

For Customer, For Technology, For Together

DONGYANG RUBBER FENDER

DONGYANG
RUBBER FENDER

MARINE FENDERING SYSTEM

System Fenders
Floating Fenders
Arch Fenders
Other Fenders
Fender Accessories

EXPANSION JOINT & INDUSTRIAL HOSE

Expansion Joint
& Marine Hose
Oil hose
AIR & Water Hose
Material Hose



DONGYANG RUBBER FENDER

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DONGYANG ENTERPRISE Co., Ltd.

ISO Certificate



ISO 14001



ISO9001



ISO45001

Patent (Domestic / FENDER)



Floating fender with excellent buffering effect



Reversing air fender



Spool-type

Patent (Foreign / FENDER)

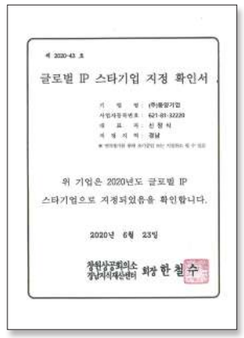


Floating fender with excellent buffering effect

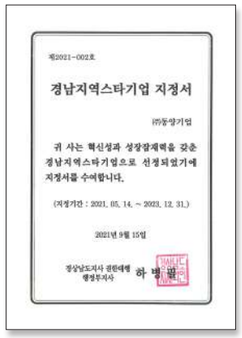
Certificate (Company, Quality, Management)



Certificate of Company Specializing in Material Parts Equipment



Certificate of Global IP Star Company



Certificate of Star Company Designation



Certificate of Inno-Biz



ISO CERTIFICATE



KS CERTIFICATE



Certificate of Intellectual Property Management



Safety and Health Management



KHNP Equipment Repair Company

Patent (foreign / HOSE)



Prevention of damage to outer rubber



Rubber sleeve



Dredge line buoyancy



Reinforced winding

Utility Model



Pneumatic fender



Burst-proof fender



Cement Hose



Rubber Pad



INTRODUCTION

Introduction Dong Yang Enterprise, one of the world's largest rubber companies, has developed and manufactured high quality marine fenders since 1998. We have continually used high performance optimum design and manufacturing to supply superior fenders to the world.

The Dong Yang Enterprise Rubber Fenders, developed in order to secure high energy adsorption effectively, keeping reaction forces low, by applying three-dimensional extension when compressed, have been delivered to port facilities in various countries since the first supply in 1998. Fenders designed and manufactured by DRF are long lasting, trouble free and do not deteriorate in performance or character in their specified lifetime.

Dong Yang Enterprise Marine Systems will help you define the ideal marine fender for the structure, the best materials for the environment and the best design for long service life and low maintence.

We are trying to get all clients to evaluate us as world best fender manufacturer with superior quality services.

DONGYANG RUBBER FENDER

DRF

HISTORY

1990

1998 -Establishment of Dongyang Enterprise Co., Ltd.

1999 -Partners of DSME special ship SUBMARINE part

2000

2003 -ISO 9001

2006 -Establishment of subsidiary (Dongyang RMP)

2009 -KS certification (KSM 6709)
-Designated as a supplier for Hyundai E&C

2010

2011 -Ulsan Port Authority (UPA) fender design and construction
-Korea Hydro & Nuclear Power EXPANSION JOINT A CLASS
-INNO-BIZ

2012 -Busan Port Authority (BPA) fender design and construction

2013 -Awarded 5 million dollars in Export Tower
(Korea International Trade Association)

2015 -KEPCO KPS Co., Ltd. EXPANSION JOINT A CLASS

2017 -Company affiliated research institute certification
-Safety and Health Management System Certification
(K-OHSMS 18001)

2020

2020 -Material parts equipment company
-Intellectual property management company
-Safety and Health Management System Certification
(KS Q ISO45001)

2021 -Star Company Designation

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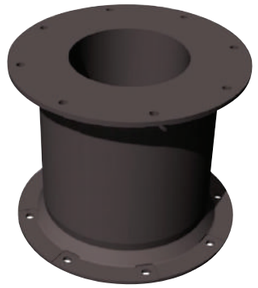
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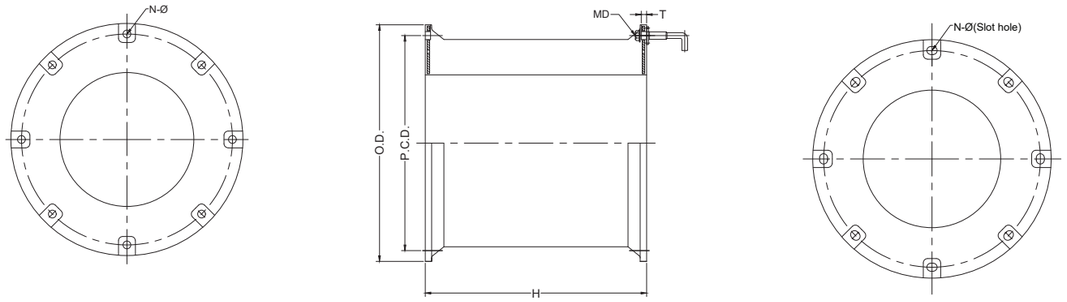
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Spool Fender

