

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.

Disclaimer

TekMarine Systems LLC ("TekMarine") has made every effort to ensure that the product descriptions and technical specifications in this catalog are correct. TekMarine can not accept liability or responsibility for errors and omissions for any reason. Customers and catalog users are kindly requested to ask TekMarine for a detailed specification and approved drawings before manufacturing and construction. TekMarine reserves the right to make changes to specifications and drawings without prior notice. All dimensions, performance values, material properties and other product specifications are subject to standard tolerances. This catalog and the information herein replaces all earlier editions. If in any doubt, please contact TekMarine.

Copyright

Copyright © 2015 TekMarine Systems LLC. All rights reserved.

This catalog may not be reproduced, copied or distributed to third parties without the consent of TekMarine Systems LLC in every case.



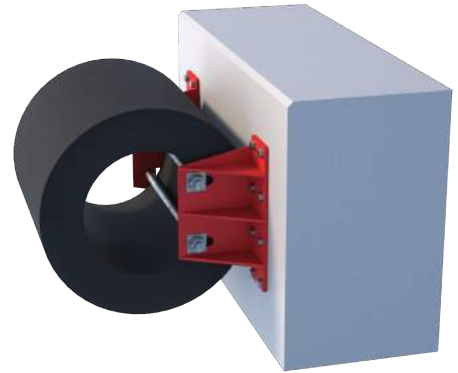
TJCY Cylindrical Fender

Cylindrical Fenders have been a popular choice for many decades. TekMarine TJCY Cylindrical Fenders come in many sizes and configurations, are easy to install and will last for years with minimal maintenance.

The reaction force and energy absorption increase proportionally all the way to the fender's rated deflection, softening vessel berthing.

Depending on size, cylindricals may be installed onto a chain or a steel bar and chains. For very large sizes a custom ladder bracket is recommended.

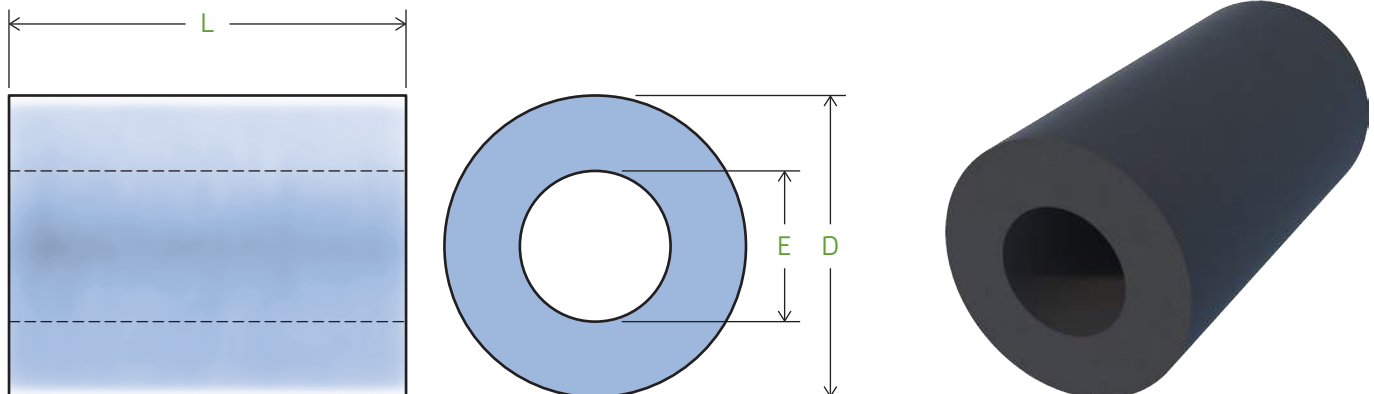
Almost any length fender can be supplied subject to transport limitations. Lengths can be pre-curved or jointed on request.



