

**TEKMARINE**



**Marine Fenders**



# About TekMarine

From its base in the United States, TekMarine Systems LLC designs and supplies advanced marine fendering and mooring systems to ports, harbors and waterways across the world.

We bring a wealth of engineering and market experience to each project. Our fender solutions range from simple modules to the most sophisticated engineered systems. We supply every type of berth, including passenger terminals, bulk and RoRo ports, Oil and Gas installations and naval facilities.

We offer full support at each step from early concept discussions through to design and detailing, material selection, construction, testing, shipping, and installation. A full after-care service helps keep your investment working safely and reliably for many years after commission.

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# TJCQ Pneumatic Fenders

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Pneumatic fenders also cope well with shear and with bow flares – energy absorption is unchanged at compression angles of up to 15°. They maintain a high, stable standoff.

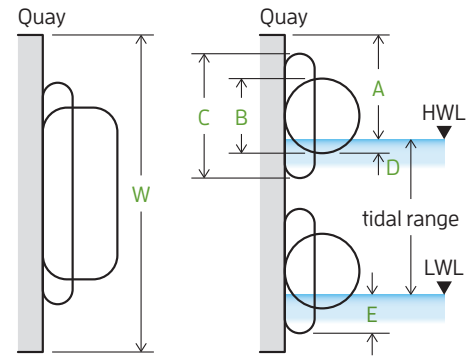
Pneumatic fenders are easy to transport. They can be shipped and stored deflated.

Available in many sizes, either 50kPa or 80kPa initial internal pressures, and with optional chain-tire nets, there is a pneumatic fender for any application. Black and naval gray finishes are available for all sizes.

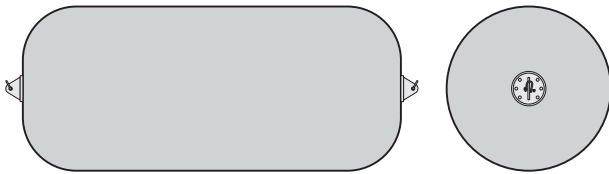


## Installation dimensions

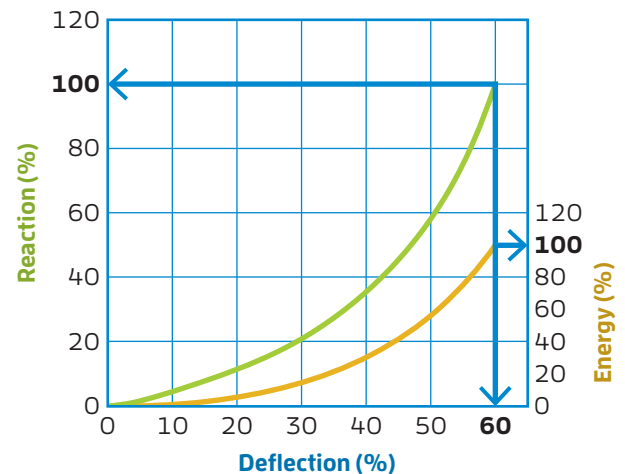
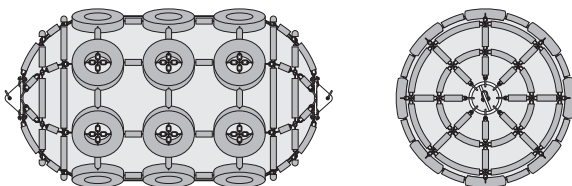
Size		A		B		C		D		E		W	
mm	ft	mm	ft	mm	ft	mm	ft	mm	ft	mm	ft	mm	ft
1000 × 1500	3 × 5	975	3.2	950	3.1	1350	4.4	200	0.7	375	1.2	2000	6.6
1200 × 2000	4 × 6.5	1200	3.9	1140	3.7	1620	5.3	220	0.7	430	1.4	2600	8.5
1500 × 2500	5 × 8	1525	5.0	1420	4.7	2050	6.7	250	0.8	525	1.7	3250	10.7
2000 × 3500	6.5 × 11.5	2050	6.7	1900	6.2	2700	8.9	300	1.0	650	2.1	4500	14.8
2500 × 4000	8 × 13	2490	8.2	2380	7.8	3380	11.1	450	1.5	890	2.9	5200	17.1
3300 × 6500	11 × 21	3380	11.1	3140	10.3	4460	14.6	500	1.6	1080	3.5	8500	27.9



