

# Foam Filled Fender





# Greeting

Since our incorporation in 1997, we have been committed to developing and supplying foam-filled fender systems to allow ships to safely dock.

As ships grow in size and dock more frequently, a safe docking system becomes increasingly critical. However, conventional fender systems still contain legacy vulnerabilities without significant improvements to reduce damage.

Hence, we are committed to supplying products of much better quality and more durability than conventional fender systems in support of marine safety.

Preparing for the future to come, SEAZONE will always try to serve the best interests of customers by changing and innovation ever more. We will do our utmost to deliver only the best products, leveraging our quality and service know-how. Our mission will be to satisfy the needs of customers and provide quality services, and we will place top priority on delivering value to customers.

We make every effort to provide our customers with the best fender system.

We look forward to serving you.

SEAZONE President Shin Yong Joo



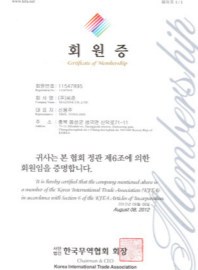

# Certification



ISO 9001



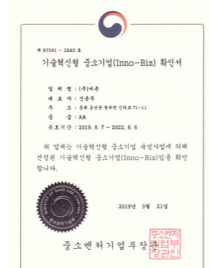
ISO 14001



KITA Certificate of Membership



Inno-Biz



Inno-Biz





## Foam Filled Fender

Foam-filled fenders are constructed with an energy-absorbing foam core and a tough outer skin of filament-reinforced polyurea elastomer.

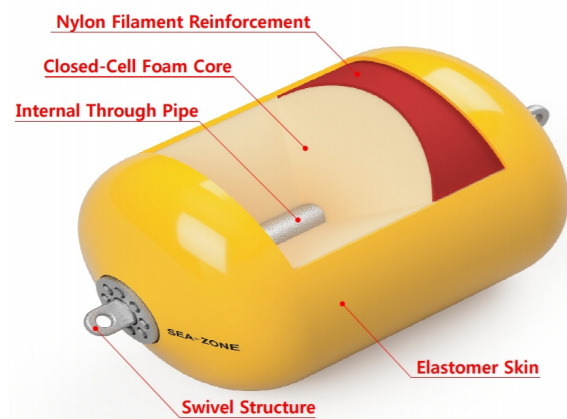
Seazone's foam-filled fender is made with industry-leading manufacturing technology, combining existing methods with computer-automated processes that enable consistent production of long-lasting, high quality fenders measured across four performance grades.

### • Features

- No point loading
- Non-Marking skin
- Low hull pressure
- High energy absorption and Low reaction force
- Low maintenance and High durability
- High abrasion resistance
- Flotation unaffected by tidal waves or harsh weather conditions
- Good angular performance

### • Steel Core

Every foam-filled fender has a central steel pipe to resist mooring loads and provide a stable, non-abrasive base for the foam body. An engineered component, the central pipe is a precise length, fully sealed and can include integral swivels or other terminations.



