as the percent of deflection is increased the reaction force curve gradually slopes upward as larger amounts of energy is absorbed.

The orange area is the typical reaction curve for a buckling type rubber panel fendering system. As shown, this system experiences the full amount of reaction force or hull pressure within the first 25% of compression, before full compression or when the fenders full energy absorption capacity is achieved. Due to this phenomenon, greater pressures are created by buckling fenders much more frequently, especially when normal berthing conditions are present.

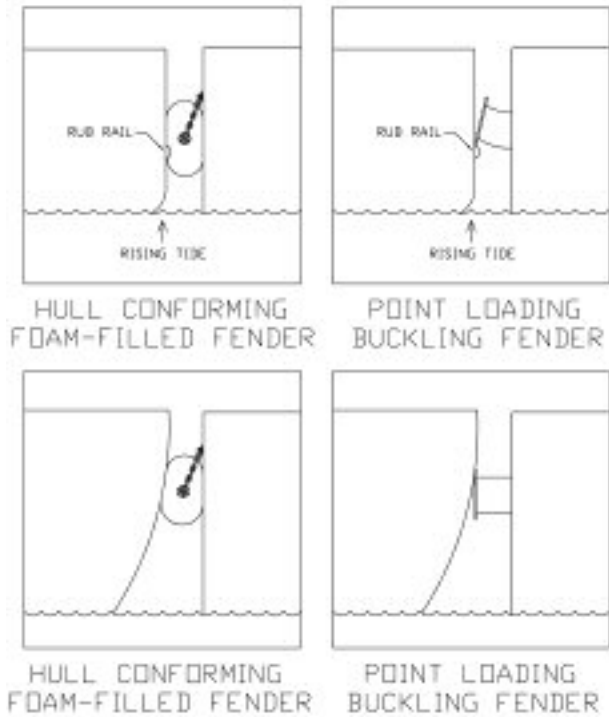
TYPICAL REACTION FORCE CURVE PROFILES FOR FOAM-FILLED AND BUCKLING FENDERS (RELATIVE TO DEFLECTION)



HULL CONFORMING CAPABILITIES

The resilient nature of a foam-filled Ocean Guard™ Netless Fender give it the unique ability to conform to a vessel's hull contours and extremities, such as rub rails.

This hull conforming feature eliminates point loading, which occurs with panel type fenders, on hull contours and therefore evenly distributes energies over a greater surface area. This results in much lower hull pressures.



NON MARKING SKIN

The nylon filament reinforced urethane elastomer skin is a non-marking material regardless of the color. This makes the non-marking properties of the foam-filled Ocean Guard™ Netless Fender ideal for light colored vessels, such as cruise ships and other highly visible vessels. Standard skin colors include black, gray, red, safety orange, white and yellow. Custom colors available upon request.



UNSYNKABLE AND SAFE

Because of the closed-cell foam core construction in the foam-filled Ocean Guard™ Netless Fender design, it is unsinkable and will not explode. Even if the skin is damaged, the fender will continue to float while maintaining its energy absorption and standoff characteristics before repairs can be made or the fender be replaced.



LOW MAINTENANCE

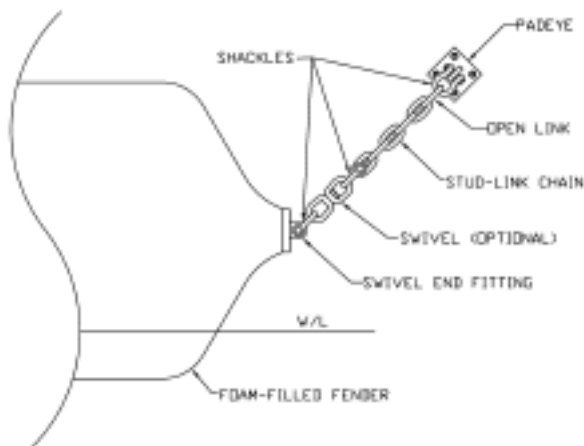
The design of the foam-filled Ocean Guard™ Netless Fender is highly resistant to environmental hazards such as extreme temperatures, hydrocarbons, fresh and salt water, ozone and ultraviolet radiation. The fender skin is even resistant to chemicals such as diesel fuels.

Additionally, since the internal construction consists of a solid heat laminated foam core, there is no need to maintain air pressure, inflation or relief valves, as with pneumatic fenders.



INSTALLATION

Ocean Guard™ Netless Fenders are designed for easy installation. Their buoyant construction allows the option of a floating installation. The unique end fittings and ultra heavy duty internal chain are also ideal for a fixed hanging installation. Both installations can include a 2-point and 4-point mounting arrangement. Typical mounting hardware includes dock plate padeyes, anchor bolts, shackles, swivels and stud link chain.



Hanging 4-point mounting arrangement



Floating 2-point mounting arrangement

CONSTRUCTION FEATURES

FOAM CORE

Construction begins with a resilient energy absorbing closed cell cross-linked polyethylene foam core which is heat laminated into a one piece solid foam core. This heat lamination process produces a thermal bond between the layers of foam which is stronger than the foam itself which, will not delaminate even under the most abusive berthing conditions. This ensures that the foam core construction of the fender will provide years of quality service and performance.

Because of this foam core, if punctured the fender will not experience a catastrophic failure as would pneumatic fenders.

REINFORCED ELASTOMERIC SKIN

The energy absorbing foam core is protected by a tough thick filament nylon tire cord reinforced elastomer skin. This non-marking reinforced elastomer fender skin is the wear surface of the fender. The reinforcing filaments are continuously wound in a helix pattern through up to 90 % of the elastomer skin and wrap around the fender swivel end fitting housings on each end of the fender. This continuous reinforcement of the elastomer skin not only increases the tensile and tear strength of the elastomer but also distributes loads through out the fender skin.

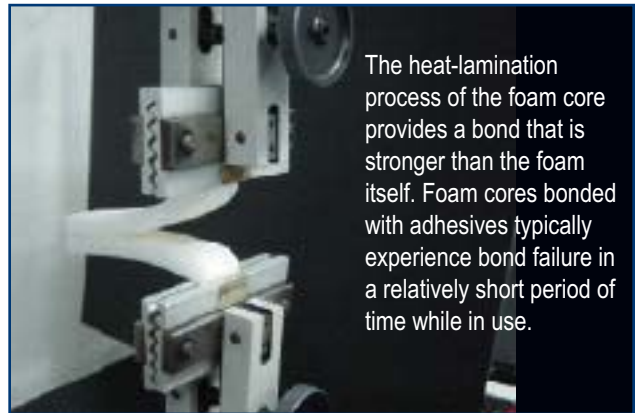
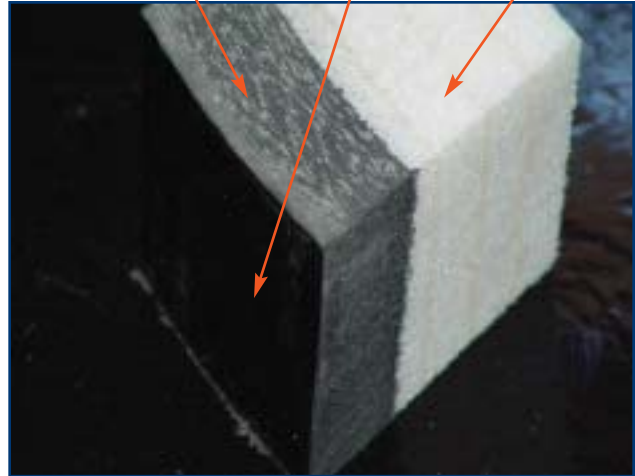
Our elastomer skin exemplifies the latest in urethane technology. This tough resilient material is specially formulated to withstand the worlds harshest environmental conditions providing superior performance in extreme temperatures, toxic environments, against hydrocarbons, salt water, ozone, and ultraviolet radiation. Its smooth sleek construction is not prone to snagging on dock or hull protrusions.

URETHANE SKIN AND ENERGY ABSORBING FOAM CORE CONSTRUCTION

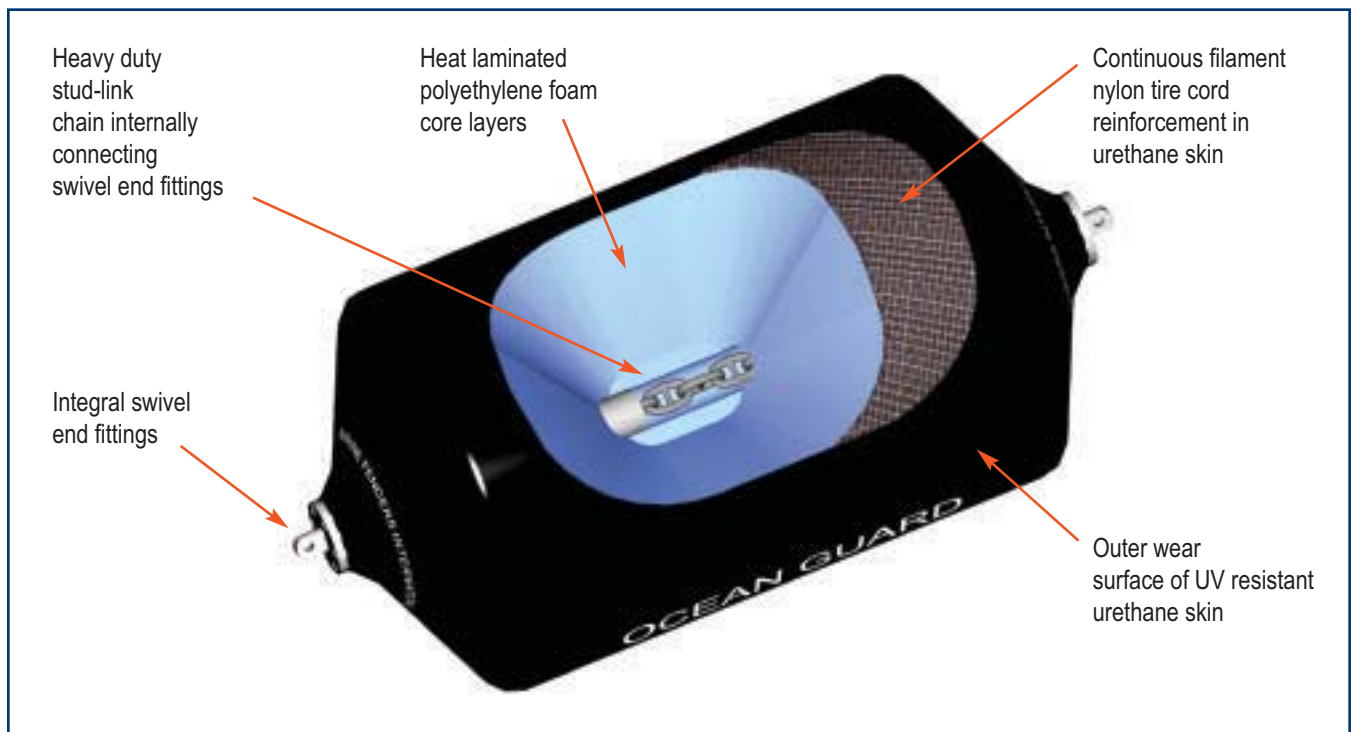
Continuous filament nylon tire cord reinforcement in urethane skin

Outer wear surface of UV resistant urethane skin

Heat laminated polyethylene foam core layers



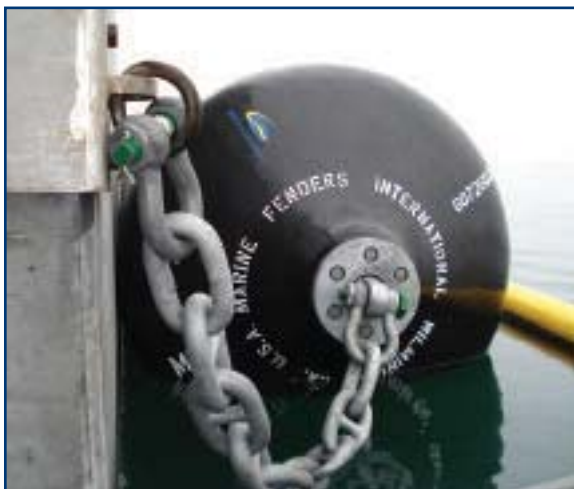
The heat-lamination process of the foam core provides a bond that is stronger than the foam itself. Foam cores bonded with adhesives typically experience bond failure in a relatively short period of time while in use.



SWIVEL END FITTINGS

All Ocean Guard™ Netless Foam Filled Marine Fenders are constructed with integral swivel end fittings at each end of the fender. The swivel end fittings are internally connected with a heavy duty stud link chain and is designed and sized to transmit the safe working loads through the fender.

During the fender skin construction the reinforcement filaments wrap around each end fitting housing. The swivel end fittings are designed to allow each swivel on each end of the fender to rotate independently and freely on the axis of the fender even under full compression.



LABORATORY TESTED

Ocean Guard™ Netless Fenders are tested at independent testing laboratories to the latest US Navy, US Coast Guard, PIANC and ASTM specification.

Our fenders are manufactured and inspected in accordance to the US Governments quality specifications and requirements. Independent inspection certification are available upon request from ABS, BUREAU VERITAS, DNV, LLOYDS and others.