## Sling (netless)



## Chain-tire net



# TJCQ Performance (50kPa)

Size		Energy		Reaction		Hull Pressure		Safety Valve Pressure Setting		Testing Pressure		Weight (Chain Tire Net type)				Weight (Sling Type)		Body Thickness	
												Fender Body		Chain Net					
mm	ft	kNm	ft.kip	kN	kips	kPa	psi	kPa	psi	kPa	psi	kg	lbs	kg	lbs	kg	lbs	mm	in
300×600	1.0×2.0	0.5	0.4	24	5.4	134	19.4	Not applicable for smaller sizes		200	29.0	15	33.1	-	-	20	44.1	12	0.47
500×1000	1.6×3.3	6	4.4	64	14.4	132	19.1			200	29.0	24	52.9	121	267	35	77.2	12	0.47
600×1000	2.0×3.3	8	5.9	74	16.6	126	18.3			200	29.0	28	61.7	132	291	39	86.0	12	0.47
700×1500	2.3×4.9	17	12.5	137	30.8	135	19.6			200	29.0	50	110	165	364	60	132	13	0.51
800×1500	2.6×4.9	24	17.7	158	35.5	132	19.1			200	29.0	64	141	280	617	72	159	14	0.55
1000×1500	3.3×4.9	33	24.3	182	40.9	122	17.7			200	29.0	80	176	220	485	107	236	14	0.55
1000×2000	3.3×6.6	46	33.9	257	57.8	132	19.1			200	29.0	97	214	242	534	124	273	14	0.55
1200×2000	3.9×6.6	64	47.2	297	66.8	126	18.3			200	29.0	144	317	352	776	171	377	14	0.55
1200×3000	3.9×9.8	109	80.4	482	108	134	19.4			200	29.0	250	551	435	959	280	617	14	0.55
1350×2500	4.4×8.2	104	76.7	427	96	130	18.9			200	29.0	220	485	385	849	264	582	15	0.59
1500×2500	4.9×8.2	125	92.2	464	104	126	18.3			200	29.0	243	536	484	1067	287	633	16	0.63
1500×3000	4.9×9.8	156	115	579	130	132	19.1			200	29.0	275	606	583	1285	319	703	16	0.63
1500×4000	4.9×13.1	230	170	815	183	130	18.9			200	29.0	330	728	690	1521	380	838	16	0.63
1700×3000	5.6×9.8	195	144	639	144	128	18.6			200	29.0	319	703	638	1407	363	800	16	0.63
1700×7200	5.6×23.6	516	381	1621	364	133	19.3			200	29.0	760	1676	-	-	810	1786	16	0.63
2000×3000	6.6×9.8	260	192	727	163	122	17.7			200	29.0	403	888	990	2183	469	1034	16	0.63
2000×3500	6.6×11.5	314	232	875	197	128	18.6			200	29.0	445	981	1056	2328	502	1107	17	0.67
2000×4000	6.6×13.1	361	266	1020	229	125	18.1			200	29.0	490	1080	1150	2535	540	1190	16	0.63
2000×6000	6.6×19.7	611	451	1631	367	136	19.7			200	29.0	658	1451	1650	3638	720	1587	16	0.63
2500×4000	8.2×13.1	676	499	1381	310	137	19.9			175	25.4	250	36.3	992	2187	1364	3007	1188	2619
2500×5500	8.2×18.0	962	710	2019	454	148	21.5	175	25.4	250	36.3	1199	2643	2035	4486	1452	3201	18	0.71
2500×9100	8.2×29.9	1631	1203	3482	783	140	20.3	175	25.4	250	36.3	2150	4740	3467	7643	2230	4916	18	0.71
3000×5000	9.8×16.4	1136	838	2021	454	154	22.3	175	25.4	250	36.3	1520	3351	1800	3968	1640	3616	19	0.75
3300×4500	10.8×14.8	1198	884	1884	424	130	18.9	175	25.4	250	36.3	1606	3541	1881	4147	2024	4462	20	0.79
3300×6500	10.8×21.3	1850	1365	3015	678	146	21.2	175	25.4	250	36.3	2057	4535	2827	6232	2475	5456	20	0.79
3300×10600	10.8×34.8	3128	2307	5257	1182	158	22.9	175	25.4	250	36.3	2816	6208	5126	11301	3366	7421	22	0.87
4500×7000	14.8×23.0	3302	2436	3796	853	133	19.3	175	25.4	250	36.3	3740	8245	4290	9458	3880	8554	24	0.94
4500×9000	14.8×29.5	4847	3575	5747	1292	146	21.2	175	25.4	250	36.3	4334	9555	5929	13071	-	-	24	0.94
4500×12000	14.8×39.4	6602	4870	7984	1795	154	22.3	175	25.4	205	29.7	5269	11616	7689	16951	-	-	24	0.94