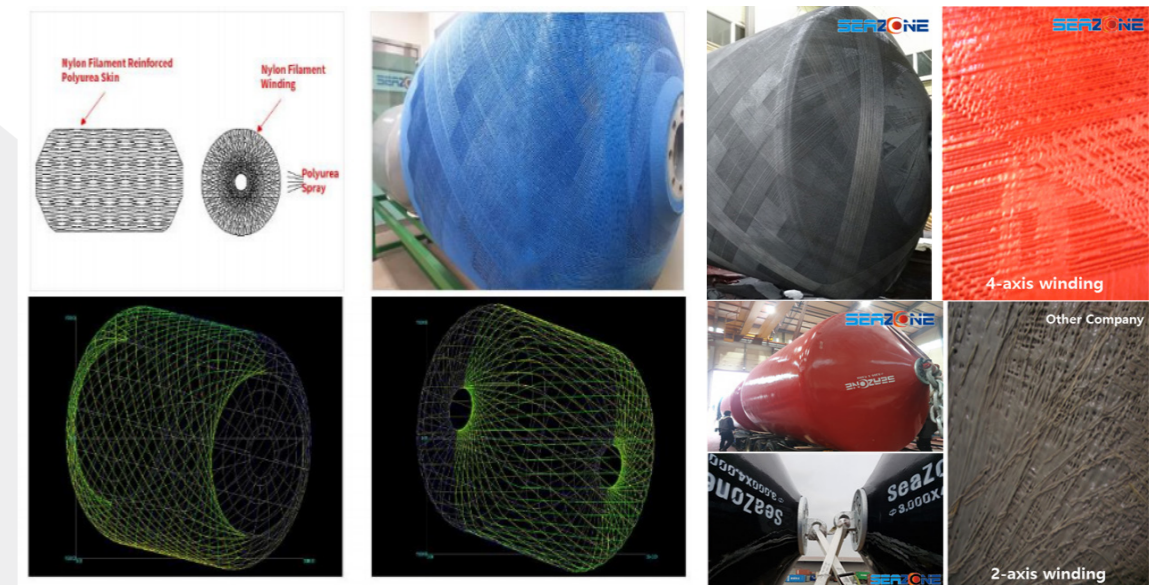
Internal pipe type structure



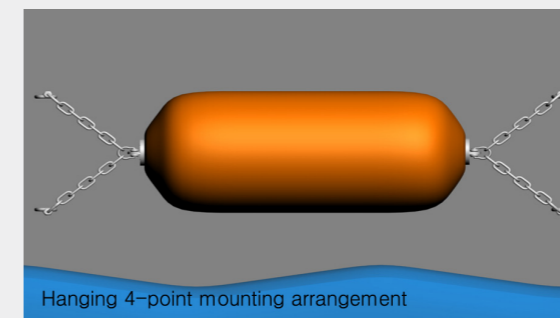
Structural stability with internal pipe  
Improved product durability and maintenance

## Fender Skin

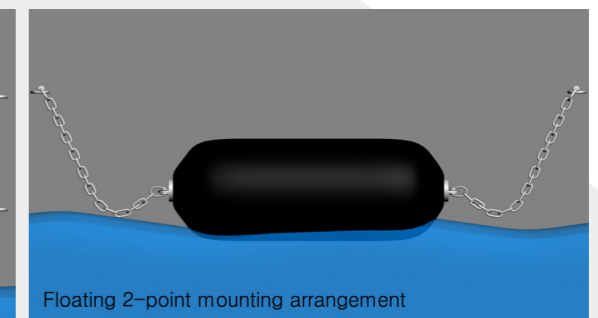
The elastomer used in the fender skin is polyurea. The skin is reinforced by filament winding wrap in a helical and hoop direction, which is controlled by an automatic winding system with load cell sensors at each filament. Our four-axis filament winding system, also used to build spacecraft fuel tanks, takes control and positions each filament for maximum strength and even finish. The polyurea shows far superior physical properties to those of the rubber. The durable and resilient polyurea skin also offers the best resistance to salt water and ultraviolet light.



## Various and Easy Installation



Hanging 4-point mounting arrangement



Floating 2-point mounting arrangement

### • Stationary Installation

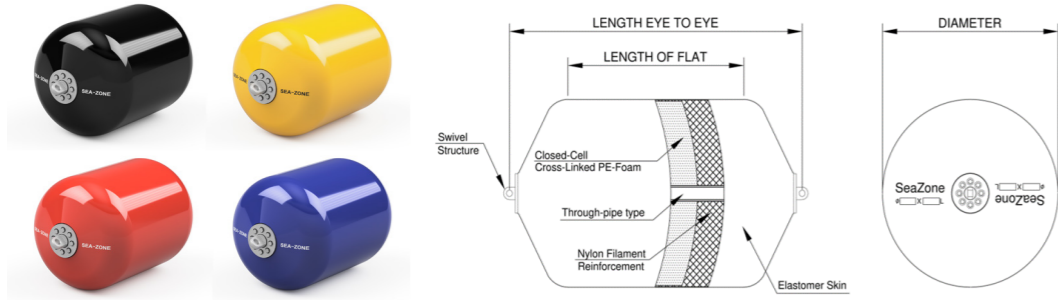
By double chain attachments, fenders are installed in a fixed positions.

### • Semi Stationary/Floating Installation

By single chain attachment, fender can rise and fall.

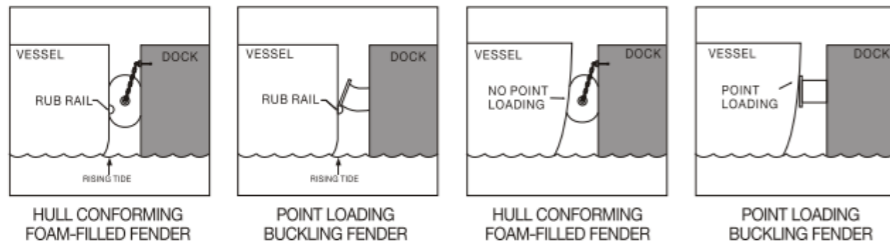
## Various Colors

Standard color shall be made of Dark red, gray and black.  
But customers can request yellow, orange etc.