Dimensions and Performance

D		E		Weight		T1				T2			
mm	in	mm	in	kg/m	lb/ft	Energy		Reaction		Energy		Reaction	
mm	in	mm	in	kg/m	lb/ft	kNm	ft-kips	kN	kips	kNm	ft-kips	kN	kips
100	3.9	50	2.0	7.1	4.8	0.8	0.6	41.3	9.3	1.1	0.8	55.0	12.4
150	5.9	75	3.0	15.9	10.7	1.9	1.4	61.9	13.9	2.5	1.8	82.6	18.6
200	7.9	100	3.9	28.3	19.0	3.4	2.5	82.6	18.6	4.5	3.3	110	24.7
250	9.8	125	4.9	44.2	29.7	5.3	3.9	103	23.2	7.0	5.2	138	31.0
300	11.8	150	5.9	63.6	42.8	7.6	5.6	124	27.9	10.1	7.4	165	37.1
400	15.7	200	7.9	113	76.0	13.5	10.0	165	37.1	18.0	13.3	220	49.5
500	19.7	250	9.8	177	119	21.1	15.6	206	46.3	28.1	20.7	275	61.8
600	23.6	300	11.8	254	171	30.3	22.3	248	55.8	40.4	29.8	330	74.2
800	31.5	400	15.7	452	304	53.9	39.8	330	74.2	71.9	53.0	440	98.9
900	35.4	450	17.7	573	385	68.2	50.3	372	83.6	91.0	67.1	495	111
1000	39.4	500	19.7	707	475	84.2	62.1	413	92.8	112	82.6	550	124
1200	47.2	600	23.6	1018	685	121	89.2	495	111	162	119	661	149
1400	55.1	700	27.6	1385	931	165	122	578	130	220	162	771	173
1500	59.1	750	29.5	1590	1069	190	140	619	139	253	187	826	186
1600	63.0	800	31.5	1810	1217	216	159	661	149	288	212	881	198
1800	70.9	900	35.4	2290	1540	273	201	743	167	364	268	991	223
2000	78.7	1000	39.4	2827	1901	337	249	826	186	449	331	1101	248
2400	94.5	1200	47.2	4072	2739	485	358	991	223	647	477	1321	297

Values are for single units, L = 1m. Other sizes and fender lengths are available on request. Please ask TekMarine for details.



Fixings

D: up to 500mm (20in.)



D: 500–1600mm (20–64in.)



D: over 1600mm (64in.)*



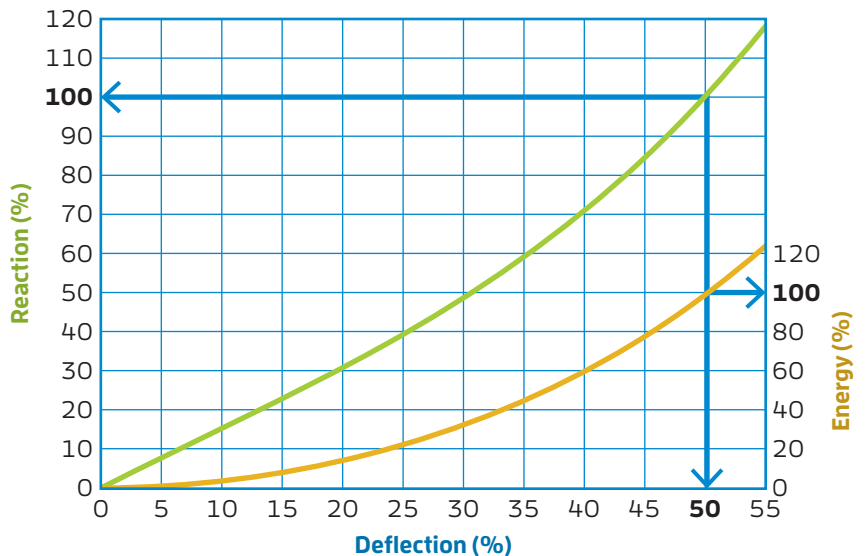
*Custom designed for each project.