# TJCQ Performance (80kPa)

Size		Energy		Reaction		Hull Pressure		Safety Valve Pressure Setting		Testing Pressure		Weight (Chain Tire Net type)				Weight (Sling Type)		Body Thickness			
												Fender Body		Chain Net							
mm	ft	kNm	ft.kip	kN	kips	kPa	psi	kPa	psi	kPa	psi	kg	lbs	kg	lbs	kg	lbs	mm	in		
300×600	1.0×2.0	0.6	0.4	31	7.0	173	25.1	Not applicable for smaller sizes		250	36.3	17	37.5	-	-	20	44.1	13	0.51		
500×1000	1.6×3.3	8	5.9	85	19.1	174	25.2			250	36.3	26	57.3	121	267	37	81.6	13	0.51		
600×1000	2.0×3.3	11	8.1	98	22.0	166	24.1			250	36.3	30	66.1	132	291	42	92.6	13	0.51		
700×1500	2.3×4.9	24	17.7	180	40.5	177	25.7			250	36.3	52	115	165	364	63	139	14	0.55		
800×1500	2.6×4.9	31	22.9	204	45.9	180	26.1			250	36.3	71	157	280	617	83	183	15	0.59		
1000×1500	3.3×4.9	45	33.2	239	53.7	160	23.2			250	36.3	84	185	220	485	111	245	15	0.59		
1000×2000	3.3×6.6	64	47.2	338	76.0	174	25.2			250	36.3	101	223	242	534	129	284	15	0.59		
1200×2000	3.9×6.6	89	65.6	390	87.7	166	24.1			250	36.3	149	328	352	776	176	388	15	0.59		
1200×3000	3.9×9.8	140	103	623	140	185	26.8			250	36.3	275	606	435	959	310	683	16	0.63		
1350×2500	4.4×8.2	144	106	561	126	170	24.7			250	36.3	226	498	385	849	270	595	17	0.67		
1500×2500	4.9×8.2	174	128	610	137	166	24.1			250	36.3	268	591	484	1067	312	688	17	0.67		
1500×3000	4.9×9.8	218	161	761	171	174	25.2			250	36.3	339	747	583	1285	355	783	17	0.67		
1500×4000	4.9×13.1	296	218	1053	237	176	25.5			250	36.3	363	800	690	1521	378	833	17	0.67		
1700×3000	5.6×9.8	272	201	840	189	168	24.4			250	36.3	348	767	638	1407	392	864	17	0.67		
1700×7200	5.6×23.6	668	493	2096	471	170	24.7			250	36.3	795	1753	-	-	845	1863	18	0.71		
2000×3000	6.6×9.8	363	268	955	215	160	23.2			250	36.3	413	911	990	2183	479	1056	19	0.75		
2000×3500	6.6×11.5	438	323	1150	259	168	24.4			250	36.3	454	1001	1056	2328	520	1146	19	0.75		
2000×4000	6.6×13.1	520	384	1380	310	173	25.1			250	36.3	505	1113	1150	2535	535	1179	19	0.75		
2000×6000	6.6×19.7	791	583	2109	474	170	24.7			230	33.4	300	43.5	724	1596	1650	3638	810	1786	18	0.71
2500×4000	8.2×13.1	944	696	1815	408	180	26.1			230	33.4	300	43.5	1111	2449	1364	3007	1309	2886	20	0.79
2500×5500	8.2×18.0	1343	991	2653	596	195	28.3	230	33.4	300	43.5	1353	2983	2035	4486	1606	3541	20	0.79		
2500×9100	8.2×29.9	2293	1691	4505	1013	199	28.9	230	33.4	300	43.5	2360	5203	3467	7643	2450	5401	20	0.79		
3000×5000	9.8×16.4	1593	1175	2608	586	185	26.8	230	33.4	300	43.5	1670	3682	1800	3968	1850	4079	21	0.83		
3300×4500	10.8×14.8	1673	1234	2476	557	171	24.8	230	33.4	300	43.5	1892	4171	1881	4147	2299	5068	22	0.87		
3300×6500	10.8×21.3	2583	1905	3961	890	191	27.7	230	33.4	300	43.5	2420	5335	2827	6232	2827	6232	22	0.87		
3300×10600	10.8×34.8	4366	3220	6907	1553	208	30.2	230	33.4	300	43.5	3333	7348	5126	11301	3872	8536	23	0.91		
4500×7000	14.8×23.0	4608	3399	4988	1121	174	25.2	230	33.4	300	43.5	4136	9118	4301	9482	4350	9590	26	1.02		
4500×9000	14.8×29.5	6766	4991	7551	1698	192	27.8	230	33.4	300	43.5	4818	10622	5929	13071	-	-	26	1.02		
4500×12000	14.8×39.4	9218	6799	14490	3257	202	29.3	230	33.4	300	43.5	5863	12926	7689	16951	-	-	26	1.02		