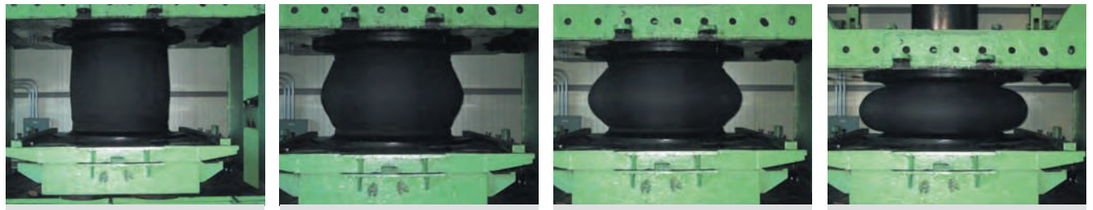
The Super Spool Fender is installed by a method of systems including 1set, 2set and 3set, which efficiently reduces the docking impact when docking vessels.
The wider dispersion of stress makes it possible to increase the design deflection from 45% to 52.5%, resulting in superior performance of the super spool fender, as well as being durable.
The fender, which is manufactured with a specialized manufacturing method by our company, maintains high durability, high repulsive power, and absorbed energy, producing and supplying various sizes (Max 3000H).



[Unit:mm]

Dimension / Height	MD	O.D.	P.C.D.	N-Ø	N-Ø (Slot Hole)	T
300H	M20 (3/4)	400	340	4-25	4-25x35	15
500H	M24 (1)	650	550	4-32	4-32x40	25
630H	M27 (1 1/8)	840	700	4-39	4-39x49	25
650H	M27 (1 1/8)	870	730	4-39	4-39x49	25
800H	M30 (1 1/4)	1050	900	6-40	6-40x50	30
1000H	M36 (1 1/2)	1300	1100	6-47	6-47x58	35
1150H	M42 (1 3/4)	1500	1300	6-50	6-50x65	37
1200H	M42 (1 3/4)	1550	1350	6-53	6-53x65	38
1250H	M42 (1 3/4)	1650	1450	6-53	6-53x65	35
1400H	M48 (2)	1800	1600	6-60	6-60x75	37
1450H	M48 (2)	1850	1650	6-60	6-60x75	37
1600H	M48 (2)	2000	1800	8-60	8-60x75	45
1700H	M56 (2 1/4)	2100	1900	8-66	8-66x80	40
2000H	M64 (2 1/2)	2200	2000	8-74	8-74x95	50
2250H	M64 (2 1/2)	2550	2300	10-74	10-74x95	52
2500H	M64 (2 1/2)	2950	2700	10-74	10-74x95	70
3000H	M64 (2 1/2)	3350	3150	12-74	12-74x95	100

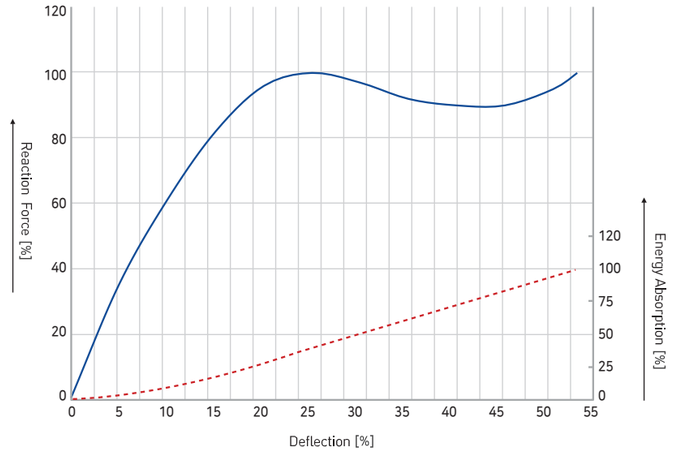
Compression Test



Deflection 0% | Deflection 15% | Deflection 30% | Deflection 52.5%

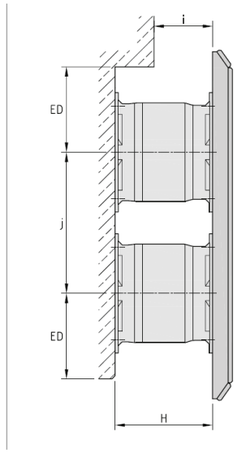
Performance of Intermediate Deflection

Deflection[%]	R·F[%]	E·A[%]
0	0	0
5	35	2
10	61	8
15	82	17
20	96	28
25	100	39
30	97	51
35	92	62
40	90	73
45	90	83
50	95	94
52.5	100	100