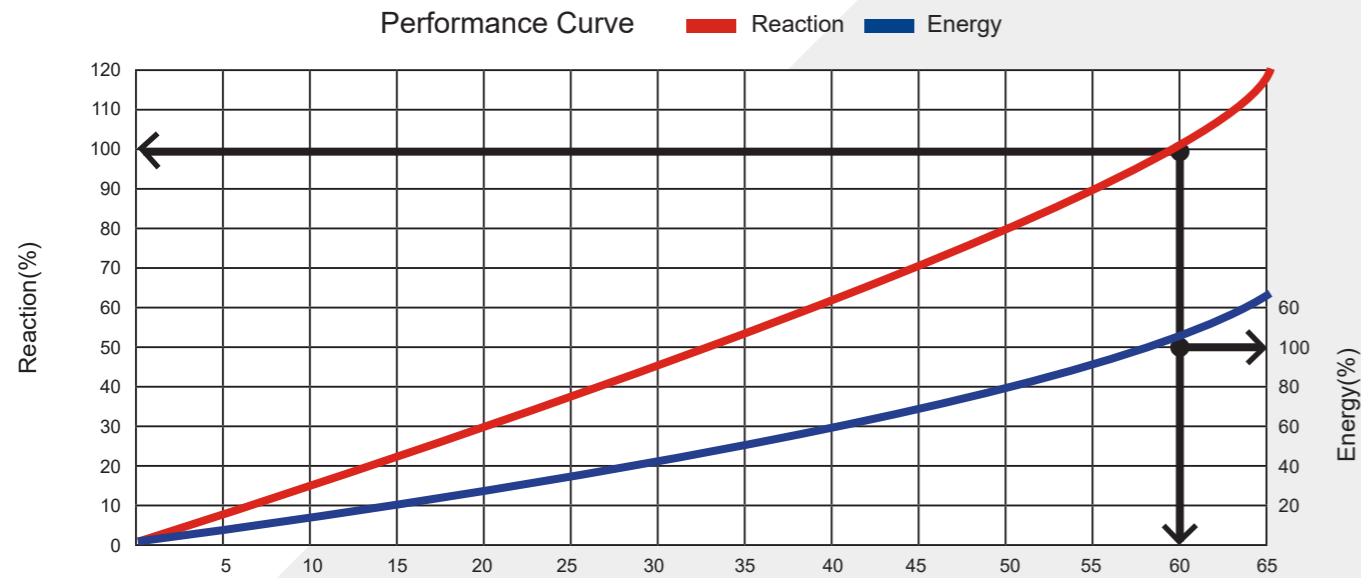


## No Point Loading

Point Loading causes serious damages to vessel.  
In contrast, foam-filled fenders conform well to hull contours as they are being deflected.



## Performance Curve



### Hull Pressures

Compound	Hull Pressure (kpa)	Energy Absorption (t/m²)	Reaction Force (ksf)
STD	134.4kpa	13.7t/m²	2.8ksf
HC	176.6kpa	18.0t/m²	3.7ksf
EHC	257.0kpa	26.2t/m²	5.4ksf
SHC	353.2kpa	36.0t/m²	7.4ksf

## High Energy Absorption & Low Reaction Force



Foam-filled fenders do not experience a high reaction force during normal docking because they have high energy absorption with low reaction force and hull pressure.  
The reaction force curve shows a gradual performance increase as deflection rate increases. Unlike foam-filled fenders, rubber fenders have high reaction force with low deflection rates, increasing the risk of damage to dock, piers, and vessels during docking.