# TJCQ Pneumatic Fenders

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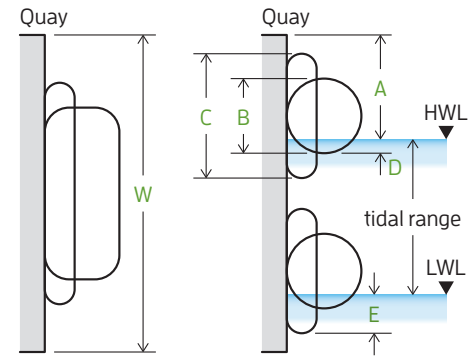
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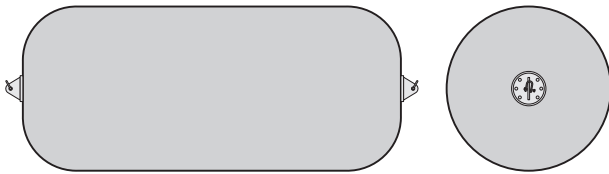


## Installation dimensions

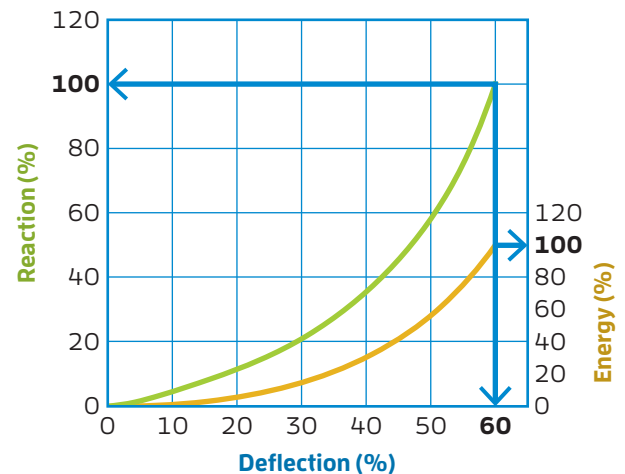
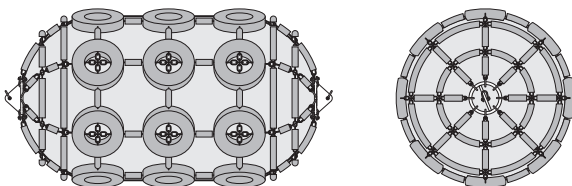
Size		A		B		C		D		E		W	
mm	ft	mm	ft	mm	ft	mm	ft	mm	ft	mm	ft	mm	ft
1000 × 1500	3 × 5	975	3.2	950	3.1	1350	4.4	200	0.7	375	1.2	2000	6.6
1200 × 2000	4 × 6.5	1200	3.9	1140	3.7	1620	5.3	220	0.7	430	1.4	2600	8.5
1500 × 2500	5 × 8	1525	5.0	1420	4.7	2050	6.7	250	0.8	525	1.7	3250	10.7
2000 × 3500	6.5 × 11.5	2050	6.7	1900	6.2	2700	8.9	300	1.0	650	2.1	4500	14.8
2500 × 4000	8 × 13	2490	8.2	2380	7.8	3380	11.1	450	1.5	890	2.9	5200	17.1
3300 × 6500	11 × 21	3380	11.1	3140	10.3	4460	14.6	500	1.6	1080	3.5	8500	27.9



## Sling (netless)



## Chain-tire net





# UHMW-PE Facings

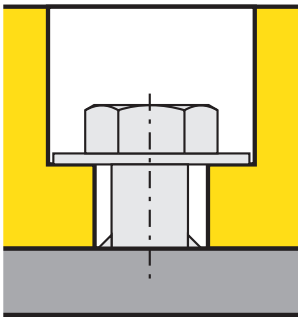
TekMarine protects every fender panel with top quality UHMW-PE (Ultra High Molecular Weight Polyethylene) facings. Impact resistant and very low in friction, UHMW-PE allows vessels to move smoothly past a fender system without snagging or abrasion. It is also popular for heavy duty impact protection where fenders are not required.

Easy to machine and install, UHMW-PE comes in many colors and several quality grades.

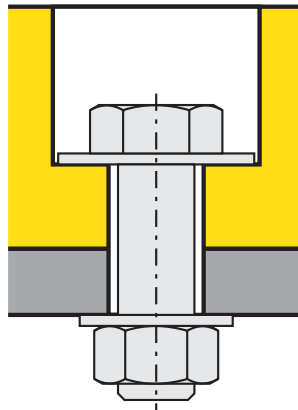
UHMW-PE does not rot, split or decay and does not suffer from UV or ozone damage. It is fully recyclable.