INSTALLATION CLEARANCES

Fender Size	H [mm]	i [mm]	j [mm]	ED[mm]
400H	400	240	600	480
500H	500	300	750	510
600H	600	360	900	570
800H	800	480	1,200	700
1000H	1,000	600	1,500	850
1150H	1,150	690	1,725	990
1250H	1,250	750	1,875	1,060
1450H	1,450	870	2,175	1,200
1600H	1,600	960	2,400	1,270
1700H	1,700	1,020	2,550	1,470
2000H	2,000	1,200	3,000	1,560
2250H	2,250	1,350	3,375	1,710
2500H	2,500	1,500	3,750	1,910
3000H	3,000	1,800	4,500	2,240



Spool Fender		G 1	G 1.2	G 1.4	G 1.6	G 1.8	G 2	G 2.2	G 2.4	G 2.6	G 2.8	G 3	G 3.1
300H	E•A(kJ)	4.2	4.5	5.1	5.6	6.1	6.5	6.8	7.2	7.7	8.2	8.7	8.8
	R•F(kN)	31.9	35.1	39.1	42.6	49.9	49.9	51.8	55.0	59.0	62.6	66.6	67.8
500H	E•A(kJ)	18.6	20.6	22.5	24.7	27.5	30.3	32.2	34.2	35.9	37.9	39.6	40.7
	R•F(kN)	85.7	94.7	104	114	127	140	149	158	166	174	182	187
650H	E•A(kJ)	41.7	47.0	52.2	57.6	63.0	68.4	72.4	76.5	80.5	84.5	86.6	89.1
	R•F(kN)	148	167	185	204	223	241	257	271	285	298	307	316
800H	E•A(kJ)	77.5	85.1	92.8	103	114	126	134	142	149	157	164	167
	R•F(kN)	221	243	265	293	327	360	383	405	426	448	469	479
1000H	E•A(kJ)	152	168	183	202	225	248	263	279	293	308	322	329
	R•F(kN)	346	381	416	460	511	563	598	633	667	700	733	749
1150H	E•A(kJ)	229	252	275	304	338	372	395	418	441	458	485	496
	R•F(kN)	459	504	550	607	676	745	791	836	881	916	969	991
1250H	E•A(kJ)	298	327	358	394	439	484	514	544	572	600	628	643
	R•F(kN)	541	595	650	717	799	880	934	989	1,041	1,092	1,143	1,168
1450H	E•A(kJ)	466	513	560	618	687	757	804	852	898	943	988	1,010
	R•F(kN)	729	802	874	965	1,074	1,182	1,256	1,331	1,403	1,474	1,544	1,578
1600H	E•A(kJ)	621	685	748	826	919	1,012	1,073	1,133	1,193	1,253	1,313	1,343
	R•F(kN)	887	978	1,069	1,180	1,313	1,446	1,532	1,618	1,704	1,791	1,876	1,919
1700H	E•A(kJ)	754	828	901	995	1,109	1,224	1,297	1,371	1,444	1,517	1,590	1,627
	R•F(kN)	1,006	1,104	1,201	1,327	1,479	1,632	1,730	1,828	1,925	2,023	2,121	2,169
2000H	E•A(kJ)	1,221	1,345	1,469	1,631	1,804	1,986	2,107	2,228	2,346	2,464	2,580	2,639
	R•F(kN)	1,388	1,528	1,669	1,853	2,050	2,257	2,395	2,531	2,666	2,800	2,932	2,999
2250H	E•A(kJ)	1,741	1,916	2,090	2,307	2,566	2,826	3,000	3,232	3,344	3,511	3,678	3,758
	R•F(kN)	1,759	1,935	2,111	2,330	2,592	2,854	3,030	3,264	3,378	3,546	3,715	3,796
2500H	E•A(kJ)	2,822	3,121	3,421	3,719	4,018	4,317	4,577	4,835	5,095	5,354	5,613	6,174
	R•F(kN)	2,565	2,837	3,110	3,381	3,653	3,924	4,160	4,396	4,632	4,867	5,103	5,613
3000H	E•A(kJ)	4,121	4,535	4,950	5,471	6,087	6,703	7,117	7,532	7,934	8,325	8,716	8,906
	R•F(kN)	3,122	3,436	3,750	4,145	4,611	5,078	5,392	5,706	6,011	6,307	6,603	6,747