Skin thickness testing on each fender



FENDER TESTING AT 60% COMPRESSION
In accordance to US Navy specifications

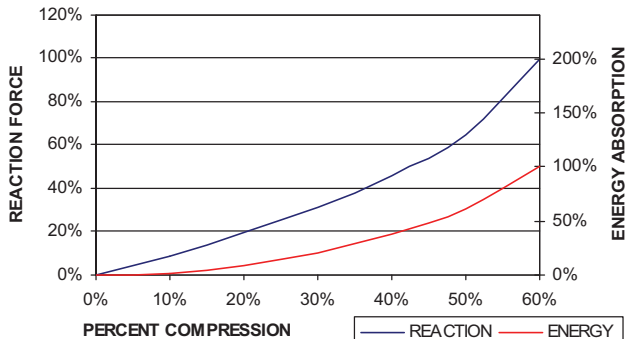
FENDERS		LOW REACTION				ENHANCED CAPACITY				STANDARD CAPACITY				ADVANCED CAPACITY				HIGH CAPACITY			
SIZE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE	
METRIC	ENGLISH	ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons
0.7 x 1.5	2.3 x 4.9	11	2	18	8	15	2	24	11	19	3	30	14	22	3	35	16	25	3	39	18
0.7 x 2.0	2.3 x 6.5	17	2	27	12	23	3	35	16	28	4	44	20	33	5	51	23	33	5	52	24
0.7 x 3.0	2.3 x 9.8	29	4	46	21	39	5	61	28	49	7	77	35	56	8	88	40	50	7	78	35
1.0 x 1.5	3.3 x 4.9	21	3	18	8	28	4	31	14	35	5	39	18	40	6	45	20	46	6	51	23
1.0 x 2.0	3.3 x 6.5	30	4	34	15	40	6	46	21	50	7	57	26	58	8	66	30	65	9	74	34
1.0 x 3.0	3.3 x 9.8	53	7	58	26	71	10	78	35	89	12	97	44	102	14	112	51	75	10	86	39
1.2 x 2.0	3.9 x 6.5	40	6	38	17	54	7	50	23	67	9	63	29	77	11	72	33	87	12	82	37
1.2 x 2.5	3.9 x 8.2	56	8	52	23	75	10	69	31	94	13	86	39	108	15	99	45	109	15	103	46
1.35 x 2.5	4.4 x 8.2	67	9	56	25	90	12	75	34	112	15	94	43	129	18	108	49	146	20	122	55
1.35 x 3.0	4.4 x 9.8	86	12	71	32	115	16	94	43	144	20	118	54	166	23	136	62	175	24	146	66
1.5 x 3.0	4.9 x 9.8	103	14	78	35	137	19	104	47	171	24	130	59	197	27	150	68	222	31	169	77
1.7 x 3.0	5.6 x 9.8	125	17	83	38	166	23	111	50	208	29	139	63	239	33	160	73	270	37	181	82
1.7 x 4.5	5.6 x 14.7	212	29	139	63	283	39	186	84	354	49	232	105	407	56	267	121	360	50	241	109
2.0 x 3.5	6.5 x 11.5	201	28	114	52	268	37	152	69	335	46	190	86	385	53	219	99	436	60	247	112
2.0 x 4.0	6.5 x 13.1	239	33	136	62	318	44	181	82	398	55	226	103	458	63	260	118	517	72	294	133
2.0 x 4.5	6.5 x 14.7	276	38	157	71	368	51	209	95	460	64	261	118	529	73	300	136	598	83	339	154
2.5 x 4.0	8.2 x 13.1	335	46	161	73	473	65	215	98	591	82	269	122	680	94	309	140	768	106	350	159
2.5 x 4.5	8.2 x 16.4	398	55	181	82	530	73	241	109	663	92	301	137	762	105	346	157	1046	145	475	215
2.5 x 5.5	8.2 x 18.0	531	73	241	109	708	98	322	146	885	122	402	182	1018	141	462	210	1151	159	523	237
3.0 x 4.9	9.8 x 16.0	633	88	239	108	844	117	271	123	1055	146	339	154	1213	168	390	177	1372	190	519	235
3.0 x 6.0	9.8 x 19.7	819	113	310	141	1092	151	413	187	1365	189	516	234	1570	217	593	269	1775	245	671	304
3.0 x 7.0	9.8 x 23.0	973	135	367	166	1297	179	489	222	1621	224	611	277	1864	258	703	319	1923	266	727	330
3.3 x 4.5	10.8 x 14.7	663	92	228	103	884	122	304	138	1105	153	380	172	1271	176	437	198	1437	199	494	224
3.3 x 6.5	10.8 x 21.3	1072	148	368	167	1429	198	491	223	1786	247	614	279	2054	284	706	320	2322	321	798	362
3.3 x 8.5	10.8 x 27.9	1498	207	516	234	1997	276	688	312	2496	345	860	390	2870	397	989	449	2323	321	799	362
3.3 x 10.6	10.8 x 34.8	1909	264	656	298	2545	352	875	397	3181	440	1094	496	3658	506	1258	571	4135	572	1422	645

* Actual values for above sizes may vary +/- 15% due to variations in materials, speed of compression, temperatures and tolerances. Performance based on 60% compression.

FENDER PRESSURE AT 60% DEFLECTION

CAPACITY	ENGLISH UNITS KIPS / SQ FT	METRIC UNITS TONS / SQ METER	METRIC UNITS kN / SQ METER
Low Reaction	2.2	10.6	104
Enhanced	2.9	14.1	138
Standard	3.6	17.6	172
Advanced	4.1	20.2	198
High Capacity	4.7	22.9	224
Advanced High	5.8	28.2	276
Extra High Capacity	6.8	33.4	327
Advanced Extra High	8.1	39.6	388
Super High Capacity	9.4	45.7	449
Advanced Super High	10.8	52.7	517
Ultra High	12.2	59.7	586

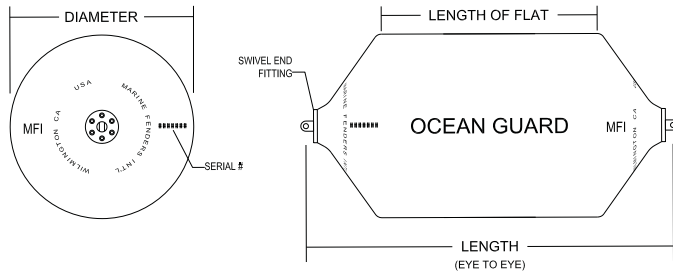
GENERIC PERFORMANCE CURVE OCEAN GUARD FENDER



FOAM FILLED FENDERS

ADVANCED HIGH CAPACITY				EXTRA HIGH CAPACITY				ADVANCED EXTRA HIGH CAPACITY				SUPER HIGH CAPACITY				ADVANCED SUPER HIGH CAPACITY				ULTRA HIGH CAPACITY				FENDER	
ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		SAFE WORKING END PULL LOAD	
ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons	kips	kN
30	4	48	22	36	5	57	26	43	6	68	31	49	7	78	35	57	8	90	41	65	9	102	46	10	42
45	6	71	32	48	7	76	34	64	9	100	45	65	9	104	47	85	12	133	60	96	13	151	68	10	42
78	11	123	56	72	10	114	52	110	15	173	78	98	14	156	71	147	20	230	105	167	23	261	118	10	42
56	8	62	28	67	9	74	34	79	11	88	40	91	13	123	56	105	15	117	53	119	16	133	60	10	42
80	11	91	41	95	13	108	49	113	16	128	58	130	18	148	67	150	21	171	78	170	24	194	88	10	42
142	20	155	70	75	10	86	39	200	28	218	99	75	10	86	39	267	37	291	132	303	42	330	150	10	42
107	15	101	46	127	18	120	54	151	21	142	64	174	24	164	74	201	28	189	86	228	32	214	97	17	76
150	21	138	62	159	22	150	68	212	29	194	88	218	30	205	93	282	39	258	117	320	44	292	133	17	76
179	25	150	68	213	29	179	81	252	35	212	96	291	40	244	111	336	46	282	128	381	53	320	145	17	76
230	32	189	86	256	35	215	97	324	45	266	120	349	48	293	133	432	60	354	161	490	68	401	182	17	76
274	38	208	94	325	45	247	112	385	53	293	133	445	62	338	153	513	71	390	177	581	80	442	200	24	107
333	46	222	101	395	55	264	120	468	65	313	142	541	75	361	164	624	86	417	189	707	98	473	214	24	107
566	78	371	168	527	73	352	160	797	110	522	237	721	100	481	218	1062	147	696	316	1204	166	789	358	24	107
536	74	304	138	637	88	361	164	754	104	428	194	871	120	494	224	1005	139	570	259	1139	158	646	293	34	151
637	88	362	164	756	105	429	195	896	124	509	231	1035	143	588	267	1194	165	678	308	1353	187	768	349	34	151
736	102	418	189	874	121	496	225	1035	143	587	266	1196	165	679	308	1380	191	783	355	1564	216	887	403	50	222
946	131	430	195	1123	155	511	232	1330	184	605	275	1537	213	699	317	1773	245	807	366	2009	278	915	415	70	311
1061	147	482	218	1529	211	694	315	1492	206	677	307	2091	289	950	431	1989	275	903	410	2254	312	1023	464	70	311
1416	196	643	292	1682	233	764	347	1991	275	905	410	2301	318	1045	474	2655	367	1206	547	3009	416	1367	620	70	311
1688	233	542	246	2005	277	758	344	2374	328	763	346	2743	379	1037	470	3165	438	1017	461	3587	496	1153	523	70	311
2184	302	826	374	2594	359	980	445	3071	425	1161	527	3549	491	1342	609	4095	566	1548	702	4641	642	1754	796	110	489
2594	359	978	443	2810	389	1062	482	3647	504	1375	624	3845	532	1454	659	4863	673	1833	831	5511	762	2077	942	110	489
1768	245	608	276	2100	290	722	327	2486	344	855	388	2873	397	988	448	3315	458	1140	517	3757	520	1292	586	110	489
2858	395	982	446	3393	469	1167	529	4019	556	1382	627	4644	642	1596	724	5358	741	1842	836	6072	840	2088	947	110	489
3994	552	1376	624	3394	469	1168	530	5616	777	1935	878	4645	642	1597	724	7488	1036	2580	1170	8486	1174	2924	1326	110	489
5090	704	1750	794	6044	836	2079	943	7157	990	2462	1117	8271	1144	2844	1290	9543	1320	3282	1489	10815	1496	3720	1687	110	489

* Actual values for above sizes may vary +/- 15% due to variations in materials, speed of compression, temperatures and tolerances. Performance based on 60% compression.



PROVEN APPLICATIONS



Ferry Terminals



Coast Guard



Dredging Operations



Navy



Navy

ENGINEERED FOR EXCELLENCE

PROVEN APPLICATIONS



Container Terminals



ENGINEERED FOR EXCELLENCE

PROVEN APPLICATIONS



Cruise Ship Terminals



ENGINEERED FOR EXCELLENCE

PROVEN APPLICATIONS



Easy Installation

ENGINEERED FOR EXCELLENCE

OCEAN CUSHION™ Foam Filled Marine Fender with Chain & Aircraft Tire Nets

The foam-filled Ocean Cushion™ Fenders, with chain & aircraft tire nets, are designed to provide a high rate of energy absorption with a relatively low reaction force. Constructed with the same high quality materials and innovative technology as our Ocean Guard™ Netless foam filled fenders, their low maintenance proven design provides reliable performance in today's demanding marine environments.

PERFORMANCE FEATURES

HIGH ENERGY ABSORPTION

The foam-filled Ocean Cushion™ Fenders, with chain & aircraft tire nets, are designed to provide a high rate of energy absorption with a relatively low reaction force.

Typically, Ocean Cushion™ foam-filled fenders, when compared to similar sized pneumatic fenders, absorb a greater amount of energy with up to 40% less reaction force.

LOW REACTION FORCE

Ocean Cushion™ Fenders, has the same low reaction force feature as our Ocean Guard™ Fenders producing a smoother, gentler berthing than hard rubber bucking fenders.

The gentle sloping reaction curve of the Ocean Cushion™ foam-filled fenders produces a lower frequency of peak reaction force or hull pressure during normal berthing conditions.



LARGE STANDOFF

Ocean Cushion™ Fenders can provide a standoff unmatched by many fendering systems. The chain & aircraft tire nets increase the diameter of the fender body achieving a standoff of up to 16 ft.



LOW MAINTENANCE

Unlike pneumatic fenders, Ocean Cushion™ foam-filled fenders are not inflated with air. The foam filled construction requires no air pressure or safety valves to maintain.



RELIABLE AND SAFE PERFORMANCE

The closed cell foam core construction of Ocean Cushion™ Fenders insure that the fender will perform even when it is cut or punctured, when you need it most. It will not deflate like pneumatic fenders.

CONSTRUCTION FEATURES

FOAM CORE

Ocean Cushion™ foam-filled fenders are constructed with a resilient energy absorbing closed cell cross-linked polyethylene foam core which is heat laminated into a one piece, solid foam core. The same heat lamination process used in our Ocean Guard™ fenders, produces a thermal bond between the layers of foam which is stronger than the foam itself which, will not delaminate even under the most abusive berthing conditions.



CHAIN & AIRCRAFT TIRE NET

The Ocean Cushion™ foam-filled fender uses a heavy duty chain and aircraft tire net, assembled with thicker walled aircraft tires. The tires are placed on all fender surface areas including flats and ends to provide maximum protection of the fender skin.

Rubber sleeves are used on the exposed chains at both ends of the fender for additional protection. Galvanized long link longitudinal chains begin and terminate on a steel end fitting which will be connected with galvanized screw pin shackles, which are passed through holes in the tires.

The lateral chains are inter connected to the longitudinal chains also through the tires and locked in place with shackles. The chain & tire net is also designed to allow for the replacement of a section of the chain or tire.



REINFORCED ELASTOMERIC SKIN

The energy absorbing foam core is protected by a tough, thick nylon filament tire cord reinforced elastomer skin. The reinforcing filaments are continuously wound in a helix pattern through up to 90 % of the elastomer skin. This continuous reinforcement of the elastomer skin greatly increases the tensile and tear strength of the skin.