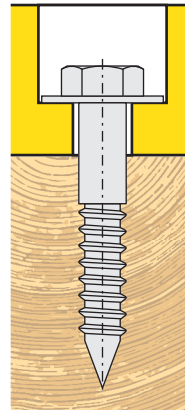
Steel panel with welded stud



Open steel structure



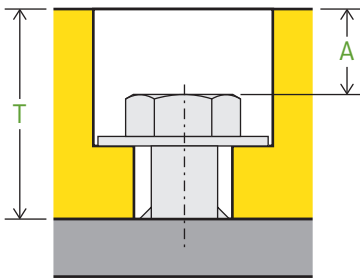
Timber structure



The fixing type depends on the underlying structure. Welded studs or stronger 'blind boss' fixings are used for steel panels. Oversize washers are recommended when bolting through open steel structures.

Fixings are available in various steel grades and finishes: please ask TekMarine for more details.

## Wear Allowances



T	A
30	5
40	10
50	15
70	25
100	40

A small increase in the thickness of UHMW-PE can dramatically improve the working life of the facing, protecting the fender and structure for longer.

# Physical Properties

Property	Test method	Metric			US Units		
		Unit	Virgin	Recycled	Unit	Virgin	Recycled
Density	ASTM D-792	kg/m <sup>3</sup>	930	945	lb/ft <sup>3</sup>	58.01	58.9
Molecular Weight	Viscosimetric	g/mol	4.2 × 10 <sup>6</sup>	4.2 × 10 <sup>6</sup>	g/mol	4.2 × 10 <sup>6</sup>	4.2 × 10 <sup>6</sup>
Yield Strength	ASTM D-638	MPa	21	20	psi	3050	2900
Ultimate Strength	ASTM D-638	MPa	40	34.3	psi	5800	4974
Elongation at Break	ASTM D-638	%	250	218	%	250	218
Impact Strength	ASTM D-4020	kJ/m <sup>2</sup>	70	50	ft-lb/in <sup>2</sup>	34	24
Tensile Impact	DIN 53448	kJ/m <sup>2</sup>	2200	1600	ft-lb/in <sup>2</sup>	1050	762
Abrasion Index (Sand Slurry)	ASTM 965	AR-01 Steel=100	90	116	AR-01 Steel=100	90	116
Hardness	ASTM D-2240	Type D	68	70	Type D	68	70
Static Friction	ASTM D-1894	-	0.15	0.15-0.20	-	0.15	0.15-0.20
Dynamic Friction	ASTM D-1894	-	0.12	0.14-0.16	-	0.12	0.14-0.16
Operating Temperature		°C	-80 to +80	-80 to +80	°F	-112 to 176	-112 to 176
Thermal Expansion	ASTM D-696	K <sup>-1</sup>	2.0 × 10 <sup>-4</sup>	1.8 × 10 <sup>-4</sup>	°F <sup>-1</sup>	1.1 × 10 <sup>-4</sup>	1.1 × 10 <sup>-4</sup>
Melting Point	ASTM D-3417	°C	137-143	137-143	°F	278-289	278
Water Absorption	ASTM D-570	%	0	0	%	0	0

## Friction comparisons

Material	Coefficient of friction against steel (μ)
<b>UHMW-PE</b>	<b>0.15-0.2</b>
HD-PE	0.3
Nylon	0.2
Rubber	0.6-0.7
Timber	0.4
Steel	0.5

The coefficient of friction of UHMW-PE varies according to the material grade and the pressure applied to the panel's surface.

These coefficients of friction only apply to smooth contact surfaces.

Source: BS 6349-4:2014

For more information please consult TekMarine.