ANGLE FACTOR

Angle	Factor
0	1.000
3	1.976
5	0.951
8	0.911
10	0.885
15	0.807
20	0.655

VELOCITY FACTOR

Time(S)	Factor
1	1.007
2	1.004
3	1.002
4	1.001
5	1.000
6	1.000
8	1.000
≥10	1.000

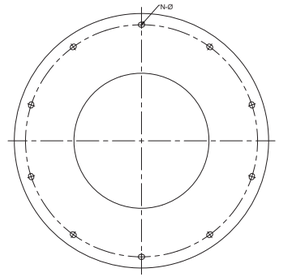
TEMPERATURE FACTOR

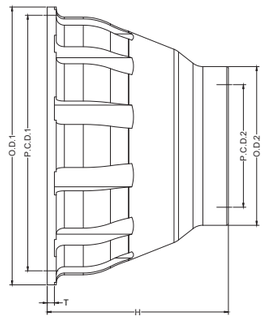
Temperature	Factor
-30	1.205
-20	1.165
-10	1.128
0	1.092
10	1.054
23	1.000
30	0.975
40	0.945
50	0.935

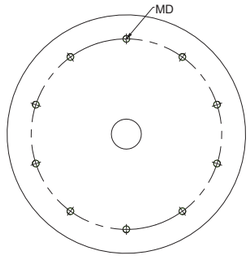


Cone Fender

Classified as a system fender, identical to the spool fender, it is applied, with excellent compression and recovery, when the fender installation space is narrow or the shock-absorbing range is wide. It is high-performance marine fender with superior durability.







[Unit:mm]

Dimension / Height	MD	O.D.1	P.C.D.1	O.D.2	P.C.D.2	T	N-Ø
300H	M20 (3/4)	500	440	262	210	18	4-26
350H	M20 (3/4)	575	510	306	245	20	4-26
400H	M20 (3/4)	650	585	350	280	20	4-26
500H	M24 (1)	820	730	436	350	22	4-30
600H	M24 (1)	900	810	525	420	23	4-30
700H	M30 (1 1/4)	1120	1020	615	490	26	4-38
800H	M30 (1 1/4)	1280	1165	700	560	31	6-38
900H	M36 (1 1/2)	1450	1313	785	630	36	6-44
1000H	M42 (1 3/4)	1600	1460	875	700	38	6-50
1100H	M42 (1 3/4)	1760	1605	963	770	40	6-50
1150H	M42 (1 3/4)	1850	1550	1000	805	41	6-50
1200H	M42 (1 3/4)	1920	1750	1050	840	46	8-50
1300H	M42 (1 3/4)	2080	1900	1140	910	53	8-50
1400H	M42 (1 3/4)	2240	2040	1225	980	54	8-50
1600H	M48 (2)	2560	2330	1400	1120	64	8-60
1800H	M56 (2 1/4)	2880	2620	1575	1260	90	10-70
2000H	M56 (2 1/4)	3200	2920	1700	1400	100	10-70

Compression Test


Deflection 0%

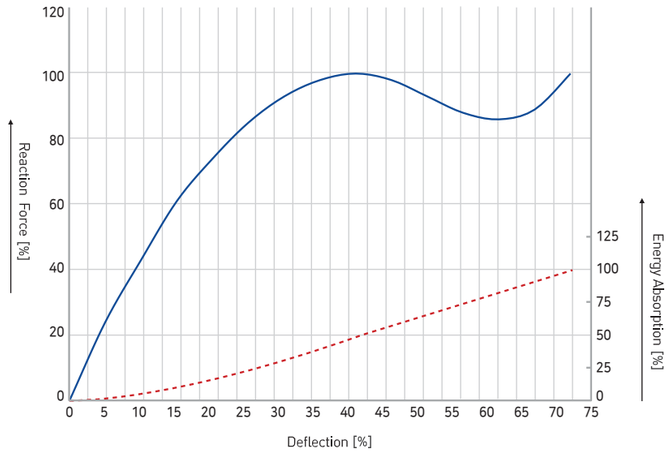

Deflection 30%


Deflection 50%


Deflection 70%

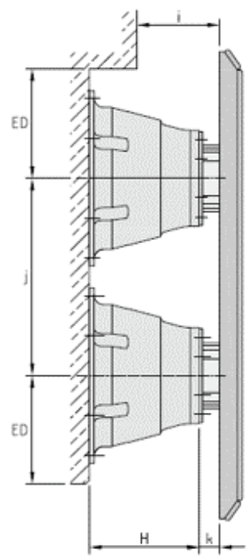
Performance of Intermediate Deflection

Deflection[%]	R·F[%]	E·A[%]
0	0	0
5	24	1
10	43	4
15	61	9
20	74	15
25	85	23
30	93	31
35	98	40
40	100	49
45	98	58
50	93	67
55	88	75
60	86	83
65	89	91
70	100	100