D		Chain	Shackle
mm	in	mm	mm
100	3.9	14	16
150	5.9	16	16
200	7.9	18	19
250	9.8	20	22
300	11.8	24	28
400	15.7	28	35
500	19.7	32	38
600	23.6	32	44

D		L		Internal Bar	Chain	Shackle
mm	in	mm	in	mm	mm	mm
800	31.5	1000	39.4	35	24	28
		1500	59.1	45	28	35
		2000	78.7	55	32	38
		2500	98.4	65	38	44
		3000	118	70	40	50
900	35.4	1000	39.4	40	24	28
		1500	59.1	50	28	35
		2000	78.7	60	32	38
		2500	98.4	70	38	44
		3000	118	80	40	50
1000	39.4	1000	39.4	45	28	35
		1500	59.1	55	32	38
		2000	78.7	65	38	44
		2500	98.4	75	40	50
		3000	118	85	40	50
1200	47.2	1000	39.4	50	28	35
		1500	59.1	65	38	44
		2000	78.7	75	40	50
		2500	98.4	85	40	50
		3000	118	100	50	56
1400	55.1	1000	39.4	65	38	44
		1500	59.1	70	38	44
		2000	78.7	80	40	50
		2500	98.4	90	50	56
		3000	118	100	52	64
1600	64.0	1000	39.4	75	40	50
		1500	59.1	80	40	50
		2000	78.7	90	40	50
		2500	98.4	110	50	56
		3000	118	120	52	64

Performance

Deflection(%)	Reaction(%)	Energy(%)
0	0	0
5	8	1
10	15	4
15	23	8
20	31	14
25	39	22
30	49	33
35	59	45
40	71	60
45	84	78
50	100	100
55	118	125

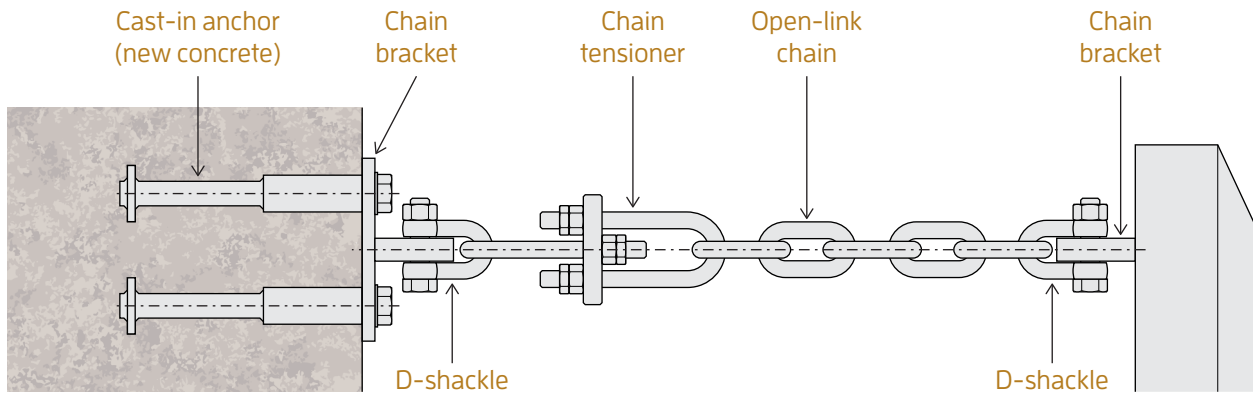




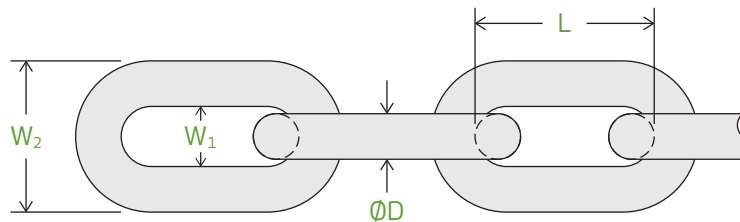
Anchors and Fixings

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

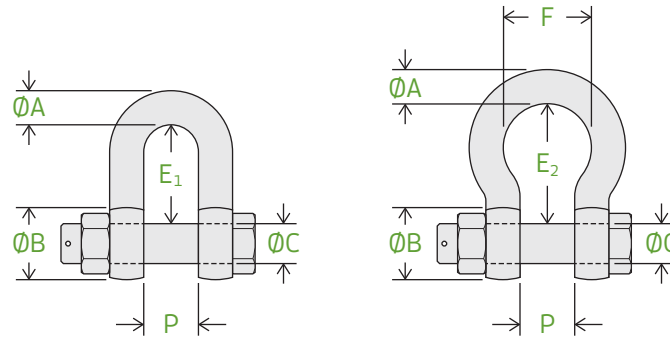


Chains



ØD	W ₁	W ₂	L = 4D	Weight	W ₁	W ₂	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