OCEAN CUSHION™ STANDARD CAPACITY FOAM FILLED FENDERS WITH CHAIN & AIRCRAFT TIRE NETS



ENGLISH SIZES											
FENDERS		STAND OFF		STANDARD CAPACITY				HIGH CAPACITY			
SIZE		DIAMETER UNCOMPRESSED		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE	
ENGLISH	METRIC										
ft x ft	m x m	ft	m	ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons
3 x 6	0.92 x 1.83	4.1	1.2	36	5	55	25	52	7	79	36
4 x 6	1.22 x 1.83	5.3	1.6	65	9	72	33	94	13	103	47
4 x 8	1.22 x 2.44	5.3	1.6	85	12	98	44	123	17	138	63
5 x 10	1.53 x 3.05	6.5	2.0	165	23	152	69	239	33	214	97
5 x 16	1.53 x 4.88	6.5	2.0	259	36	240	109	375	52	338	153
6 x 12	1.83 x 3.66	7.5	2.3	295	41	217	98	428	59	306	139
7 x 14	2.13 x 4.27	8.5	2.6	450	62	260	118	652	90	366	166
8 x 12	2.44 x 3.66	9.8	3.0	465	64	268	122	674	93	377	171
8 x 16	2.44 x 4.88	9.8	3.0	662	92	380	172	959	133	535	243
9 x 14	2.75 x 4.27	10.8	3.3	730	101	373	169	1058	146	525	238
9 x 18	2.75 x 5.49	10.8	3.3	937	130	480	218	1358	188	676	307
10 x 16	3.05 x 4.88	11.8	3.6	976	135	450	204	1414	196	634	287
10 x 20	3.05 x 6.10	11.8	3.6	1,286	178	590	268	1864	258	831	377
11 x 18	3.35 x 5.49	12.8	3.9	1,386	192	581	264	2009	278	818	371
11 x 22	3.35 x 6.71	12.8	3.9	1,697	235	711	323	2459	340	1001	454
12 x 24	3.70 x 7.30	13.8	4.2	2,196	304	844	383	3183	440	1189	539
13 x 26	3.96 x 7.90	14.8	4.5	2,785	385	987	448	4036	558	1390	631
14 x 28	4.27 x 8.53	15.8	4.8	3,421	473	1,128	512	4958	686	1589	721

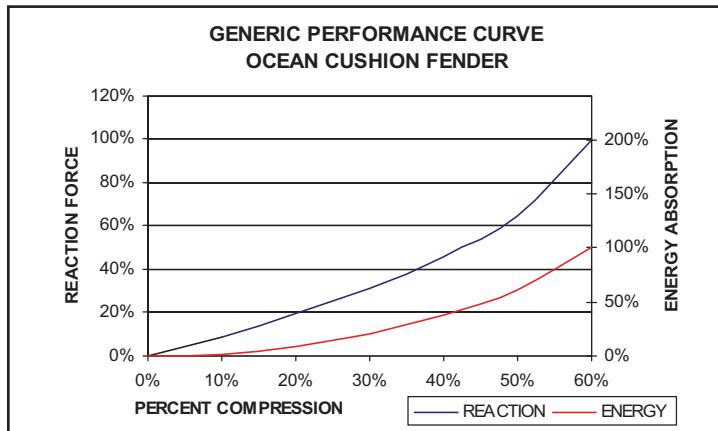
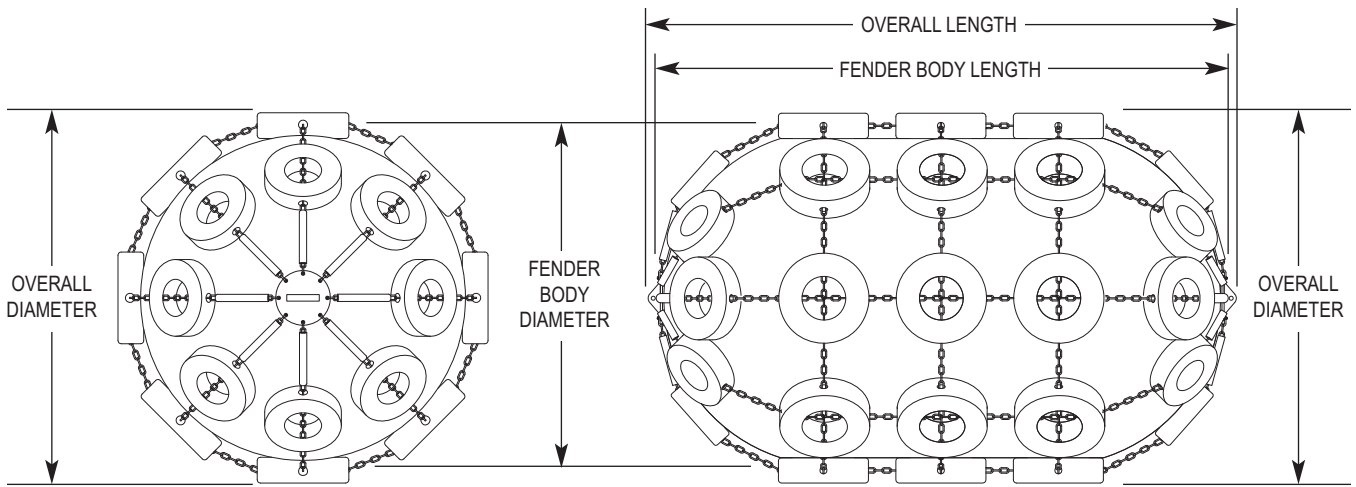
PERFORMANCE AT 60% COMPRESSION

METRIC SIZES											
FENDERS		STAND OFF		STANDARD CAPACITY				HIGH CAPACITY			
SIZE		DIAMETER UNCOMPRESSED		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE	
METRIC	ENGLISH										
m x m	ft x ft	ft	m	ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons
1.00 x 1.50	3.3 x 4.9	4.4	1.3	35	5	50	23	50	7	71	32
1.00 x 2.00	3.3 x 6.6	4.4	1.3	49	7	67	30	71	10	96	43
1.20 x 2.00	3.9 x 6.6	5.3	1.6	64	9	76	34	93	13	107	49
1.20 x 2.50	3.9 x 8.2	5.3	1.6	80	11	94	43	116	16	132	60
1.35 x 2.50	4.4 x 8.2	5.9	1.8	103	14	108	49	150	21	152	69
1.35 x 4.00	4.4 x 13.1	5.9	1.8	165	23	172	78	239	33	242	110
1.50 x 3.00	4.9 x 9.8	6.4	2.0	156	22	146	66	226	31	206	93
1.70 x 3.00	5.6 x 9.8	7.1	2.2	196	27	162	73	284	39	227	103
1.70 x 4.50	5.6 x 14.8	7.1	2.2	297	41	244	111	430	60	344	156
2.00 x 3.50	6.6 x 11.5	8.1	2.5	318	44	222	101	461	64	313	142
2.00 x 4.00	6.6 x 13.1	8.1	2.5	371	51	259	117	538	74	365	165
2.20 x 4.50	7.2 x 14.8	8.7	2.7	500	69	321	146	725	100	452	205
2.20 x 5.50	7.2 x 18.0	8.7	2.7	609	84	390	177	883	122	549	249
2.50 x 4.00	8.2 x 13.1	10.0	3.0	542	75	305	138	786	109	430	195
2.50 x 5.50	8.2 x 18.0	10.0	3.0	793	110	447	203	1149	159	629	285
3.00 x 6.00	9.8 x 19.7	11.6	3.5	1,213	168	571	259	1758	243	804	365
3.30 x 4.50	10.8 x 14.8	12.6	3.8	1,010	140	430	195	1464	202	606	275
3.30 x 6.50	10.8 x 21.3	12.6	3.8	1,581	219	675	306	2291	317	951	431
3.30 x 10.6	10.8 x 34.8	12.6	3.8	2,774	384	1,185	538	4020	556	1669	757
4.20 x 8.40	13.8 x 27.6	15.6	4.8	3,325	460	1,110	503	4819	666	1563	709

PERFORMANCE AT 60% COMPRESSION

** ACTUAL VALUES FOR ABOVE SIZES MAY VARY +/- 15% DUE TO VARIATIONS IN MATERIALS, SPEED OF COMPRESSION, TEMPERATURES AND TOLERANCES.

Ocean Cushion foam filled fenders are also available in other sizes and capacity models, Low Reaction, High, Extra High, and Super High Capacity.



PROVEN APPLICATIONS



ENGINEERED FOR EXCELLENCE

PROVEN APPLICATIONS



Ship to Ship and Bunkering



ENGINEERED FOR EXCELLENCE

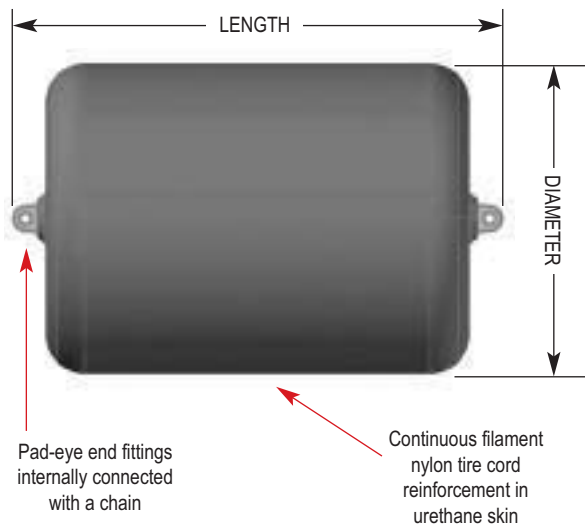
OCEAN GUARD™ Small Standard Duty Foam Filled Fender

Marine Fenders International, Inc. Ocean Guard™ Small Standard Duty (SSD) & Ocean Guard™ Small Standard Duty with Hawse Pipe fitting (SSD-HP) foam filled marine fenders are designed for quick and convenient use. SSD fenders compact sizes are ideal for the limited storage space available on board of Naval and Commercial Vessels. Their lightweight allows for easy installation and can be handled by one or two people.

OCEAN GUARD™ SMALL STANDARD DUTY (SSD)

SSD fenders are constructed in accordance with US Navy Technical Specifications. They are built with the same quality construction and materials as OCEAN GUARD™ fenders.

- Lightweight heat laminated closed cell resilient energy absorbing foam core
- Tough non-marking nylon Tire Cord reinforced urethane elastomeric skin
- Integral end fittings either stainless steel or galvanized
- Optional internal through chain



OCEAN GUARD SSD FOAM FILLED FENDERS

FENDERS		LOW REACTION				ENHANCED CAPACITY				STANDARD CAPACITY				HARDWARE	
SIZE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		SHACKLE SIZE	
ENGLISH	METRIC	ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons	ft - kips	ton-m	kips	tons	tons	inches
16 x 24	400 x 600	1.7	0.2	10.8	4.9	2.2	0.3	14.4	6.5	2.8	0.4	18.0	8.2	0.5	13
16 x 36	400 x 900	3.2	0.4	12.0	5.4	4.2	0.6	16.0	7.3	5.3	0.7	20.0	9.1	0.5	13
18 x 36	457 x 900	4.1	0.6	12.4	5.6	5.4	0.8	16.6	7.5	6.8	0.9	20.7	9.4	0.5	13
20 x 36	500 x 900	4.9	0.7	13.6	6.2	6.6	0.9	18.1	8.2	8.2	1.1	22.6	10.3	0.5	13
20 x 39	500 x 1000	5.3	0.7	14.7	6.7	7.0	1.0	19.6	8.9	8.8	1.2	24.5	11.1	0.5	13
20 x 48	500 x 1200	6.6	0.9	18.0	8.2	8.8	1.2	24.0	10.9	11.0	1.5	30.0	13.6	0.5	13
22 x 48	558 x 1200	7.3	1.0	19.8	9.0	9.8	1.3	26.4	12.0	12.2	1.7	33.0	15.0	0.5	13
24 x 36	600 x 900	6.3	0.9	14.7	6.7	8.4	1.2	19.6	8.9	10.5	1.5	24.5	11.1	0.5	13
24 x 48	600 x 1200	8.4	1.2	19.2	8.7	11.2	1.5	25.6	11.6	14.0	1.9	32.0	14.5	0.5	13
32 x 50	800 x 1270	16.8	2.3	64.8	29.1	22.4	3.1	86.4	38.8	28.0	3.9	108.0	48.5	0.625	16
36 x 48	900 x 1200	20.4	2.8	31.2	14.2	27.2	3.8	41.6	18.9	34.0	4.7	52.0	23.6	0.625	16
36 x 60	900 x 1500	25.0	3.5	39.0	17.7	33.3	4.6	52.0	23.6	41.6	5.8	65.0	29.5	0.625	16
36 x 72	900 x 1828	32.0	4.4	50.0	22.7	42.6	5.9	66.6	30.2	53.3	7.4	83.3	37.8	0.625	16
39 x 60	1000 x 1500	30.0	4.1	42.0	19.1	40.0	5.5	56.0	25.4	50.0	6.9	70.0	31.8	0.625	16
40 x 60	1016 x 1500	31.2	4.3	43.7	19.8	41.6	5.8	58.2	26.4	52.0	7.2	72.8	33.0	0.625	16

* Actual values for above sizes may vary +/- 15% due to variations in materials, speed of compression, temperatures and tolerances. Performance based on 60% compression.



OCEAN GUARD™ SMALL STANDARD DUTY WITH HAWSE PIPE (SSD-HP)

SSD-HP fenders are constructed equivalent to our OCEAN GUARD™ Small Standard Duty (SSD) foam filled fenders, which they exception that they are constructed with a heavy duty thru pipe – Hawse pipe instead of pad eye end fittings.

- Standard denser heat laminated closed cell resilient energy absorbing foam core
- Tough non-marking nylon Tire Cord reinforced urethane elastomeric skin
- Hawse pipe (thru pipe) construction



OCEAN GUARD™ Floating Monopile Donut Fender

The Ocean Guard™ Donut Monopile floating fender design is an innovative foam filled fender. This unique fendering system provides a floating energy absorbing foam filled fender. It is designed to simply slip over a stationary monopile and float at the fluctuating water line.

Upon contact of a ship or vessel, this design allows the fender to freely rotate and self adjust with the changing water level. The unique rotating feature also makes it ideal for turning dolphins and eliminates shear forces. Where there are large or extreme tidal fluctuations a mooring crown can be constructed into the fender to allow safe moorage during the tidal swings even if the donut fender is compressed.



PERFORMANCE FEATURES

HIGH ENERGY ABSORPTION WITH LOW REACTION FORCE

The floating Ocean Guard™ Monopile Fenders, are also designed to provide a high rate of energy absorption with a relatively low reaction force. As with our other fendering systems the energy absorbing foam produces a smoother, gentler berthing than hard rubber bucking fenders while producing low reaction forces. Additional energy absorption is also supplied by the piling.



LOW SHEAR FORCE FENDERING SYSTEM

The freely rotating design of the floating Ocean Guard™ Monopile Fenders, eliminating shear forces of a contacting vessel. The internal anti-friction UHMW bearing pads allows the fender to slide around and up and down the pile. Allows vessel to roll along fender.



SELF ADJUSTING WITH WATER LEVEL & ALL TIDE MOORING

Ocean Guard™ Monopile Fender's buoyancy allows it to freely float with water levels, maintaining optimal fendering. With the addition of a mooring crown this unique feature provides all tide mooring. This eliminates the need for frequent mooring line adjustments during tidal fluctuations.

HULL CONFORMING FLEXIBLE DESIGN

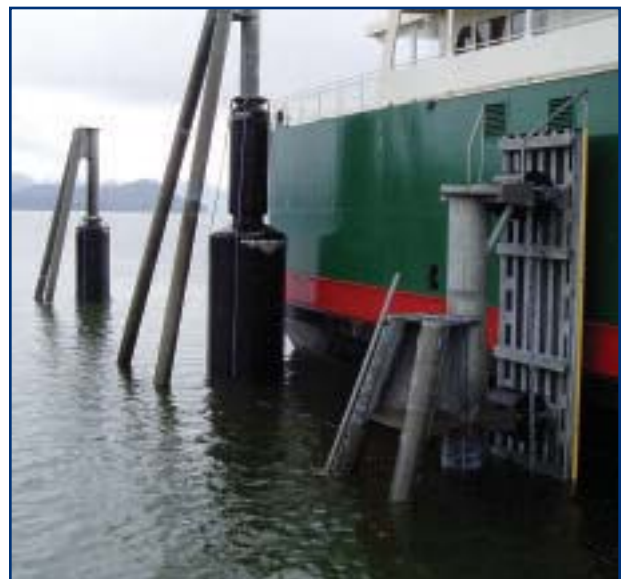
Ocean Guard™ Monopile Fender's flexible energy absorbing foam core and its tough resilient elastomer skin give it the unique ability to conform to a vessel's hull contours and extremities, such as rub rails.