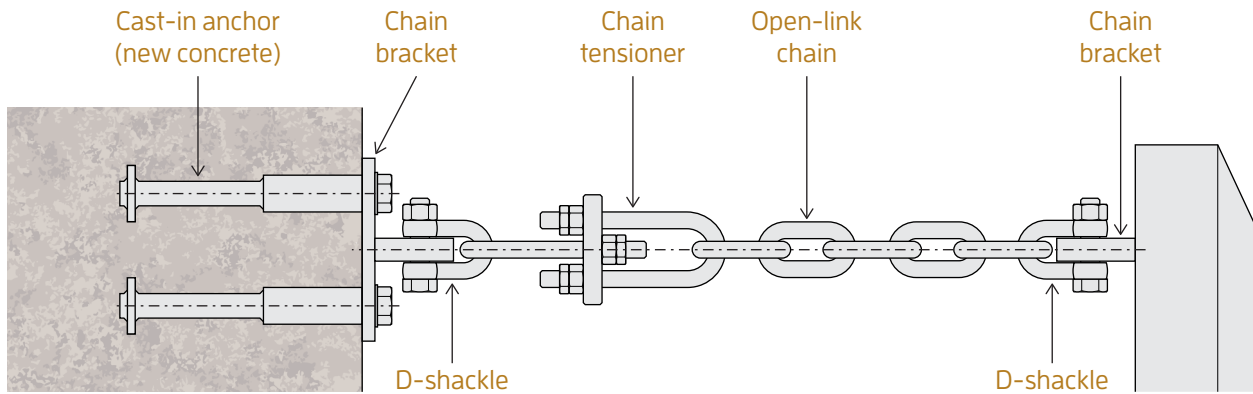




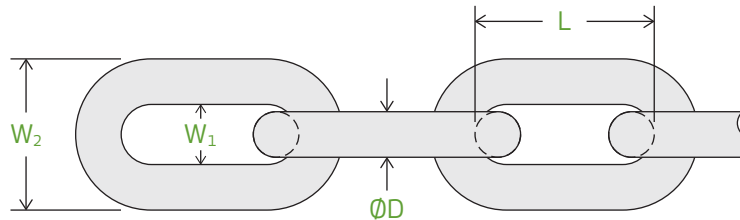
# Anchors and Fixings

A fender system relies on the best quality fixings and accessories to perform properly. Large or heavy-duty fenders need chain systems to manage shear, tension and weight. These comprise open or stud-link chain, tensioners and shackles. Cast-in or resin anchors connect the chain systems and brackets to the quay structure. Various material grades and finishes are available: please ask TekMarine for details.

## Typical chain system

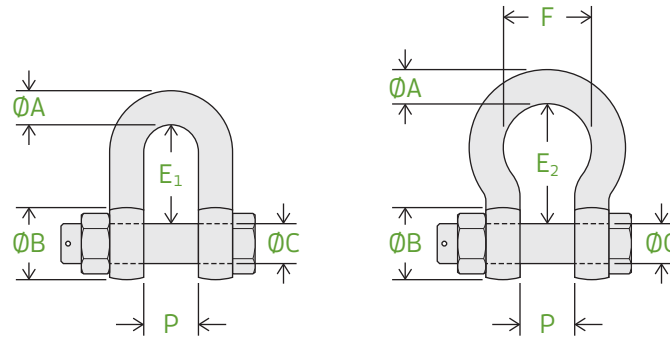


## Chains



ØD	W <sub>1</sub>	W <sub>2</sub>	L = 4D	Weight	W <sub>1</sub>	W <sub>2</sub>	L = 5D	Weight	MBL	
									SL2	SL3
mm	mm	mm	mm	kg/m	mm	mm	mm	kg/m	kN	kN
14	20	48	56	3.8	21	49	70	3.7	124	154
16	22	54	64	5.0	24	56	80	4.8	160	202
18	25	61	72	6.3	27	63	90	6.0	209	262
20	28	68	80	7.8	30	70	100	7.5	264	330
22	31	75	88	9.4	33	77	110	9.0	304	380
25	35	85	100	12.1	38	88	125	11.6	393	491
28	39	95	112	15.2	42	98	140	14.6	492	616
30	42	102	120	17.4	45	105	150	16.7	566	706
32	45	109	128	19.8	48	112	160	19.0	644	804
35	49	119	140	23.8	53	123	175	22.8	770	964
38	53	129	152	28.0	57	133	190	26.9	900	1130
40	56	136	160	31.0	60	140	200	29.8	1010	1260
45	63	153	180	39.3	68	158	225	37.7	1275	1590
50	70	170	200	48.5	75	175	250	46.5	1570	1960
55	77	187	220	58.6	83	193	275	56.4	1900	2380
60	84	204	240	70.0	90	210	300	67.0	2260	2770

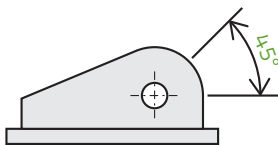
# Shackles



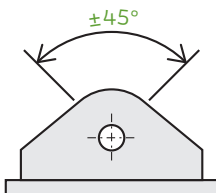
ØA	ØB	ØC	P	D-shackle		Bow shackle			NBL
				E <sub>1</sub>	Weight	E <sub>2</sub>	F	Weight	
mm	mm	mm	mm	mm	kg	mm	mm	kg	kN
13	26	16	22	43	0.4	51	32	0.4	120
16	32	19	27	51	0.7	64	43	0.8	195
19	38	22	31	59	1.1	76	51	1.3	285
22	44	25	36	73	1.5	83	58	1.9	390
25	50	28	43	85	2.6	95	68	2.8	510
28	56	32	47	90	3.3	108	75	3.8	570
32	64	35	51	94	4.7	115	83	5.3	720
35	70	38	57	115	6.2	133	95	7.0	810
38	76	42	60	127	7.6	146	99	8.8	1020
45	90	50	74	149	12.8	178	126	15.0	1500
50	100	57	83	171	18.2	197	138	20.7	2100
57	114	65	95	190	27.8	222	160	29.3	2550
65	130	70	105	203	35.1	254	180	64.5	3330

# Brackets

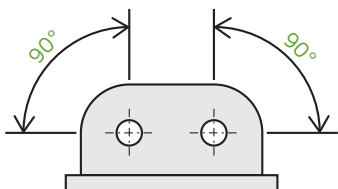
BSO



BSC

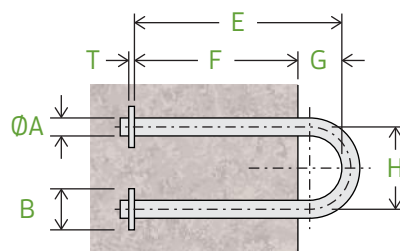


BDB



Brackets are purpose designed for every project. Please ask TekMarine for details.