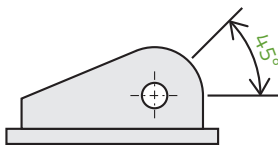
Shackles



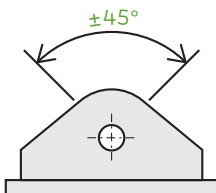
ØA	ØB	ØC	P	D-shackle		Bow shackle			NBL
				E ₁	Weight	E ₂	F	Weight	
mm	mm	mm	mm	mm	kg	mm	mm	kg	kN
13	26	16	22	43	0.4	51	32	0.4	120
16	32	19	27	51	0.7	64	43	0.8	195
19	38	22	31	59	1.1	76	51	1.3	285
22	44	25	36	73	1.5	83	58	1.9	390
25	50	28	43	85	2.6	95	68	2.8	510
28	56	32	47	90	3.3	108	75	3.8	570
32	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

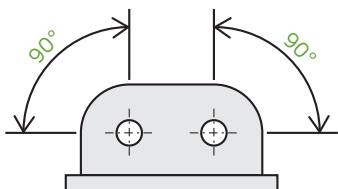
BSO



BSC

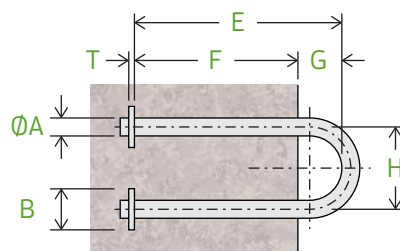


BDB



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

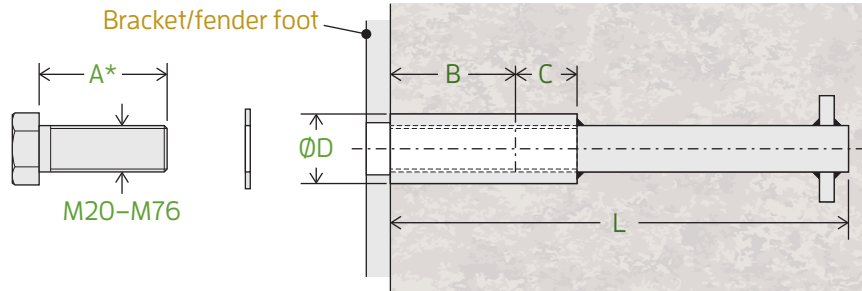
U-anchors



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

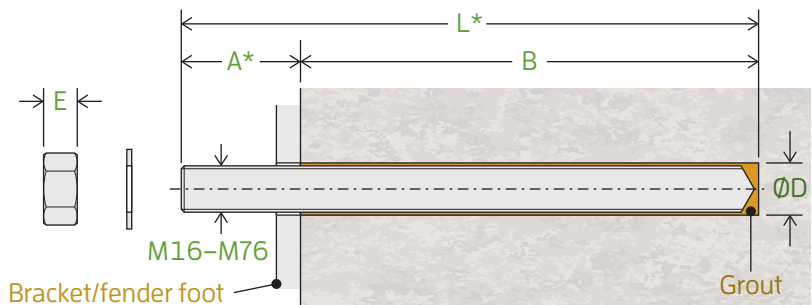
Chemical type

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%.



TEKMARINE



TEKMARINE SYSTEMS LLC
9595 Six Pines Drive, Suite 8210
The Woodlands
Houston, TX 77380, USA

phone +1 832 631-6104
email sales@tekmarine.com
web www.tekmarine.com

Presented by

Catalogue version 001d