SAFE AND DEPENDABLE

The buoyant burst resistant materials used in the construction of Ocean Guard™ Monopile Fender's produce a very safe fendering system. Even if damages it will not sink and will continue to absorb energy and provide standoff.

LOW MAINTENANCE

Ocean Guard™ Monopile Fender's design and construction provide a long lasting, low maintenance fendering system. Its tough resilient elastomer skin is designed to withstand the worlds harshest environmental conditions.



CONSTRUCTION FEATURES

FOAM CORE

The floating Ocean Guard™ Monopile Fenders are also constructed with a resilient energy absorbing 100% closed cell cross-linked polyethylene foam core which is heat laminated into a one piece, solid foam core. The same heat lamination process used in our Ocean Guard™ fenders, produces a thermal bond between the layers of foam which is stronger than the foam itself which, will not delaminate even under the most abusive berthing conditions. Additionally, a number of foam variations are available for each size which provide higher capacity fenders.

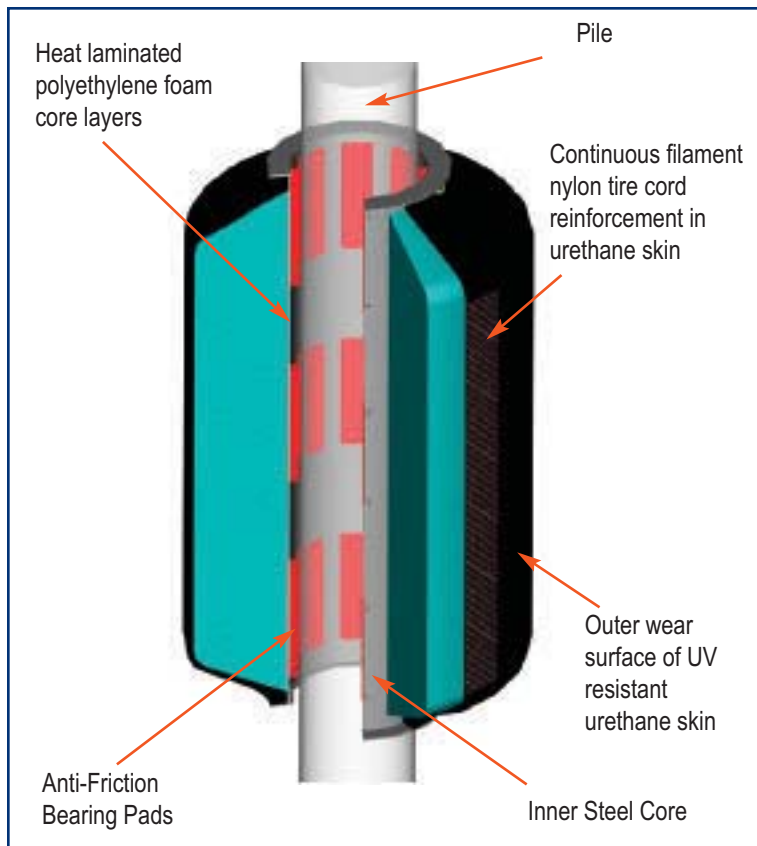


REINFORCED ELASTOMERIC SKIN

The energy absorbing foam core is protected by a tough, thick nylon filament tire cord reinforced elastomer skin. The reinforcing filaments are continuously wound in a helix pattern through up to 90 % of the elastomer skin. This continuous reinforcement of the elastomer skin greatly increases the tensile and tear strength of the skin. The elastomer skin is non-marking and highly resistant to environmental hazards such as ozone and ultra-violet radiation.

HEAVY DUTY INTERNAL STRUCTURAL STEEL CORE

The internal steel core of the Ocean Guard Monopile Donut fender is the foundation of the fender. Affixed to this heavy duty fabricated steel structure are the components of the fender, energy absorbing foam core, reinforced elastomer skin, UHMW anti-friction bearing pads and optional mooring crown.



ANTI-FRICTION BEARING PADS

The internal anti - friction UHMW bearing pads allows the fender to slide around and up and down the pile. Their special design prevents the fender from binding. Each anti-friction bearing pad is machined to the radius of internal steel core and to diameter of the central piling. The anti-friction bearing pads are designed to easily be replaced if needed.



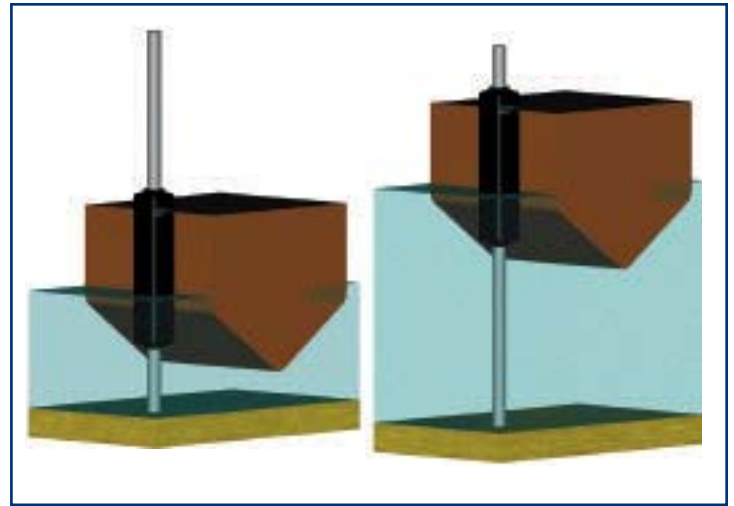
APPLICATIONS

DESIGN

The basic design principle of the floating Ocean Guard™ Monopile Fender is to provide an innovative fendering system that absorbs energy, adjust to tidal fluctuations and eliminates shear forces.

The ability of this fendering system to freely ride up and down and rotate around the driven stationary central steel pile even under compression achieves this design goal.

The proven performance and versatility of the Ocean Guard™ Monopile Fendering System make it ideal for the toughest mooring applications.



APPLICATIONS

- Breasting Dolphins
- Bridge protection
- Corner protection
- Dock fendering where large tidal changes occur
- Dock fendering where vessels need roll along fenders for loading
- Ferry vessel applications
- Lock entrance
- Turning dolphin applications



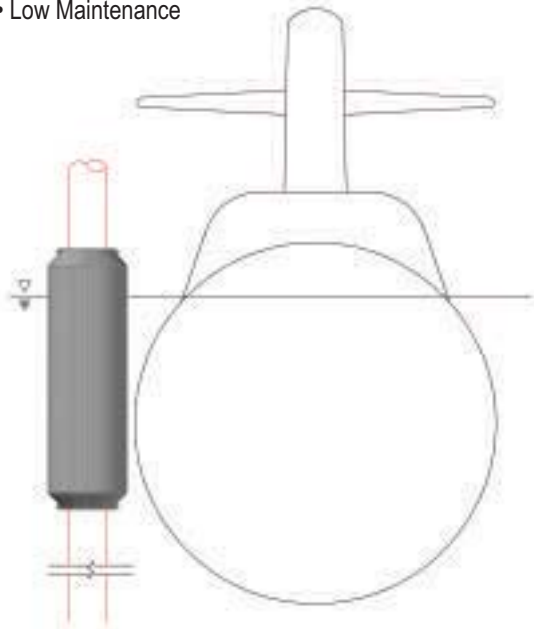
CUSTOM DESIGNS

As the world's commerce gets smaller, higher demands on ports and vessels are made to provide safer berthing operations. The Ocean Guard™ Donut Monopile fender reduces ship, vessel and dock maintenance costs. Marine Fenders International, Inc. works closely with the customer to design a custom Ocean Guard™ Donut Monopile foam-filled fender that is specific to their needs in size, shape, and color.

DONUT FENDER SUBMARINE APPLICATIONS

The Ocean Guard™ Donut Monopile floating fender design makes it an ideal choice for submarine applications. Its advantages over other submarine fendering include:

- Maintains constant draft by self adjusting adjusts with tidal fluctuations
- Low hull pressure
- Low shear force fendering systems (freely rotates)
- Unlike Hydro-pneumatic fenders there is no need to maintain of air and water pressure.
- Safe and dependable – constructed with burst resistant materials
- Unsinkable – will not sink if damaged
- Will not mark hulls
- Low Maintenance



OCEAN GUARD™ MONOPILE

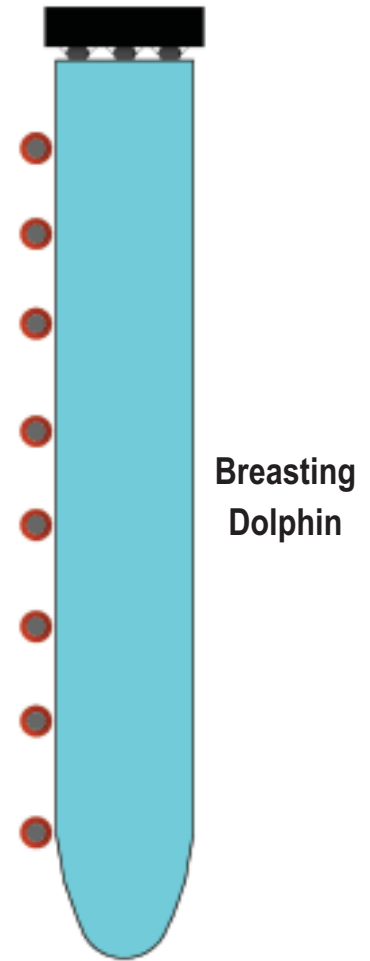
FENDER SPECIFICATIONS						STANDARD CAPACITY				HIGH CAPACITY			
FENDER DIAMETER		PILE DIAMETER		FLAT LENGTH		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE	
FT	M	FT	M	FT	M	FT-KIPS	TON-M	KIPS	TON	FT-KIPS	TON-M	KIPS	TON
4.5	1.4	2	0.6	2	0.6	4	0.6	18	8.2	7	1.0	29	13.2
4.5	1.4	2	0.6	3	0.9	6	0.8	27	12.2	10	1.4	43	19.5
4.5	1.4	2	0.6	4	1.2	8	1.1	35	15.9	13	1.8	58	26.3
4.5	1.4	2	0.6	5	1.5	10	1.4	44	20.0	16	2.2	72	32.7
4.5	1.4	2	0.6	6	1.8	12	1.7	53	24.0	20	2.8	87	39.5
4.5	1.4	2	0.6	7	2.1	14	1.9	62	28.1	23	3.2	101	45.8
4.5	1.4	2	0.6	8	2.4	16	2.2	71	32.2	26	3.6	116	52.6
5	1.5	2.5	0.8	2	0.6	5	0.7	21	9.5	8	1.1	34	15.4
5	1.5	2.5	0.8	3	0.9	7	1.0	31	14.1	11	1.5	51	23.1
5	1.5	2.5	0.8	4	1.2	10	1.4	41	18.6	15	2.1	68	30.8
5	1.5	2.5	0.8	5	1.5	12	1.7	52	23.6	19	2.6	84	38.1
5	1.5	2.5	0.8	6	1.8	15	2.1	62	28.1	23	3.2	101	45.8
5	1.5	2.5	0.8	7	2.1	17	2.4	72	32.7	27	3.7	118	53.5
5	1.5	2.5	0.8	8	2.4	20	2.8	83	37.6	30	4.1	135	61.2
6	1.8	3	0.9	2	0.6	7	1.0	24	10.9	12	1.7	39	17.7
6	1.8	3	0.9	3	0.9	11	1.5	35	15.9	17	2.4	58	26.3
6	1.8	3	0.9	4	1.2	14	1.9	47	21.3	23	3.2	77	34.9
6	1.8	3	0.9	5	1.5	18	2.5	59	26.8	29	4.0	96	43.5
6	1.8	3	0.9	6	1.8	21	2.9	71	32.2	35	4.8	116	52.6
6	1.8	3	0.9	7	2.1	25	3.5	83	37.6	41	5.7	135	61.2
6	1.8	3	0.9	8	2.4	29	4.0	94	42.6	46	6.4	154	69.9
7	2.1	3.5	1.1	3	0.9	15	2.1	40	18.1	24	3.3	65	29.5
7	2.1	3.5	1.1	4	1.2	19	2.6	53	24.0	33	4.6	87	39.5
7	2.1	3.5	1.1	5	1.5	24	3.3	66	29.9	41	5.7	109	49.4
7	2.1	3.5	1.1	6	1.8	29	4.0	80	36.3	49	6.8	130	59.0
7	2.1	3.5	1.1	7	2.1	34	4.7	93	42.2	57	7.9	152	68.9
7	2.1	3.5	1.1	8	2.4	39	5.4	106	48.1	65	9.0	174	78.9
7.5	2.3	4	1.2	3	0.9	17	2.4	44	20.0	27	3.7	72	32.7
7.5	2.3	4	1.2	4	1.2	22	3.0	59	26.8	36	5.0	96	43.5
7.5	2.3	4	1.2	5	1.5	28	3.9	74	33.6	45	6.2	121	54.9
7.5	2.3	4	1.2	6	1.8	33	4.6	89	40.4	54	7.5	145	65.8
7.5	2.3	4	1.2	7	2.1	39	5.4	103	46.7	63	8.7	169	76.7
7.5	2.3	4	1.2	8	2.4	45	6.2	118	53.5	72	10.0	193	87.5
8.3	2.5	4.5	1.4	3	0.9	20	2.8	49	22.2	33	4.6	80	36.3
8.3	2.5	4.5	1.4	4	1.2	27	3.7	65	29.5	44	6.1	106	48.1
8.3	2.5	4.5	1.4	5	1.5	33	4.6	81	36.7	55	7.6	133	60.3
8.3	2.5	4.5	1.4	6	1.8	40	5.5	97	44.0	66	9.1	159	72.1
8.3	2.5	4.5	1.4	7	2.1	47	6.5	114	51.7	77	10.6	186	84.4
8.3	2.5	4.5	1.4	8	2.4	54	7.5	130	59.0	88	12.2	212	96.2
9	2.7	5	1.5	3	0.9	24	3.3	53	24.0	39	5.4	87	39.5
9	2.7	5	1.5	4	1.2	32	4.4	71	32.2	52	7.2	116	52.6
9	2.7	5	1.5	5	1.5	40	5.5	89	40.4	65	9.0	145	65.8
9	2.7	5	1.5	6	1.8	48	6.6	106	48.1	78	10.8	174	78.9
9	2.7	5	1.5	7	2.1	56	7.7	124	56.2	91	12.6	203	92.1
9	2.7	5	1.5	8	2.4	64	8.9	142	64.4	104	14.4	232	105.2