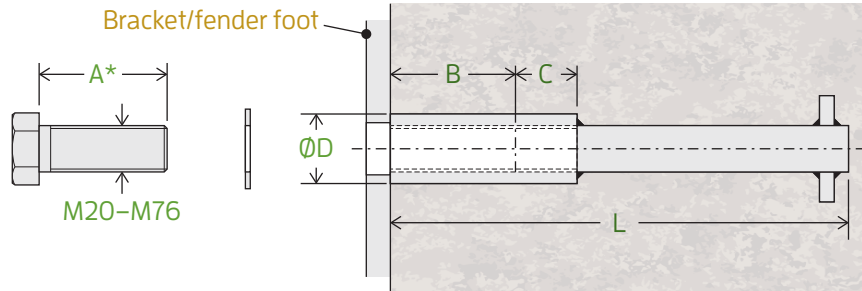
# U-anchors



ØA	E	F	G	H	B	T	Weight	NBL
mm	mm	mm	mm	mm	mm	mm	kg	kN
26	320	260	60	104	50	12	3.4	209
30	370	300	70	120	50	15	5.1	264
34	410	340	70	136	60	15	7.3	304
36	430	360	70	144	60	20	8.6	393
42	510	420	90	168	70	20	13.7	492
44	540	440	100	176	80	20	16.1	566
48	580	480	100	192	80	25	20.5	644
50	610	500	110	200	90	25	23.7	770
56	680	560	120	224	100	30	33.4	900
60	730	600	130	240	110	30	41.1	1010
66	800	660	140	264	120	35	54.8	1275
74	900	740	160	296	130	40	76.9	1570

# Anchors

Anchors are available in galvanized or stainless steel finishes, in various strength grades and in metric or inch sizes. Ask TekMarine for details if the required specification is not listed.



## Cast-in type

Cast-in anchors are preferred for new concrete structures. The threaded anchor links via a long tail to an anchor plate, for even load distribution.

\* Dimension A varies according to the thickness of the bracket or fender foot and should always be calculated.

Anchor	B	C	ØD	L	Weight
mm	mm	mm	mm	mm	kg
M20	50	20	30	214	0.9
M24	60	25	35	258	1.5
M30	70	30	45	318	2.7
M36	80	40	55	328	4.2
M42	85	45	65	416	6.9
M48	100	50	75	431	10.2
M56	105	60	85	436	14.0
M64	128	80	100	600	29.8
M76	152	90	114	700	46.1

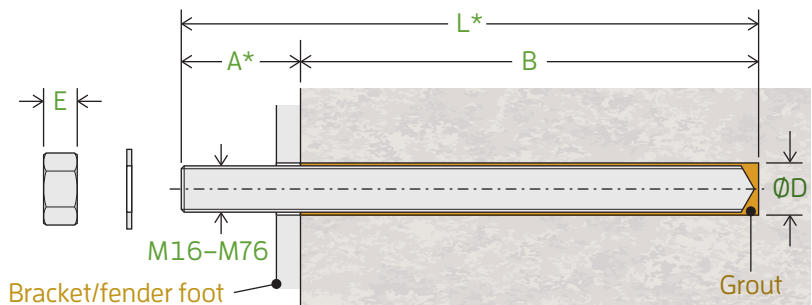
## Chemical type

Chemical anchors are used for existing concrete structures.

Please ask about glass grout capsules and other grouting systems.

For an accurately drilled hole, allow for grout wastage of 10%–30%, depending on grout type.

\* Dimensions A and L depend on the bracket/fender foot thickness and the concrete grade, and should always be calculated.



Anchor	B	ØD	E	Grout
mm	mm	mm	mm	ml
M16	140	20	13	16
M20	170	24	16	23
M24	210	28	19	34
M30	280	35	24	71
M36	360	42	29	132
M42	420	50	34	243
M48	460	54	38	221
M56	500	64	45	377
M64	560	72	51	479
M76	670	84	61	674



# Rubber Properties

Every TekMarine rubber fender unit uses the highest quality Natural Rubber (NR) and/or Styrene-butadiene (SBR) based compounds. These meet or exceed the performance requirements of the main international fender specifications such as PIANC and EAU-E 62 "Acceptance Requirements for Fender Elastomers". The table below shows typical specifications for laboratory prepared and tested specimens.