Compounds	Standard Capacity		High Capacity		Extra High Capacity		Super High Capacity	
	60%		60%		60%		60%	
Deflection	E.A (ton.m)	R.F (ton)	E.A (ton.m)	R.F (ton)	E.A (ton.m)	R.F (ton)	E.A (ton.m)	R.F (ton)
φ600×1,200L	2	9	2	12	3	17	4	24
φ600×1,800L	3	15	3	20	5	29	7	39
φ600×2,400L	4	21	5	28	7	40	9	55
φ600×3,000L	4	27	6	35	8	52	11	71
φ700×1,500L	3	14	3	18	5	26	7	35
φ900×1,500L	4	20	6	27	8	39	11	53
φ900×1,800L	5	22	7	28	10	41	14	57
φ900×2,400L	8	31	10	40	15	59	20	80
φ900×3,000L	10	40	13	52	19	76	26	104
φ900×3,700L	12	49	16	64	23	93	31	127
φ900×4,300L	14	58	19	75	27	110	37	151
φ1,000×1,500L	5	18	6	23	9	34	13	46
φ1,000×2,000L	7	26	9	34	13	49	18	67
φ1,200×1,800L	8	26	11	33	16	48	22	66
φ1,200×2,000L	9	29	12	37	18	54	24	74
φ1,200×2,400L	12	38	16	49	23	72	32	98
φ1,200×3,000L	16	50	21	65	31	96	42	131
φ1,200×3,700L	20	62	26	80	38	117	53	161
φ1,200×4,900L	28	86	37	112	53	163	73	223
φ1,200×6,100L	36	110	47	143	68	209	93	285
φ1,350×2,500L	15	43	20	56	29	81	40	111
φ1,500×2,400L	18	45	24	59	36	86	49	118
φ1,500×3,000L	25	61	32	79	47	116	65	158
φ1,500×3,700L	31	75	41	98	59	144	81	197
φ1,500×4,300L	37	91	48	118	71	172	97	236
φ1,500×4,900L	43	106	56	137	82	201	113	275
φ1,500×5,500L	49	121	64	157	94	229	128	314
φ1,800×3,700L	41	84	54	110	79	160	108	220
φ1,800×4,300L	50	102	65	133	96	194	131	265
φ1,800×4,900L	59	120	77	156	112	229	154	313
φ1,800×5,500L	68	138	88	180	129	263	177	360
φ1,800×6,100L	77	156	100	203	146	297	199	406
φ2,000×3,500L	46	86	60	112	88	164	121	224
φ2,000×4,000L	55	102	72	133	105	195	143	267
φ2,000×4,500L	64	118	83	154	121	225	166	308
φ2,100×4,300L	67	117	88	153	128	223	175	305



## Low Maintenance & Durability

Foam-filled fenders are easily installed and customers can look forward to extended longevity time and low maintenance.

Foam-filled fenders will not explode and are unsinkable. Furthermore, they retain their energy absorbing performance and resilience even if the skin has been damaged.

Compounds	Standard Capacity		High Capacity		Extra High Capacity		Super High Capacity	
	60%		60%		60%		60%	
	Deflection	Performance	E.A	R.F	E.A	R.F	E.A	R.F
Size	E.A (ton.m)	R.F (ton)	E.A (ton.m)	R.F (ton)	E.A (ton.m)	R.F (ton)	E.A (ton.m)	R.F (ton)
Ø2,100x4,900L	79	138	103	180	151	263	206	360
Ø2,100x5,500L	91	159	119	207	173	303	237	414
Ø2,100x6,100L	103	180	134	234	196	342	269	468
Ø2,100x6,700L	115	201	150	261	219	382	300	523
Ø2,400x3,700L	73	111	95	145	139	212	191	291
Ø2,400x4,300L	85	130	111	170	163	248	223	340
Ø2,400x4,900L	101	155	132	201	193	294	264	402
Ø2,400x5,500L	117	179	152	232	223	340	305	464
Ø2,400x6,100L	133	203	173	264	253	385	346	527
Ø2,400x6,700L	149	227	193	295	283	431	387	590
Ø2,500x4,000L	82	122	106	159	155	232	213	317
Ø2,500x5,500L	122	181	159	237	233	347	318	474
Ø2,700x4,300L	108	146	140	190	205	277	280	380
Ø2,700x4,900L	123	167	160	217	234	317	320	434
Ø2,700x5,500L	143	194	186	252	271	368	371	503
Ø2,700x6,100L	163	220	211	287	309	419	423	573
Ø2,700x6,700L	182	247	237	322	346	470	474	643
Ø3,000x4,900L	150	182	194	237	284	347	389	474
Ø3,000x5,500L	174	212	226	276	331	403	452	552
Ø3,000x6,000L	189	234	246	304	359	445	491	609
Ø3,000x6,100L	198	242	258	315	377	460	516	630
Ø3,000x6,700L	223	272	290	354	424	517	580	708
Ø3,000x7,300L	250	306	316	386	462	564	632	772
Ø3,300x4,500L	153	172	199	224	291	328	398	448
Ø3,300x6,500L	247	278	321	362	469	529	643	725
Ø3,400x5,500L	219	265	267	295	389	432	533	591
Ø3,400x6,100L	241	279	296	338	446	494	610	676
Ø3,400x6,700L	264	293	343	381	502	557	687	762
Ø3,400x7,300L	288	319	375	415	548	607	749	831
Ø3,700x6,100L	299	321	389	417	-	-	-	-
Ø3,700x7,300L	359	386	467	502	-	-	-	-
Ø4,000x7,900L	448	447	582	581	-	-	-	-
Ø4,200x8,000L	495	478	644	621	-	-	-	-
Ø4,300x8,500L	553	513	719	667	-	-	-	-
Ø4,500x9,000L	639	580	831	754	-	-	-	-
Ø4,500x10,500L	763	689	992	896	-	-	-	-

The tolerance shall be ±10%

## Proven Applications









[www.seazonekorea.com](http://www.seazonekorea.com)

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