* Actual values for above sizes may vary +/- 15% due to variations in materials, speed of compression, temperatures and tolerances.
 The fender performance is engineered at 60% foam compression. The monopile deflection provides additional energy absorption for the same reaction force rating

DONUT FLOATING FENDER

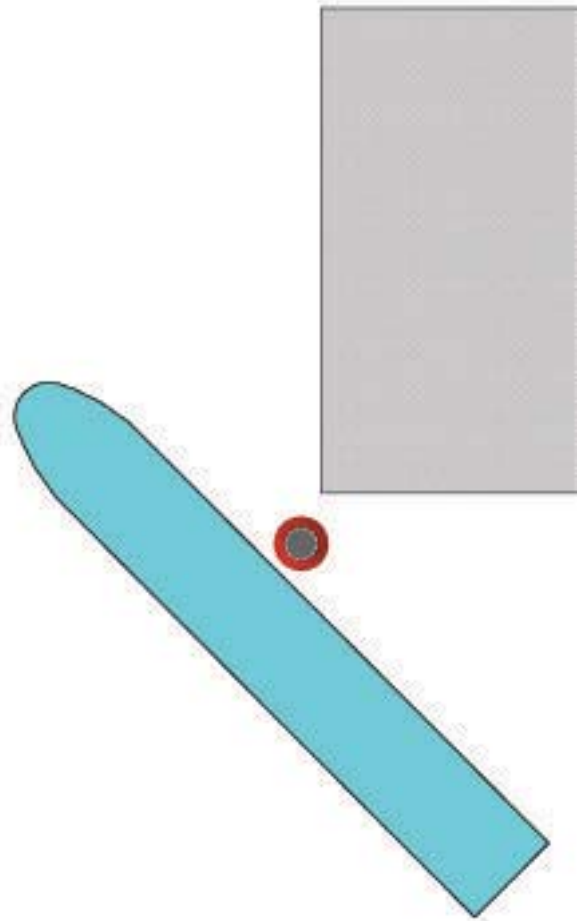
EXTRA HIGH CAPACITY				SUPER HIGH CAPACITY				ULTRA HIGH CAPACITY			
ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE		ENERGY ABSORPTION		REACTION FORCE	
FT-KIPS	TON-M	KIPS	TON	FT-KIPS	TON-M	KIPS	TON	FT-KIPS	TON-M	KIPS	TON
10	1.4	44	20.0	15	2.1	66	29.9	20	2.8	90	40.8
15	2.1	66	29.9	22	3.0	99	44.9	30	4.1	135	61.2
20	2.8	88	39.9	30	4.1	132	59.9	40	5.5	180	81.6
25	3.5	110	49.9	37	5.1	165	74.8	51	7.1	225	102.1
30	4.1	132	59.9	44	6.1	198	89.8	61	8.4	270	122.5
35	4.8	154	69.9	52	7.2	230	104.3	71	9.8	315	142.9
40	5.5	176	79.8	59	8.2	263	119.3	81	11.2	360	163.3
12	1.7	51	23.1	17	2.4	77	34.9	24	3.3	105	47.6
17	2.4	77	34.9	26	3.6	115	52.2	35	4.8	157	71.2
23	3.2	103	46.7	35	4.8	154	69.9	47	6.5	210	95.3
29	4.0	128	58.1	43	5.9	192	87.1	59	8.2	262	118.8
35	4.8	154	69.9	52	7.2	230	104.3	71	9.8	315	142.9
40	5.5	180	81.6	60	8.3	269	122.0	83	11.5	367	166.5
46	6.4	205	93.0	69	9.5	307	139.3	94	13.0	419	190.1
18	2.5	59	26.8	26	3.6	88	39.9	36	5.0	120	54.4
26	3.6	88	39.9	40	5.5	132	59.9	54	7.5	180	81.6
35	4.8	117	53.1	53	7.3	176	79.8	72	10.0	240	108.9
44	6.1	147	66.7	66	9.1	219	99.3	90	12.4	300	136.1
53	7.3	176	79.8	79	10.9	263	119.3	108	14.9	360	163.3
62	8.6	205	93.0	92	12.7	307	139.3	126	17.4	419	190.1
70	9.7	234	106.1	105	14.5	351	159.2	144	19.9	479	217.3
37	5.1	99	44.9	56	7.7	148	67.1	76	10.5	202	91.6
49	6.8	132	59.9	74	10.2	198	89.8	101	14.0	270	122.5
62	8.6	165	74.8	93	12.9	247	112.0	126	17.4	337	152.9
74	10.2	198	89.8	111	15.4	296	134.3	152	21.0	404	183.3
87	12.0	231	104.8	130	18.0	346	156.9	177	24.5	472	214.1
99	13.7	264	119.8	148	20.5	395	179.2	202	27.9	539	244.5
41	5.7	110	49.9	62	8.6	165	74.8	84	11.6	225	102.1
55	7.6	147	66.7	82	11.3	219	99.3	112	15.5	300	136.1
69	9.5	183	83.0	103	14.2	274	124.3	140	19.4	375	170.1
82	11.3	220	99.8	120	16.6	329	149.2	169	23.4	449	203.7
96	13.3	256	116.1	144	19.9	384	174.2	197	27.2	524	237.7
110	15.2	293	132.9	165	22.8	439	199.1	225	31.1	599	271.7
50	6.9	121	54.9	75	10.4	181	82.1	102	14.1	247	112.0
66	9.1	161	73.0	100	13.8	241	109.3	136	18.8	330	149.7
83	11.5	201	91.2	124	17.1	302	137.0	170	23.5	412	186.9
100	13.8	242	109.8	149	20.6	362	164.2	204	28.2	494	224.1
116	16.0	282	127.9	174	24.1	422	191.4	238	32.9	577	261.7
133	18.4	322	146.1	199	27.5	483	219.1	272	37.6	659	298.9
59	8.2	132	59.9	89	12.3	198	89.8	121	16.7	270	122.5
79	10.9	176	79.8	119	16.5	263	119.3	162	22.4	360	163.3
99	13.7	220	99.8	148	20.5	329	149.2	202	27.9	449	203.7
119	16.5	264	119.8	178	24.6	395	179.2	243	33.6	539	244.5
138	19.1	308	139.7	207	28.6	461	209.1	283	39.1	629	285.3
158	21.9	352	159.7	237	32.8	527	239.0	324	44.8	719	326.1

PROVEN APPLICATIONS



ENGINEERED FOR EXCELLENCE

PROVEN APPLICATIONS

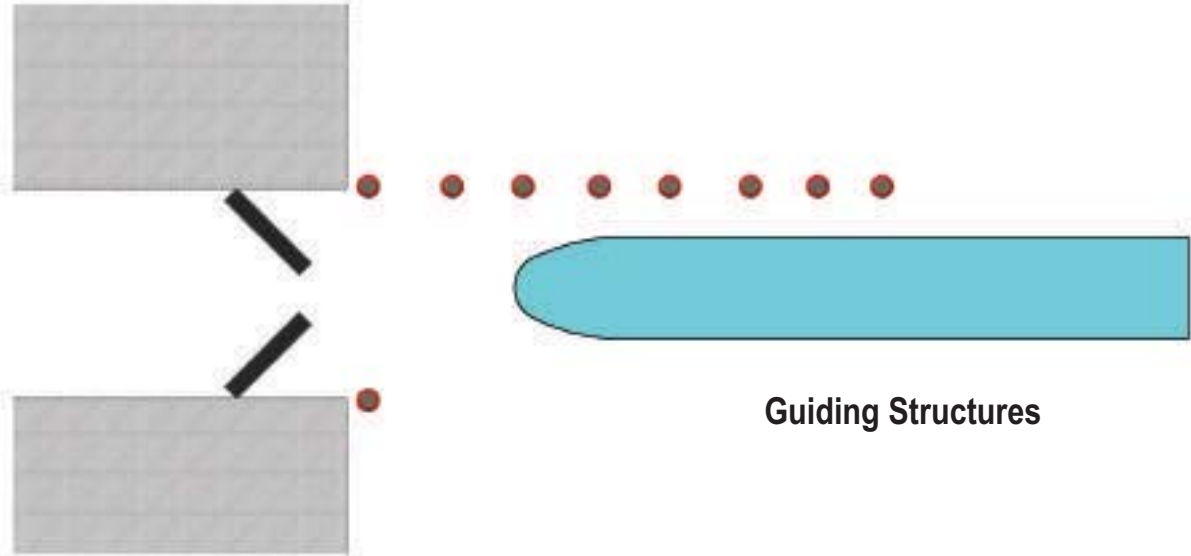


Corner Protection – Turning Dolphin



ENGINEERED FOR EXCELLENCE

PROVEN APPLICATIONS

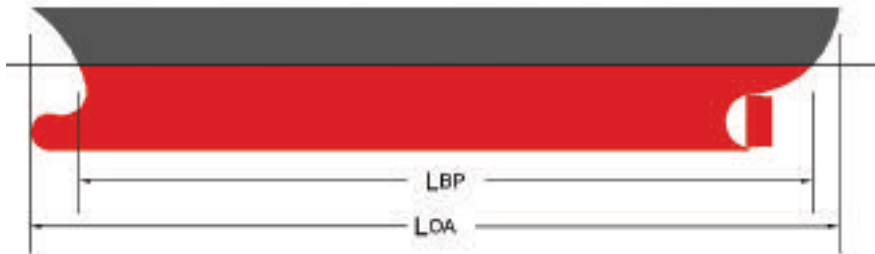
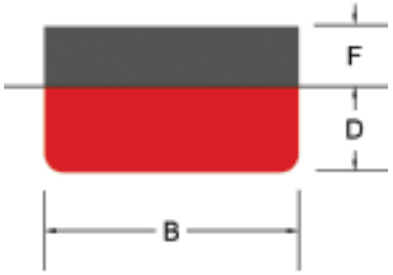






Guiding Structures

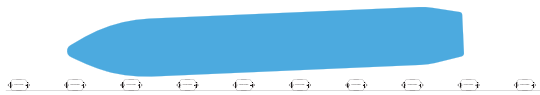




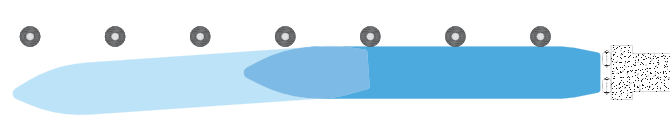


ENGINEERED FOR EXCELLENCE

PROJECT REQUIREMENTS

PROJECT DETAILS		PROJECT STATUS	
PORT		MFI REF:	
PROJECT DETAILS		<input type="checkbox"/> PRELIMINARY	
CONSULTANT		<input type="checkbox"/> DETAIL DESIGN	
CONTRACTOR		<input type="checkbox"/> TENDER	
			
LARGEST VESSEL		SMALLEST VESSEL	
VESSEL TYPE		VESSEL TYPE	
DEAD WEIGHT TONNAGE (DWT)	(t)	DEAD WEIGHT TONNAGE (DWT)	(t)
GROSS TONNAGE (GT)	(t)	GROSS TONNAGE (GT)	(t)
DISPLACEMENT (DISP)	(t)	DISPLACEMENT (DISP)	(t)
LENGTH OVERALL (LOA)	(m)	LENGTH OVERALL (LOA)	(m)
LENGTHS BETWEEN PERPS (LBP)	(m)	LENGTHS BETWEEN PERPS (LBP)	(m)
BEAM (B)	(m)	BEAM (B)	(m)
DRAFT (D)	(m)	DRAFT (D)	(m)
FREEBOARD (F)	(m)	FREEBOARD (F)	(m)
HULL PRESSURE (P)	(t/m ²)	HULL PRESSURE (P)	(t/m ²)
BERTH DETAILS			
<input type="checkbox"/> CLOSED STRUCTURE 		<input type="checkbox"/> SEMI-OPEN STRUCTURE 	
		<input type="checkbox"/> OPEN STRUCTURE 	
		<input type="checkbox"/> CORNER PROTECTION / TURNING DOLPHIN" 	
STRUCTURE		TIDE LEVELS	
LENGTH OF BERTH	(m)	TIDAL RANGE	(m)
FENDER / DOLPHIN SPACING	(m)	HIGHEST RECORDED TIDE (HRT)	(m)
PERMITTED FENDER REACTION	(kN/m)	HIGHEST ASTRONOMIC TIDE (HAT)	(m)
QUAY LEVEL	(m)	MEAN HIGH WATER SPRING (MHWS)	(m)
COPE THICKNESS	(m)	MEAN SEA LEVEL (MSL)	(m)
SEABED LEVEL	(m)	MEAN LOW WATER SPRING (MLWS)	(m)
SEABED COMPOSITION		LOWEST ASTRONOMIC TIDE (LAT)	(m)
STANDOFF	max min (m)	LOWEST RECORDED TIDE (LRT)	(m)
REFERENCES			
1. BS 6349: Maritime Structures - Part 4 Code of practice for design of fendering and mooring systems		3. United Facilities Guild Specification 02396 4. United Facilities Guild Specification 35 59 13.16 (August 2008)	
2. PIANC: Guidelines for the design of fendering systems: 2002			

PROJECT REQUIREMENTS

BERTHING APPROACH	PROJECT DETAILS	
<p>APPROACH CONDITION</p> <p><input type="checkbox"/> a) EASY BERTHING (SHELTERED)</p> <p><input type="checkbox"/> b) DIFFICULT BERTHING (SHELTERED)</p> <p><input type="checkbox"/> c) EASY BERTHING (EXPOSED)</p> <p><input type="checkbox"/> d) GOOD BERTHING (EXPOSED)</p> <p><input type="checkbox"/> e) DIFFICULT BERTHING (EXPOSED)</p>	<p><input type="checkbox"/> SIDE BERTHING</p> 	
	<p><input type="checkbox"/> DOLPHIN BERTHING b)</p> 	
LARGEST VESSEL	<p><input type="checkbox"/> END BERTHING</p> 	
BERTHING SPEED (m/s)		
BERTHING ANGLE (deg.)	<p><input type="checkbox"/> LOCK OR DOCK ENTRANCE</p> 	
SAFETY FACTOR ON ENERGY		
<p>LEAST LESS MEDIUM MORE MOST</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>		
SMALLEST VESSEL	<p><input type="checkbox"/> SHIP-TO-SHIP BERTHING</p> 	
BERTHING SPEED (m/s)		
BERTHING ANGLE (deg.)	<p><input type="checkbox"/> RoRo MODE c)</p> 	
SAFETY FACTOR ON ENERGY		
<p>LEAST LESS MEDIUM MORE MOST</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>		
ENVIRONMENT	SYSTEM DESIGN PREFERENCE	
OPERATING TEMPERATURE	TYPE / NUMBER OF FENDERS	
MINIMUM (°C)	OCEAN GUARD (NETLESS)	
MAXIMUM (°C)	OCEAN CUSHION (W/ TIRE AND CHAIN NETS)	
CORROSIVITY	OCEAN GUARD DONUT FENDER	
LOW MEDIUM HIGH EXTREME	CONNECTING HARDWARE MATERIAL / COATING	
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	ANCHORING HARDWARE MATERIAL / COATING	
	CHAIN MATERIAL / COATING	
CONTACT INFORMATION		
NAME	TELEPHONE	
COMPANY	FAX	
POSITION	MOBILE	
ADDRESS	EMAIL	
	WEB	

OCEAN GUARD™ Resilient Foam Filled Buoys

The Ocean Guard™ Buoys resilient surfaces are constructed to withstand the toughest marine applications and environments the world can offer. The Ocean Guard™ Buoys constructed with the latest technology and materials exemplifies state-of-the-art technology in buoy design and functionality. Marine Fenders International's composite buoys are designed to absorb minor impacts without damaging the buoy body or vessel.