Please consult TekMarine about other fender compounds such as EPDM, Butyl, Neoprene and Polyurethane.

Material samples for laboratory test purposes are prepared differently to rubber fender units. Please ask TekMarine for details.

Property	Test method	Conditions	Requirements	Unit
Tensile Strength	ASTM D412 Die C; AS 1180.2; BS 903.A2; ISO 37; JIS K6251 Item 3, Dumbell 3	Original	≥ 16.0	MPa
		Aged for 96 hours at 70°C	≥ 12.8	
Elongation at Break	ASTM D 412 Die C; AS 1180.2; BS 903.A2; ISO 37; JIS K 6251 Item 3, Dumbell 3	Original	≥ 400	%
		Aged for 96 hours at 70°C	≥ 320	
Hardness	ASTM D 2240; AS1683.15.2; BS 903.A6; ISO 815; JIS K 6301 Item 5A Tester	Original	≤ 78°	Shore A
		Aged for 96 hours at 70°C	original value +6°	
Compression Set	ASTM D 395; AS1683.13B; BS903.A6; ISO 815; JIS K6262 Item 10	Aged for 22 hours at 70°C	≤ 30	%
	DIN 53517	Aged for 24 hours at 70°C	≤ 40	
Tear Resistance	ASTM D624; AS1683.12; BS903.A3; ISO 34.1; JIS K6301 Item 9; Test Piece A	Die B	≥ 70	kN/m
Ozone Resistance	ASTM D1149; AS1683.24; BS903.43; DIN 53509; ISO 143/1	1ppm at 20% strain at 40°C for 100 hours	no visible cracking	n/a
Seawater Resistance (Hardness)	ASTM D 471; BS ISO 1817	28 days in artificial seawater at 95°C ±2°C	≤ ±10°	Shore A
Seawater Resistance (Volume)			≤ +10/-5	%
Abrasion Resistance	BS 903.A9	Method B	≤ 0.5	cc
Bond Strength (Steel to Rubber)	BS 903.A21	Method B	≥ 7	N/mm



# Tolerances

Standard manufacturing and performance tolerances apply to all TekMarine fenders. TekMarine may agree to smaller tolerances in special cases. Please ask TekMarine for tolerances of types not listed below.

Fender Type	Property	Tolerance	
TJCO, TJSC, TJUE, TJDA-A and TJDA-B	All dimensions	±3% or ±2mm (whichever greater)	
	Bolt hole spacing	±2mm	
TJCY	Outside diameter	±4%	
	Inside diameter	±4%	
	Length	±40mm	
TJDD, TJSD, TJDO and TJSO	Cross-section	±4%	
	Length	±2% or ±10mm (whichever greater)	
	Drilled hole centers	±4mm (non-cumulative)	
	Counterbore depth	±4mm (under-head depth)	
TJCA, TJCB	Cross-section	±3% or ±2mm (whichever greater)	
	Length	±2% or ±25mm (whichever greater)	
	Drilled hole centers	±4mm (non-cumulative)	
	Counterbore depth	±4mm (under-head depth)	
HD-PE fenders	Cross-section	±4%	
	Length	±2% or ±20mm (whichever greater)	
	Drilled hole centers	±4mm (non-cumulative)	
	Counterbore depth	±4mm (under-head depth)	
UHMW-PE panels	Length and width	(cut panels)	±5mm (cut pads)
		(uncut sheets)	±20mm (uncut sheets)
	Planed thickness	≤ 30mm	±0.2mm
		31–100mm	±0.3mm
		≥ 100mm	±0.5mm
	Unplaned thickness	≤ 30mm	±2.5mm
		31–100mm	±4.0mm
≥ 100mm		±6.0mm	
Drilled hole centers		±2mm (non-cumulative)	
Counterbore depth		±2mm (under-head depth)	
M, W and Block fenders	Cross-section	±3% or ±2mm (whichever greater)	
	Length	±3% or ±20mm (whichever greater)	
	Fixing hole centers	±3mm	
	Fixing hole diameter	±3mm	

## Performance

Fender Type	Property	Tolerance
TJCO, TJSC, TJUE, TJDA-A and TJDA-B	Reaction, energy and deflection	±10%
Cylindricals (wrapped)	Reaction, energy and deflection	±10%
Cylindricals (extruded)	Reaction, energy and deflection	±10%
Profile fenders	Reaction, energy and deflection	±10%
Pneumatic fenders	Reaction and energy	±10%
Foam fenders	Reaction and energy	±15%

Unless otherwise listed or agreed with TekMarine, tolerances are ±20%.



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