INSTALLATION CLEARANCES

Fender Size	H [mm]	i [mm]	j [mm]	k [mm]	ED [mm]
300H	300	225	540	45	≥ 300
350H	350	263	630	53	≥ 350
400H	400	300	720	60	≥ 400
500H	500	375	900	75	≥ 500
600H	600	450	1,080	90	≥ 600
700H	700	525	1,260	105	≥ 700
800H	800	600	1,440	120	≥ 800
900H	900	675	1,620	135	≥ 900
1000H	1,000	750	1,800	150	≥ 1,000
1100H	1,100	825	1,900	165	≥ 1,100
1150H	1,150	863	2,070	175	≥ 1,150
1200H	1,200	900	2,160	180	≥ 1,200
1300H	1,300	975	2,340	195	≥ 1,300
1400H	1,400	1,050	2,520	210	≥ 1,400
1600H	1,600	1,200	2,880	240	≥ 1,600
1800H	1,800	1,350	3,240	270	≥ 1,800
2000H	2,000	1,500	3,600	300	≥ 2,000



The fender system design should allow for:
increased diameter of Fenders during compression [j] / sufficient clearance of front panel [i]
minimum edge distance for anchoring and to other protrusions [ED] / angular compression spool piece [k]

Cone Fender		G 0.9	G 1.0	G 1.2	G 1.4	G 1.6	G 1.8	G 2	G 2.2	G 2.4	G 2.6	G 2.8	G 3.0	G 3.1
300H	E•A(kJ)	8.8	9.1	9.9	10.9	11.7	12.5	13.3	14.2	15.0	15.8	16.6	17.6	17.9
	R•F(kN)	55	57.0	62.0	68.0	73.0	78.0	83.0	89.0	94.0	99.0	104	110	112
350H	E•A(kJ)	14.8	15.7	16.7	17.6	18.4	19.3	20.0	21.1	22.1	23.2	24.3	25.4	27.9
	R•F(kN)	82	87	93	98	102	107	111	117	123	129	135	141	155
400H	E•A(kJ)	20.6	21.4	23.3	25.2	27.1	29.0	31.1	33.0	34.9	37.0	38.9	40.7	41.8
	R•F(kN)	98	102	111	120	129	138	148	157	166	176	185	194	199
500H	E•A(kJ)	40.5	42.1	45.8	49.8	53.5	57.5	61.2	65.2	68.9	72.9	76.6	80.6	82.4
	R•F(kN)	153	159	173	188	202	217	231	246	260	275	289	304	311
600H	E•A(kJ)	68.2	71.0	77.2	83.7	90.2	96.7	103	110	116	123	129	136	139
	R•F(kN)	220	229	249	270	291	312	333	354	375	396	417	438	448
700H	E•A(kJ)	110	115	125	135	146	156	167	177	188	198	208	219	224
	R•F(kN)	300	312	340	368	397	425	454	482	511	539	568	596	610
800H	E•A(kJ)	167	173	189	204	220	236	252	268	283	299	315	331	339
	R•F(kN)	392	407	444	481	518	555	593	630	667	704	741	779	797
900H	E•A(kJ)	233	242	264	286	308	330	353	375	397	419	441	463	474
	R•F(kN)	496	515	562	609	656	703	750	797	844	891	939	986	1,009
1000H	E•A(kJ)	318	331	361	391	421	451	482	512	542	573	603	633	648
	R•F(kN)	612	636	694	752	810	868	926	984	1,043	1,101	1,159	1,217	1,246
1100H	E•A(kJ)	426	441	483	523	564	604	644	685	726	766	806	847	867
	R•F(kN)	741	767	840	910	980	1,050	1,120	1,191	1,262	1,332	1,402	1,473	1,508
1150H	E•A(kJ)	486	505	551	597	643	689	675	781	827	874	920	966	989
	R•F(kN)	810	841	918	995	1,072	1,149	1,125	1,302	1,379	1,456	1,533	1,610	1,648
1200H	E•A(kJ)	551	573	625	677	729	782	834	886	939	991	1,044	1,096	1,122
	R•F(kN)	882	916	1,000	1,083	1,167	1,251	1,335	1,418	1,502	1,586	1,670	1,753	1,795
1300H	E•A(kJ)	700	728	794	860	927	993	1,060	1,126	1,193	1,259	1,326	1,393	1,426
	R•F(kN)	1,030	1,070	1,167	1,265	1,363	1,461	1,559	1,656	1,754	1,852	1,950	2,048	2,097
1400H	E•A(kJ)	889	923	1,007	1,092	1,176	1,260	1,345	1,429	1,513	1,598	1,682	1,766	1,809
	R•F(kN)	1,201	1,247	1,361	1,475	1,589	1,703	1,817	1,931	2,045	2,159	2,273	2,387	2,444
1600H	E•A(kJ)	1,312	1,363	1,490	1,615	1,739	1,864	1,989	2,113	2,237	2,412	2,487	2,611	2,670
	R•F(kN)	1,567	1,628	1,780	1,929	2,078	2,227	2,376	2,524	2,673	2,882	2,971	3,119	3,190
1800H	E•A(kJ)	1,865	1,937	2,120	2,298	2,475	2,654	2,832	3,010	3,188	3,366	3,545	3,722	3,807
	R•F(kN)	1,984	2,061	2,255	2,445	2,633	2,823	3,013	3,202	3,392	3,581	3,771	3,960	4,050
2000H	E•A(kJ)	2,501	2,646	2,895	3,139	3,382	3,624	3,868	4,111	4,354	4,598	4,841	5,085	5,200
	R•F(kN)	2,405	2,544	2,784	3,018	3,252	3,485	3,719	3,953	4,187	4,421	4,655	4,889	5,000
2250H	E•A(kJ)	3,535	3,747	3,947	4,147	4,390	4,677	4,964	5,278	5,591	5,949	6,351	6,753	7,429
	R•F(kN)	2,970	3,149	3,317	3,485	3,689	3,930	4,171	4,435	4,699	4,999	5,337	5,675	6,243
2500H	E•A(kJ)	4,297	4,555	4,798	5,041	5,337	5,685	6,033	6,415	6,796	7,231	7,720	8,208	9,030
	R•F(kN)	3,228	3,422	3,605	3,788	4,010	4,271	4,533	4,819	5,106	5,433	5,800	6,167	6,785