PERFORMANCE FEATURES

UNSINKABLE CONSTRUCTION

The Ocean Guard™ Buoys closed cell foam filled construction provides a buoy that is unsinkable even if its punctured.

IMPACT ABSORBING

The resilient outer foam layer and the reinforced elastomeric skin of the Ocean Guard™ Buoys are designed to absorb impacts of vessels with out damaging the buoy or the impacting vessel.



NON MARKING

The tough, thick reinforced elastomeric urethane skin of Ocean Guard™ Buoys is non marking and available in different colors and will not wear off.



END FITTINGS

Ocean Guard™ Buoys end fittings are available in a variety of styles including mooring tees, padeyes, quick release hooks, swivel eyes, bails, forged eyes, hawse pipe with capture plates, and navigational lights



SUPERIOR TO STEEL BUOYS

The Ocean Guard™ Buoys are designed and constructed to be lighter, more corrosion resistant, less maintenance, and easier to handle than conventional steel buoys. The abrasion resistant urethane skin will resist the harshest environments without corroding.



CUSTOM DESIGNS

Maine Fenders International, Inc. engineers work closely with the customer to select or custom design a Ocean Guard™ Buoy to meet their specific requirements and needs.



CONSTRUCTION FEATURES

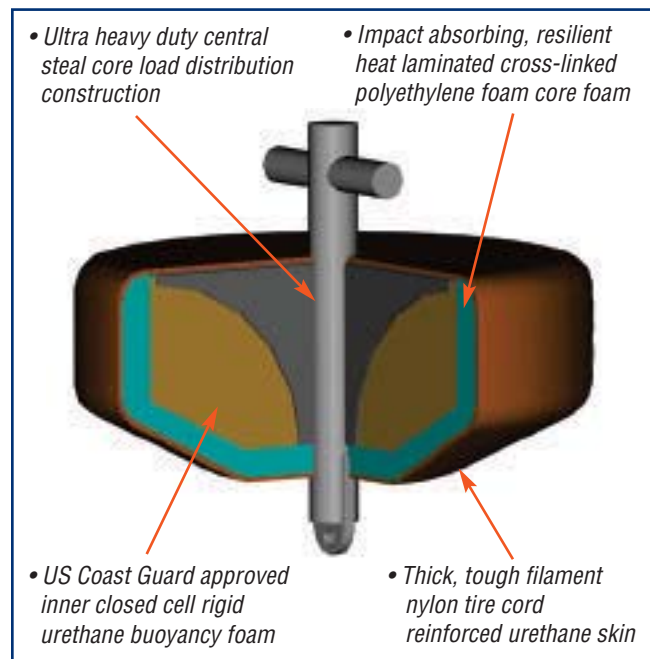
INTERNAL STEEL CENTRAL STRENGTH MEMBER

The Ocean Guard™ Buoys construction begins with a Ultra heavy duty internal steel central strength member which provides excellent working load performance. The welded steel structure contains load distribution plates which provide outstanding pull through performance.



RIGID INNER CLOSED CELL URETHANE FOAM CORE

The second layer in Ocean Guard™ Buoys construction consists of a US Coast Guard compliant rigid inner 100% closed cell urethane foam core. This strong foam core has excellent buoyancy and compression strength properties. The foam is molded directly onto the Internal Steel Central Strength Member which provides an unsinkable buoy.



RESILIENT OUTER FOAM CORE

The third layer in Ocean Guard™ Buoys construction consists of an impact absorbing closed cell cross-linked polyethylene foam core which is heat laminated into a one piece, solid foam core. The same heat lamination process used in our Ocean Guard™ fenders, produces a thermal bond between the layers of foam which is stronger than the foam itself which, will not delaminate even under the most abusive berthing conditions. This impact absorbing foam core is added to absorb vessel impacts without damaging the buoy or impacting the vessel.



REINFORCED ELASTOMERIC SKIN

The final layer, impact absorbing foam core is protected by a tough thick filament nylon tire cord reinforced elastomer skin. This non-marking reinforced elastomer fender skin is the wear surface of the fender. The reinforcing filaments are continuously wound in a helix pattern through up to 90 % of the elastomer skin and wrap around the buoys end fittings. This continuous reinforcement of the elastomer skin not only increases the tensile and tear strength of the elastomer but also distributes loads through out the fender skin.

This tough resilient material is specially formulated to withstand the worlds harshest environmental conditions providing superior performance in extreme temperatures, toxic environments, against hydrocarbons, salt water, ozone, and ultraviolet radiation.



OCEAN GUARD MOORING BUOYS												
BUOY MODEL	BUOYANCY NET		BUOY WEIGHT		DIAMETER OVERALL		HEIGHT BUOY BODY		HEIGHT OVERALL		WORKING LOAD	
	LBS	KG	LBS	KG	FT	M	FT	M	FT	M	LBS	TONS
MB-25	5,512	2,500	1,756	797	6.1	1.9	3.6	1.1	7.6	2.3	100,000	45
MB-35	7,716	3,500	2,340	1,061	7.0	2.1	4.3	1.3	8.5	2.6	150,000	68
MB-50	11,023	5,000	2,371	1,075	7.5	2.3	4.9	1.5	8.6	2.6	150,000	68
MB-70	15,432	7,000	2,938	1,333	8.5	2.6	5.0	1.5	8.6	2.6	200,000	91
MB-90	19,842	9,000	4,657	2,112	10	3.0	5	1.5	8.6	2.6	200,000	91
MB-115	25,353	11,500	5,109	2,317	10	3.0	6.1	1.9	9.5	2.9	200,000	91
MB-135	29,762	13,500	6,017	2,729	10.5	3.2	6.5	2.0	10.0	3.0	300,000	136
MB-160	35,274	16,000	6,333	2,873	11	3.4	6.8	2.1	11.75	3.6	300,000	136
MB-185	40,785	18,500	6,836	3,101	11.1	3.4	7.8	2.4	12.7	3.9	300,000	136
MB-225	49,604	22,500	8,491	3,852	12.0	3.7	8.1	2.5	12.9	3.9	300,000	136
MB-250	55,116	25,000	9,469	4,295	12.5	3.8	8.3	2.5	13.1	4.0	300,000	136
MB-275	60,627	27,500	9,965	4,520	12.6	3.8	8.9	2.7	13.7	4.2	300,000	136
MB-340	74,957	34,000	11,841	5,371	13.83	4.2	9	2.7	13.8	4.2	300,000	136
MB-455	100,310	45,500	14,599	6,622	15	4.6	10	3.0	14.8	4.5	300,000	136

* ACTUAL VALUES FOR ABOVE SIZES MAY VARY +/- 15% DUE TO VARIATIONS IN MATERIALS, AND TOLERANCES.



OCEAN GUARD SUPPORT BUOYS										
BUOY MODEL	BUOYANCY NET		BUOY WEIGHT		DIAMETER OVERALL		HEIGHT OVERALL		WORKING LOAD	
	LBS	KG	LBS	KG	FT	M	FT	M	LBS	TONS
SB-25	551	250	158	72	2.6	0.8	2.6	0.8	22,000	10
SB-50	1,102	500	285	129	3.2	1.0	3.2	1.0	22,000	10
SB-75	1,653	750	390	177	3.5	1.1	3.5	1.1	22,000	10
SB-100	2,205	1,000	475	215	3.8	1.2	3.8	1.2	40,000	18
SB-125	2,756	1,250	537	244	4.1	1.2	4.1	1.2	40,000	18
SB-150	3,307	1,500	584	265	4.3	1.3	4.3	1.3	40,000	18
SB-175	3,858	1,750	687	312	4.6	1.4	4.6	1.4	40,000	18
SB-200	4,409	2,000	819	371	4.8	1.5	4.8	1.5	40,000	18
SB-250	5,511	2,500	931	422	5.2	1.6	5.2	1.6	40,000	18
SB-300	6,614	3,000	1,200	544	5.5	1.7	5.5	1.7	45,000	20
SB-350	7,716	3,500	1,300	590	5.8	1.8	5.8	1.8	45,000	20
SB-400	8,818	4,000	1,612	731	6.0	1.8	6.0	1.8	45,000	20
SB-450	9,921	4,500	1,712	777	6.2	1.9	6.2	1.9	45,000	20
SB-500	11,023	5,000	1,945	882	6.4	2.0	6.4	2.0	45,000	20
SB-600	13,228	6,000	2,302	1,044	6.8	2.1	6.8	2.1	45,000	20
SB-700	15,432	7,000	2,500	1,134	7.2	2.2	7.2	2.2	45,000	20

* ACTUAL VALUES FOR ABOVE SIZES MAY VARY +/- 15% DUE TO VARIATIONS IN MATERIALS, AND TOLERANCES.



OCEAN GUARD UTILITY CYLINDRICAL BUOYS												
BUOY MODEL	BUOYANCY NET		BUOY WEIGHT		DIAMETER OVERALL		BUOY HEIGHT		HEIGHT OVERALL		WORKING LOAD	
	LBS	KG	LBS	KG	FT	M	FT	M	FT	M	LBS	TONS
CB-5	110	50	55	25	1.3	0.4	2	0.6	2.8	0.9	5,000	2.3
CB-10	220	100	79	36	1.5	0.5	2.8	0.8	3.6	1.1	5,000	2.3
CB-15	331	150	93	42	1.7	0.5	3.0	0.9	3.8	1.2	5,000	2.3
CB-25	551	250	160	73	2.2	0.7	3.1	0.9	4.0	1.2	7,500	3.4
CB-45	992	450	222	101	2.5	0.8	4.0	1.2	5.1	1.5	10,000	4.5
CB-70	1,543	700	340	154	3.0	0.9	4.2	1.3	5.3	1.6	10,000	4.5
CB-100	2,205	1,000	439	199	3.3	1.0	5	1.5	6.33	1.9	20,000	9.1
CB-115	2,535	1,150	539	244	3.5	1.1	5.0	1.5	6.3	1.9	20,000	9.1
CB-140	3,086	1,400	606	275	3.5	1.1	6.0	1.8	7.3	2.2	20,000	9.1
CB-180	3,968	1,800	704	319	4.0	1.2	5.8	1.8	7.4	2.3	40,000	18.0
CB-230	5,071	2,300	868	394	4.5	1.4	5.9	1.8	7.5	2.3	40,000	18.0
CB-275	6,063	2,750	973	441	4.5	1.4	7.0	2.1	8.6	2.6	40,000	18.0

* ACTUAL VALUES FOR ABOVE SIZES MAY VARY +/- 15% DUE TO VARIATIONS IN MATERIALS, AND TOLERANCES.



OCEAN GUARD PENDANT BUOYS

BUOY MODEL	BUOYANCY NET		BUOY WEIGHT		DIAMETER OVERALL		BUOY LENGTH		HEIGHT OVERALL		WORKING LOAD	
	LBS	KG	LBS	KG	FT	M	FT	M	FT	M	LBS	TONS
PB-25	5,511	2,500	1,223	555	4.5	1.4	6.8	2.1	7.3	2.2	150,000	68
PB-50	11,023	5,000	2,123	963	6.0	1.8	7.2	2.2	8.7	2.7	150,000	68
PB-75	16,534	7,500	3,184	1,444	6.5	2.0	9.2	2.8	9.2	2.8	150,000	68
PB-100	22,046	10,000	2,735	1,241	6.5	2.0	11.0	3.4	9.3	2.8	150,000	68
PB-150	33,069	15,000	4,020	1,823	8.0	2.4	11.5	3.5	10.9	3.3	150,000	68
PB-200	44,092	20,000	4,922	2,233	8.5	2.6	13.5	4.1	11.5	3.5	200,000	91
PB-250	55,115	25,000	5,827	2,643	9.0	2.7	15.0	4.6	11.8	3.6	200,000	91
PB-300	66,138	30,000	6,688	3,034	9.5	2.9	16.0	4.9	12.8	3.9	200,000	91
PB-350	77,160	35,000	10,581	4,800	10.3	3.1	16.8	5.1	14.5	4.4	250,000	114
PB-400	88,183	40,000	11,449	5,193	10.5	3.2	18.0	5.5	16.3	5.0	250,000	114

* ACTUAL VALUES FOR ABOVE SIZES MAY VARY +/- 15% DUE TO VARIATIONS IN MATERIALS, AND TOLERANCES.