ANGLE FACTOR

Angle	Factor
0	1.000
3	1.000
5	1.000
8	0.991
10	0.982
15	0.935
20	0.876

VELOCITY FACTOR

Time(S)	Factor
1	1.048
2	1.025
3	1.014
4	1.006
5	1.000
6	1.000
8	1.000
≥10	1.000

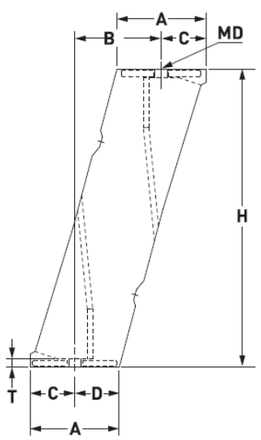
TEMPERATURE FACTOR

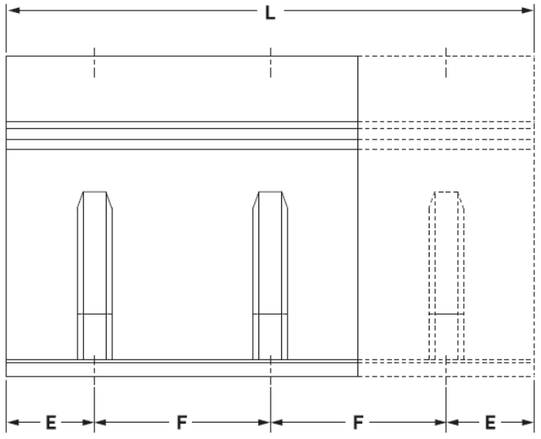
Temperature	Factor
-30	1.205
-20	1.165
-10	1.128
0	1.092
10	1.054
23	1.000
30	0.975
40	0.945
50	0.935



Super TR Fender

Super TR is an improved model from previous TR Fender.
DRF developed it since highly efficient fender was in need of developing. And, this fender can also be used in a vessel upgrade when there is lack of space for setting up.



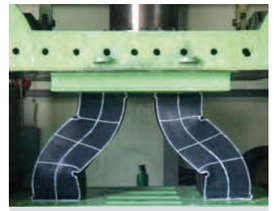


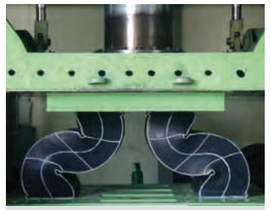
[Unit:mm]

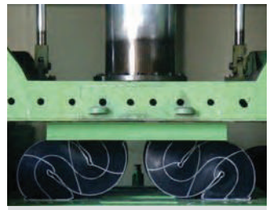
Dimension / Height	MD	T	A	B	C	D	E	F
250H	M20(3/4)	17	80	78	40	40	150	300
300H	M20(3/4)	17	94	93	47	47	150	300
400H	M24(1)	17	125	124	63	62	250	500
500H	M30(1 1/4)	20	158	142	87	71	250	500
600H	M30(1 1/4)	20	188	199	87	101	250	500
750H	M30(1 1/2)	26	235	230	118	117	250	500
800H	M30(1 1/2)	26	250	240	129	121	250	500
1000H	M42(1 3/4)	31	322	310	162	160	250	500
1250H	M48(2)	36	401	388	202	199	250	500
1450H	M48(2)	41	454	445	228	226	250	500
1600H	M56(2 1/4)	50	507	480	261	246	250	500