OCEAN GUARD MODULAR ANCHOR PENDANT BUOYS

BUOY MODEL	BUOYANCY NET		NUMBER OF MODULES	DIAMETER OVERALL		THROUGH PIPE DIAMETER	
	LBS	KG		FT	M	IN	MM
MAPB2-4	8,818	4,000	2	6.6	2.0	6.0	152
MAPB4-8	17,637	8,000	4	6.6	2.0	6.0	152
MAPB2-8	17,637	8,000	2	7.5	2.3	6.0	152
MAPB4-16	35,273	16,000	4	7.5	2.3	6.0	152
MAPB2-11	24,250	11,000	2	9.8	3.0	8.0	203
MAPB4-22	48,501	22,000	4	9.8	3.0	8.0	203
MAPB2-17	37,478	17,000	2	10.5	3.2	10.0	254
MAPB4-34	74,956	34,000	4	10.5	3.2	10.0	254
MAPB2-23	50,705	23,000	2	10.5	3.2	10.0	254
MAPB4-46	101,411	46,000	4	10.5	3.2	10.0	254

* ACTUAL VALUES FOR ABOVE SIZES MAY VARY +/- 15% DUE TO VARIATIONS IN MATERIALS, AND TOLERANCES.



OCEAN GUARD OCEANOGRAPHIC BUOYS

BUOY MODEL	BUOYANCY NET		FLOTATION WEIGHT		TOTAL WEIGHT		DIAMETER OVERALL		DIAMETER INTERNAL		FLOTATION HEIGHT		TOWER HEIGHT	
	LBS	KG	LBS	KG	LBS	KG	FT	M	FT	M	FT	M	FT	M
OG-10	2,205	1,000	60	27	513	233	5.4	1.6	2.2	0.7	2.3	0.7	5.6	1.7
OG-15	3,307	1,500	72	33	606	275	6.1	1.9	2.3	0.7	2.4	0.7	5.6	1.7
OG-20	4,409	2,000	99	45	752	341	6.5	2.0	2.5	0.8	2.6	0.8	6.1	1.9
ATLAS-3	5,000	2,268	130	59	1,200	544	7.4	2.3	3.2	1.0	3.2	1.0	7.0	2.1

* ACTUAL VALUES FOR ABOVE SIZES MAY VARY +/- 15% DUE TO VARIATIONS IN MATERIALS, AND TOLERANCES.



OCEAN GUARD NAVIGATIONAL AND MARKER BUOYS

BUOY MODEL	BUOYANCY NET		BUOY WEIGHT		BUOY DIAMETER		BUOY BODY HEIGHT	
	LBS	KG	LBS	KG	FT	M	FT	M
NAV-100	221	100	194	88	3.0	0.9	2.3	0.7
NAV-200	441	200	399	181	3.8	1.2	3.0	0.9
NAV-500	1,103	500	650	295	4.9	1.5	3.0	0.9
NAV-750	1,654	750	981	445	6.7	2.0	3.3	1.0
NAV-1000	2,205	1,000	1,816	824	8.5	2.6	4.2	1.3
NAV-3000	6,615	3,000	3,112	1,412	10.0	3.0	4.5	1.4
NAV-5000	11,025	5,000	4,462	2,024	10.2	3.1	6.0	1.8
NAV-7500	16,538	7,500	6,703	3,040	11.8	3.6	6.6	2.0
NAV-10000	22,050	10,000	7,845	3,558	13.2	4.0	6.0	1.8

* ACTUAL VALUES FOR ABOVE SIZES MAY VARY +/- 15% DUE TO VARIATIONS IN MATERIALS, AND TOLERANCES.



OCEAN GUARD CHAIN THROUGH BUOYS												
BUOY MODEL	NET BUOYANCY		BUOY WEIGHT		BODY DIAMETER		BODY LENGTH		OVERALL LENGTH		THROUGH PIPE DIAMETER	
	LB	KG	LB	KG	FT	M	FT	M	FT	M	IN	MM
CTB-100	2,205	1000	1,170	570	3.6	1.1	5.8	1.7	7.0	2.1	13.0	330
CTB-150	3,307	1,500	1,345	610	4.1	1.3	5.9	1.7	7.1	2.1	13.0	330
CTB-200	4,409	2,000	1,488	675	4.5	1.4	6.2	1.9	7.7	2.4	13.0	330
CTB-225	4,960	2,250	1,842	777	4.9	1.5	6.0	2.0	7.5	2.4	15.0	381
CTB-275	6,063	2,750	2,023	840	5.1	1.6	6.6	2.1	8.0	2.6	15.0	381
CTB-350	7,716	3,500	2,698	1,060	5.1	1.6	8.6	2.9	10.0	3.4	17.0	432
CTB-400	8,818	4,000	2,791	1,159	5.3	1.7	9.0	2.6	10.3	3.1	17.0	432
CTB-450	9,921	4,500	3,076	1,395	5.5	1.8	9.2	2.6	10.5	3.1	19.0	483
CTB-550	12,125	5,500	3,440	1,560	5.8	1.8	9.8	3.2	11.0	3.7	19.0	483

* ACTUAL VALUES FOR ABOVE SIZES MAY VARY +/- 15% DUE TO VARIATIONS IN MATERIALS, AND TOLERANCES.



OCEAN GUARD RECTANGULAR ANCHOR PENDANT BUOYS														
BUOY MODEL	BUOYANCY NET		BUOY WEIGHT		BUOY DIMENSIONS								WORKING LOAD	
	LBS	KG	LBS	KG	LENGTH		HEIGHT		WIDTH		OVERALL HEIGHT		FT	TONS
RPB-10	2,200	1000	408	185	3.0	0.9	5.0	1.5	3.0	0.9	7.3	2.2	150,000	68
RPB-20	4,400	2000	817	371	3.6	1.1	5.0	1.5	5.0	1.5	7.3	2.2	150,000	68
RPB-40	8,800	4000	1,470	667	4.5	1.4	6.0	1.8	6.0	1.8	9.9	3.0	150,000	68
RPB-60	13,200	6000	3,060	1,388	5.0	1.5	7.0	2.1	8.5	2.6	10.9	3.3	150,000	68
RPB-80	17,600	8000	3,514	1,594	5.4	1.6	7.5	2.3	8.5	2.6	11.4	3.5	150,000	68
RPB-100	22,000	10000	4,312	1,956	6.0	1.8	9.0	2.7	8.1	2.5	12.6	3.8	150,000	68
RPB-120	26,400	12000	4,641	2,105	6.5	2.0	9.5	2.9	8.4	2.6	13.4	4.1	150,000	68
RPB-140	30,800	14000	5,835	2,647	6.5	2.0	10.5	3.2	9.0	2.7	14.8	4.5	200,000	91
RPB-160	35,200	16000	6,442	2,922	6.5	2.0	10.5	3.2	10.5	3.2	14.6	4.5	200,000	91
RPB-180	39,600	18000	7,195	3,264	6.5	2.0	11.5	3.5	11.0	3.4	15.6	4.8	200,000	91
RPB-200	44,000	20000	7,533	3,417	8.0	2.4	11.0	3.4	10.7	3.3	14.8	4.5	200,000	91
RPB-250	55,000	25000	8,427	3,822	8.5	2.6	12.6	3.8	10.8	3.3	16.5	5.0	200,000	91
RPB-300	66,000	30000	9,918	4,499	8.5	2.6	14.4	4.4	11.1	3.4	18.2	5.5	200,000	91

* ACTUAL VALUES FOR ABOVE SIZES MAY VARY +/- 15% DUE TO VARIATIONS IN MATERIALS, AND TOLERANCES.



OCEAN GUARD UNIVERSAL BUOYS										
BUOY MODEL	NET BUOYANCY (MIN)		BUOY WEIGHT		BODY DIAMETER		BODY HEIGHT		OVERALL HEIGHT	
	LBS	KG	LBS	KG	FT	M	FT	M	FT	M
UB-1500	1,500	680	710	322	4.2	1.3	2.5	0.8	4.3	1.3
UB-2000	2,000	907	801	363	4.2	1.3	3.3	1.0	5.5	1.7
UB-2500	2,500	1,134	689	313	5.0	1.5	2.9	0.9	5.0	1.5
UB-3000	3,000	1,361	929	421	5.0	1.5	3.3	1.0	5.5	1.7
UB-4000	4,000	1,814	1,488	675	6.0	1.8	3.3	1.0	5.5	1.7
UB-5000	5,000	2,268	1,570	712	6.0	1.8	3.8	1.1	6.0	1.8

* ACTUAL VALUES FOR ABOVE SIZES MAY VARY +/- 15% DUE TO VARIATIONS IN MATERIALS, AND TOLERANCES.

Universal Buoy End Fittings



Bail eye



Pad eye



Pick-up Tee



Swivel Eye

PROVEN APPLICATIONS














ENGINEERED FOR EXCELLENCE

PROVEN APPLICATIONS



ENGINEERED FOR EXCELLENCE

BUOY REQUIREMENTS

PROJECT DETAILS					PROJECT STATUS	
PROJECT NAME					MFI REF	
LOCATION					<input type="checkbox"/> PRELIMINARY	
CONSULTANT					<input type="checkbox"/> DETAIL DESIGN	
CONTRACTOR					<input type="checkbox"/> TENDER	
NAME		POSITION		TELEPHONE		E-MAIL
OPERATIONAL DETAILS						
VESSEL TYPE				VESSEL SIZE		
LOCATION		EXPOSED	SHELTERED	DURATION	TEMPORARY	PERMANENT
WATER DEPTH						
TIDAL LEVEL (H.W.L.)						
TIDAL LEVEL (L.W.L.)						
BOTTOM MATERIAL		MUD		SAND		ROCK
OPERATING TEMPERATURE			MAX	<input type="checkbox"/> F	<input type="checkbox"/> C	MIN
						<input type="checkbox"/> F
						<input type="checkbox"/> C
BUOY DETAILS						
NET BUOYANCY		MIN	MAX	FREEBOARD	MIN	MAX
PULL-THROUGH CAPACITY				WORKING LOAD		
BUOY END FITTINGS		TOP			BOTTOM	
FORGED SWIVEL EYE						
FABRICATED SWIVEL EYE						
PADEYE						
QUICK RELEASE HOOK						
BAIL EYE						
CRUCIFIX						
HAWSE PIPE						
HAWSE PIPE (WITH CAPTURE PLATE)						
LIGHTS (TYPE)						
<input type="checkbox"/> MOORING BUOY 		<input type="checkbox"/> MOORING BUOY- PEG BOTTOM 		<input type="checkbox"/> PENDANT BUOY 		<input type="checkbox"/> RECTANGULAR ANCHOR PENDANT BUOY 
<input type="checkbox"/> MODULAR ANCHOR PENDANT BUOY 		<input type="checkbox"/> SUPPORT BUOY 		<input type="checkbox"/> CYLINDRICAL BUOY 		<input type="checkbox"/> CHAIN THROUGH BUOY 
<input type="checkbox"/> RECTANGULAR CHAIN THROUGH BUOY 		<input type="checkbox"/> NAVIGATIONAL BUOY 		<input type="checkbox"/> MARKER BUOY 		<input type="checkbox"/> OTHER

OCEAN GUARD™ Resilient Dredge Floats

The innovative OCEAN GUARD™ resilient dredge floats takes Marine Fenders International's tough and proven fendering technology to the dredge market. With the latest in polymer technology OCEAN GUARD™ resilient dredge floats solve the problems associated with fiber or plastic slip-on or clamp on dredge floats. Our buoyant, impact absorbing technology provides a tough reliable solution for the most demanding dredging operations.

PERFORMANCE FEATURES

ONE PIECE - SLIP ON DESIGN

OCEAN GUARD™ resilient dredge floats are designed and constructed for easy installation. Their one piece construction eliminates the risk of losing or maintaining parts during use.

HIGH BUOYANCY

The resilient closed cell foam core construction of OCEAN GUARD™ resilient dredge floats provide a highly buoyant float, with 59 lbs/ft³ or 950 kg/m³ net buoyancy.

IMPACT ABSORBING CONSTRUCTION

The resilient construction of OCEAN GUARD™ resilient dredge float is designed to absorb the impacts of vessels, equipment and debris. Constructed with the same tough proven technology as our OCEAN GUARD™ foam filled fenders, these floats will not crack, splinter or break as rotationally molded plastic and fiber or glass reinforced floats may upon impacts.

SIZES

Our innovative manufacturing process allows us to quickly and easily manufacture floats sized to our customers needs. Our engineering staff offers our customers



a variety of size solutions which take into account, buoyancy requirements, inner pipe diameter, length, and outer float diameter. All these factors can vary depending on customers requirements.

LOW MAINTENANCE

OCEAN GUARD™ resilient dredge floats are designed for low maintenance use. There are no metal or non resilient components to its construction. Its impact absorbing low friction flexible 100% plastic construction reduces downtime and maintenance costs.



CONSTRUCTION FEATURES

INNER REINFORCED ELASTOMERIC SKIN

The inner layer construction consists of a low friction, abrasion resistant, tough, thick nylon filament tire cord reinforced elastomer skin. The reinforcing filaments are continuously wound in a helix pattern through up to 90 % of the elastomer skin greatly increasing wear characteristics such as tensile and tear strengths. The low friction design allows for rotation of the float and is corrosion resistant

FOAM CORE

The floating Ocean Guard™ resilient dredge floats are also constructed with a resilient energy absorbing 100% closed cell cross-linked polyethylene foam core which is heat laminated into a one piece, solid foam core. The same heat lamination process used in our Ocean Guard™ fenders, produces a thermal bond between the layers of foam which is stronger than the foam itself which, will not delaminate even under the most abusive berthing conditions.

OUTER REINFORCED ELASTOMERIC SKIN

The outer layer construction also consists of a low friction, tough, thick nylon filament tire cord reinforced elastomer skin which offers superior wear and impact characteristics. The reinforcing filaments are continuously wound in a helix pattern through up to 90 % of the elastomer skin. This continuous reinforcement of the elastomer skin greatly increases the tensile and tear strength of the skin. The elastomer skin is non-marking and highly resistant to environmental hazards such as ozone and ultra-violet radiation.

INTERNAL FILAMENT
NYLON TIRE CORD
REINFORCED URETHANE
ELASTOMER SKIN

HEAT LAMINATED
IMPACT ABSORBING
CROSSLINKED POLYETHYLENE
FLOTATION FOAM CORE



OUTER FILAMENT NYLON TIRE
CORD REINFORCED URETHANE
ELASTOMER SKIN

TYPICAL
DREDGE PIPE

HIGH VISIBILITY OUTER
URETHANE ELASTOMER SKIN

OCEAN GUARD™ Port Security Barriers Systems

OCEAN GUARD floating Port Security Barriers systems are designed to provide the highest level of security and quality for Port facilities. This highly visible floating physical barrier is designed for easy installation and maintenance. OCEAN GUARD floating Port Security Barriers systems are modular and available in a number of sizes. Smaller sizes are designed as demarcation barriers. The larger sizes are designed not only as demarcation barriers but also to physically restrict entry in sensitive areas.

OCEAN GUARD – PSB floating Port Security Barriers systems are available with 2 different internal strength member designs.

- Ultra heavy duty integral swivel end fittings which are internally connected with a stud link chain. Each end fitting is under tension and swivels independently.
- Alternatively central hawse pipe with end flanges. A chain is passed through the central pipe core and locked in place with a heavy duty locking plate.



OCEAN GUARD Barrier Buoys are specially designed to maintain the Port Security Barrier System in located in their designated locations. The substantial internal central strength member is design to moor barrier sections and absorb impact loads from the barrier system.

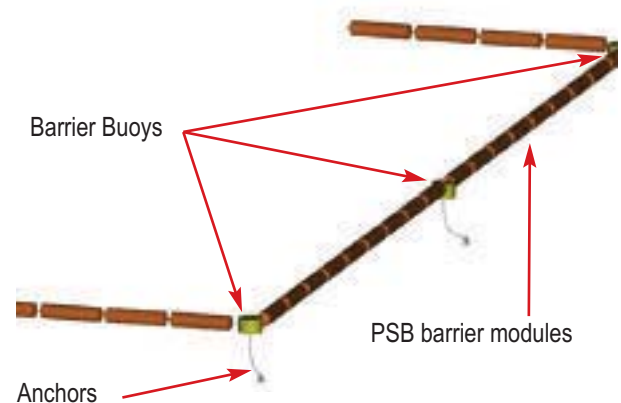
CONSTRUCTION FEATURES

- Impact absorbing heat laminated cross linked polyethylene foam core.
- Tough, thick filament nylon tire cord reinforced urethane skin – highly visible orange. Other colors available.
- Heavy duty integral steel strength members



PERFORMANCE FEATURES

- Physical deterrent
- Highly visible
- Low maintenance and long life construction
- Foam filled construction (will not fail if punctured)
- High tensile designs
- Modular design allows easy resizing and transportation





PSB - PORT SECURITY BARRIERS MODULE SIZES

PSB MODULES			END FITTINGS	
MODEL NUMBER	SIZE		SAFE WORKING END PULL LOAD	
	ENGLISH	METRIC	kips	kN
ENGLISH	ft x ft	m x m		
OG-PSB2x10	2 x 10	0.6 x 3.0	9.5	42
OG-PSB2x20	2 x 20	0.6 x 6.1	9.5	42
OG-PSB2x30	2 x 30	0.6 x 9.1	9.5	42
OG-PSB3x10	3 x 10	0.9 x 3.0	17	76
OG-PSB3x20	3 x 20	0.9 x 6.1	17	76
OG-PSB3x30	3 x 30	0.9 x 9.1	17	76
OG-PSB4x10	4 x 10	1.2 x 3.0	17	76
OG-PSB4x20	4 x 20	1.2 x 6.1	17	76
OG-PSB4x30	4 x 30	1.2 x 9.1	17	76
OG-PSB5x10	5 x 10	1.5 x 3.0	24	107
OG-PSB5x20	5 x 20	1.5 x 6.1	24	107
OG-PSB5x30	5 x 30	1.5 x 9.1	24	107
OG-PSB6x10	6 x 10	1.8 x 3.0	34	151
OG-PSB6x20	6 x 20	1.8 x 6.1	34	151
OG-PSB6x30	6 x 30	1.8 x 9.1	34	151
OG-PSB7x10	7 x 10	2.1 x 3.0	50	222
OG-PSB7x20	7 x 20	2.1 x 6.1	50	222
OG-PSB7x30	7 x 30	2.1 x 9.1	50	222
OG-PSB8x10	8 x 10	2.4 x 3.0	70	311
OG-PSB8x20	8 x 20	2.4 x 6.1	70	311
OG-PSB8x30	8 x 30	2.4 x 9.1	70	311

PSB - PORT SECURITY BARRIERS MODULE SIZES

PSB MODULES			END FITTINGS	
MODEL NUMBER	SIZE		SAFE WORKING END PULL LOAD	
	METRIC	ENGLISH	kips	kN
METRIC	m x m	ft x ft		
OG-PSB0.5x2.5	0.5 x 2.50	1.6 x 8.2	9.5	42
OG-PSB0.5x5.0	0.5 x 5.00	1.6 x 16.4	9.5	42
OG-PSB0.5x10	0.5 x 10.0	1.6 x 32.8	9.5	42
OG-PSB1.0x2.5	1.00 x 2.50	3.3 x 8.2	17	76
OG-PSB1.0x5.0	1.00 x 5.00	3.3 x 16.4	17	76
OG-PSB1.0x10.0	1.00 x 10.0	3.9 x 32.8	17	76
OG-PSB2.0x2.5	2.00 x 2.50	6.6 x 8.2	34	151
OG-PSB2.0x5.0	2.00 x 5.00	6.6 x 16.4	34	151
OG-PSB2.0x10	2.00 x 10.0	6.6 x 32.8	34	151
OG-PSB2.5x3.5	2.50 x 3.50	8.2 x 11.5	70	311
OG-PSB2.5x5.0	2.50 x 5.00	8.2 x 16.4	70	311
OG-PSB2.5x10	2.50 x 10.0	8.2 x 32.8	70	311
OG-PSB3.0x5.0	3.00 x 5.00	9.8 x 16.4	70	311
OG-PSB3.0x10	3.00 x 10.0	9.8 x 32.8	70	311

*SIZES AND END FITTING CAPACITIES MAY VARY DEPENDING ON DESIGN ED APPLICATIONS

OCEAN GUARD™ Coated Piles

As a leader in urethane polymer technology Marine Fenders International has developed the appropriate materials and processes to provide superior protection and encapsulation of steel and timber pilings. Our OCEAN GUARD™ piling coatings can be applied as a encapsulate to creosote treated piling, preventing leaching of toxins into waterways. Additionally when applied to steel pilings, this resilient protective coating will not chip or crack like brittle epoxy pile coatings.

TIMBER PILINGS

OCEAN GUARD™ piling coatings provide an environmentally safe alternative to traditional chemically-treated wooden piles and can be applied to both untreated and treated wooden piles. The thick tough elastomeric coating penetrates and coats cracks, checks, and all surfaces. This encapsulation treatment keeps helps prevent the micro organisms from attacking and deteriorating the wooden piles.



STEEL PILINGS

OCEAN GUARD™ piling coatings provide a resilient flexible alternative to the brittle epoxy pile coatings. Unlike epoxy paints and coatings this impact resistant coating will not crack if deflected or impacted . OCEAN GUARD™ piling coatings provides a innovative low maintenance, corrosion resistant solution steel pile coatings.



OCEAN CAMEL™

The OCEAN CAMEL™ marine timber camel extends the life of a traditional timber camel. As Ports looking for environmentally safe solutions for chemically treated camels, OCEAN CAMEL™ marine timber camel coatings provide tough encapsulation and protection of these untreated and treated wooden camels. These camels are used to distribute vessel berthing loads across multiple fendering pings and also provide standoff of the vessel from the pier.

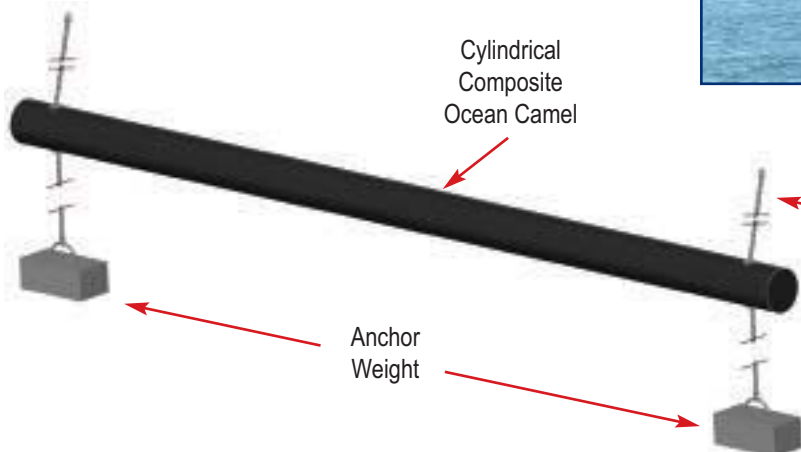


OCEAN CAMEL™

OCEAN CAMEL™ composite floating camels are designed to provide standoff between vessel and pier. Additionally they are designed to distribute forces over a larger length of the pier structure to avoid point loads.

A variety of composite materials are available for their construction. The use of these materials provides a high strength positive buoyancy camel.

OCEAN CAMELS™ are available in numerous designs, configuration and constructions. Options include decking, deck fittings, colors, fendering, additional buoyancy as well as other options.



Mooring Chain

Cylindrical Composite Ocean Camel

Anchor Weight



Hawse pipe

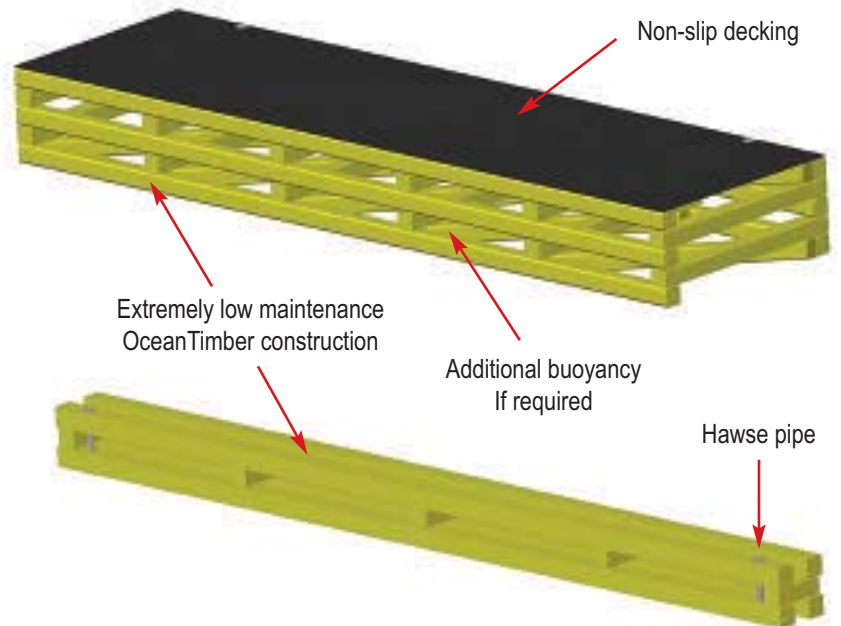
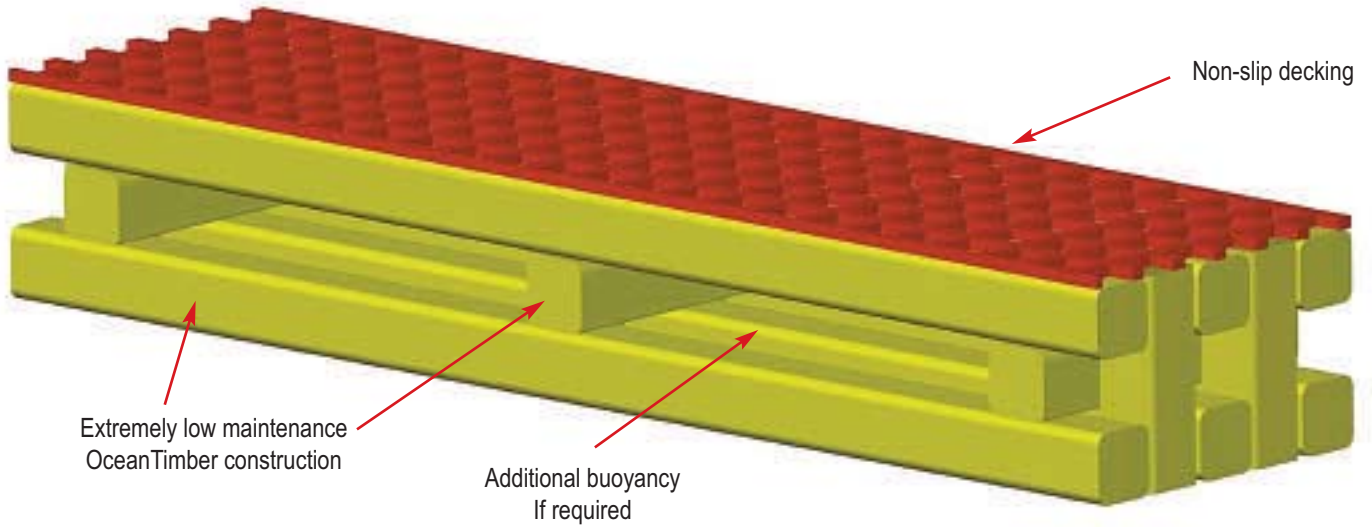
Cylindrical Composite Ocean Camel



Mooring Chain

Anchor Weight

OCEAN CAMEL™



Fendering And Mooring Hardware

In any fendering or mooring system all components play a integral part in the durability and success of the system. All the basic components in the system must be appropriately matched in design function and strength to achieve the systems maximum performance and safety.

Marine Fenders International, Inc. offers a large variety of fendering and mooring marine hardware to ensure the performance of the designed fendering or mooring system. Our large selection of Anchors, Chains, Quick Release Hooks, Shackles, Swivels, Tow Plates are available for immediate delivery. Available in a variety of grades, carbon steel or stainless steel with ABS Certificates.

ANCHORS

- Stockless Anchors available from 200 lbs to 50,000 lb anchor weight
- Workboat Anchors available from 20 lbs to 30,000 lb anchor weight



CHAIN

- Dock Chain
- Long Link Chain
- Stud-Link Chain
- Available in Grade 1, Grade 2 and Grade 3
- All chain is available in both Black and Galvanized.



QUICK RELEASE HOOKS (BUOY TYPE)

- Available in proof test of 300,000 and 400,000 lbs
- Total Weight 375 lbs



SHACKLES

- Bolt Type Anchor Shackles
- Bolt Type Chain Shackles
- Screw Pin Anchor Shackles
- Screw Pin Chain Shackles
- Towing Shackles – High Capacity
- Shackles available in both Hot-Dipped Galvanized and Stainless Steel



SWIVELS

- Eye and Eye Swivels
- Jaw and Eye Swivels

TOW PLATES

- Available in 3 sizes
- Three connection points
- Accepts hardware from 1-1/2 inch to 4 inches



DOCK PLATES – PAD EYES SYSTEMS

- Fender mounting pad eye are designed and constructed to meet the performance requirements of a fendering system design
- 316 stainless steel embeds
- Epoxy Grout





**QUALITY
VALUE
PERFORMANCE
TECHNOLOGY
EXPERIENCE
SOLUTIONS**

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