Compression Test


Deflection 0%

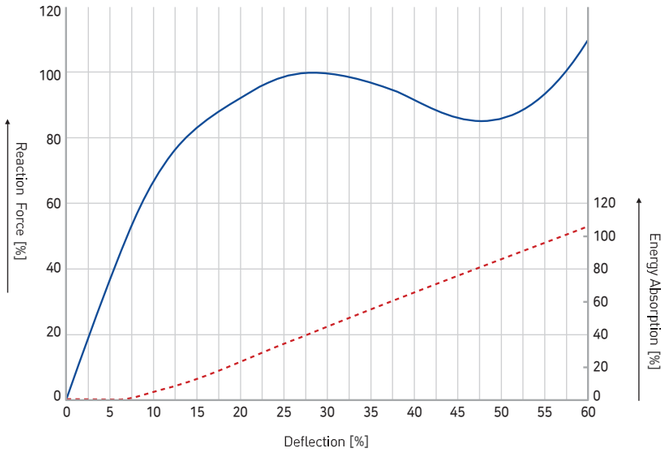

Deflection 15%


Deflection 30%


Deflection 57.5%

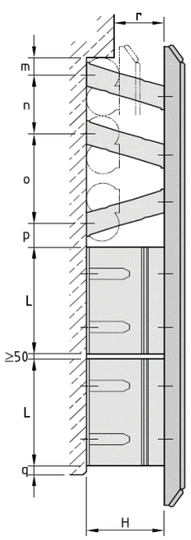
Performance of Intermediate Deflection

Deflection[%]	R·F[%]	E·A[%]
0	0	0
5	32	2
10	60	7
15	79	14
20	92	24
25	99	34
30	100	45
35	97	56
40	92	66
45	86	76
50	85	86
55	94	95
57.5	100	100
60	110	106



INSTALLATION CLEARANCES

Fender Size	L [mm]	H [mm]	m [mm]	n [mm]	o [mm]	p [mm]	q [mm]	r [mm]
250	1,000	250	60	195	300	80	30	163
300	1,000	300	72	234	360	96	36	195
400	1,000	400	96	312	480	128	48	260
500	1,000	500	120	390	600	160	60	325
550	1,000	550	132	429	660	176	66	358
600	1,000	600	144	468	720	192	72	390
700	1,000	700	168	546	840	224	84	455
750	1,000	750	180	585	900	240	90	488
800	1,000	800	192	624	960	256	96	520
900	1,000	900	216	702	1,080	288	108	585
1000	1,000	1,000	240	780	1,200	320	120	650
1200	1,000	1,200	288	936	1,440	384	144	780
1250	1,000	1,250	300	975	1,500	400	150	813
1400	1,000	1,400	336	1,092	1,680	448	168	910
1450	1,000	1,450	348	1,131	1,740	464	174	943
1600	1,000	1,600	384	1,248	1,920	512	192	1,040
2000	1,000	2,000	425	1,500	2,100	575	250	1,200



Super TR		G 1.0	G 1.2	G 1.4	G 1.6	G 1.8	G 2.0	G 2.2	G 2.4	G 2.6	G 2.8	G 3.0	G 3.1
250H	E•A(kJ)	17	19	20	21	23	24	26	27	29	30	31	34
	R•F(kN)	164	178	192	206	220	234	248	262	276	290	296	326
300H	E•A(kJ)	25	27	29	30	32	33	35	36	38	41	43	47
	R•F(kN)	212	224	238	250	264	276	290	302	316	344	358	392
400H	E•A(kJ)	45	49	52	55	58	61	64	68	71	74	77	85
	R•F(kN)	252	270	288	306	324	340	358	376	394	410	428	470
500H	E•A(kJ)	72	77	82	87	93	98	103	109	114	119	124	135
	R•F(kN)	314	336	358	380	404	426	448	472	494	516	540	588
550H	E•A(kJ)	87	93	99	105	111	117	123	130	136	142	148	162
	R•F(kN)	346	370	396	420	444	468	492	518	542	566	590	646
600H	E•A(kJ)	105	113	120	128	136	143	151	158	166	173	180	197
	R•F(kN)	376	404	430	458	484	510	538	564	592	618	644	704
700H	E•A(kJ)	140	150	161	170	180	191	200	211	221	231	241	264
	R•F(kN)	438	470	502	532	564	596	626	658	690	722	752	826
750H	E•A(kJ)	162	173	184	195	206	218	228	239	251	262	273	301
	R•F(kN)	476	508	540	574	606	640	672	704	738	770	804	886
800H	E•A(kJ)	186	198	212	224	238	249	262	275	288	302	314	348
	R•F(kN)	502	536	572	606	644	674	708	744	778	816	848	940
900H	E•A(kJ)	234	250	266	282	298	314	330	346	362	378	394	434
	R•F(kN)	570	610	648	688	726	766	804	844	884	922	962	1,058
1000H	E•A(kJ)	292	311	331	351	371	391	411	431	451	471	491	540
	R•F(kN)	634	676	720	764	806	850	894	938	980	1,024	1,068	1,174
1200H	E•A(kJ)	408	433	458	482	507	531	564	596	629	661	693	762
	R•F(kN)	756	802	848	892	938	984	1,044	1,104	1,164	1,224	1,284	1,412
1250H	E•A(kJ)	431	458	486	511	537	555	589	622	656	689	756	809
	R•F(kN)	756	804	852	896	942	974	1,034	1,092	1,150	1,208	1,326	1,420
1400H	E•A(kJ)	572	600	634	678	701	736	781	824	869	913	957	1,053
	R•F(kN)	894	938	990	1,060	1,096	1,150	1,220	1,288	1,358	1,426	1,496	1,646
1450H	E•A(kJ)	685	717	748	780	811	846	876	909	939	970	1,002	1,106
	R•F(kN)	1,022	1,070	1,116	1,164	1,210	1,262	1,308	1,356	1,402	1,448	1,496	1,650
1600H	E•A(kJ)	747	792	838	882	928	972	1,015	1,063	1,106	1,151	1,196	1,218
	R•F(kN)	1,010	1,070	1,132	1,192	1,254	1,314	1,372	1,436	1,494	1,556	1,616	1,646
2000H	E•A(kJ)	1,170	1,228	1,294	1,360	1,424	1,490	1,556	1,620	1,686	1,752	1,818	1,850
	R•F(kN)	1,170	1,228	1,294	1,360	1,424	1,490	1,556	1,620	1,686	1,752	1,818	1,850

ANGLE FACTOR

Angle	Factor(A=1.2H)	Factor(A=1.5H)
0	1.000	1.000
3	0.995	0.986
5	0.989	0.968
8	0.975	0.934
10	0.960	0.897
15	0.900	0.801
20	0.830	0.705

VELOCITY FACTOR

Time(S)	Factor
1	1.017
2	1.009
3	1.004
4	1.002
5	1.001
6	1.000
8	1.000
≥10	1.000

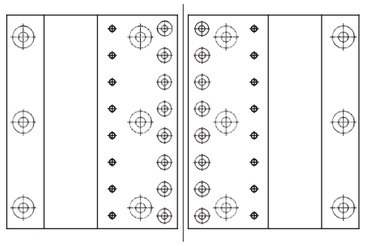
TEMPERATURE FACTOR

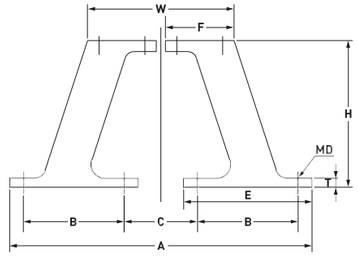
Temperature	Factor
-30	1.205
-20	1.165
-10	1.128
0	1.092
10	1.054
23	1.000
30	0.975
40	0.945
50	0.935

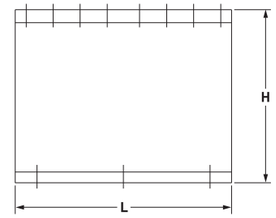


TR Fender

TR fender consists of two independent legs of solid rubber bolted to a wide steel-framed rubbing board protected with square pads of high quality plastic material.



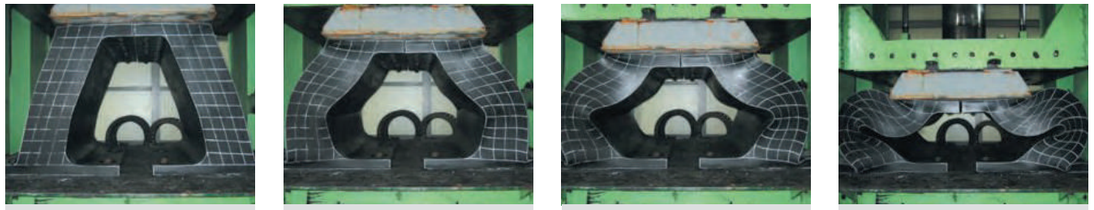




[Unit:mm]

Dimension / Height	MD	A	B	C	E	F	T	W	L
600H	M48(2)	1435	450	375	592.5	180	50	965	
800H	M64(2 1/2)	1850	585	480	765	240	60	800	
1000H	M64(2 1/2)	2180	685	610	890	300	65	1000	
1150H	M64(2 1/2)	2500	800	650	1005	345	65	1150	
1300H	M76(3)	2740	880	750	1115	395	65	1300	1000
1450H	M76(3)	3100	1000	800	1300	675	100	1450	~
1600H	M76(3)	3300	1100	800	1400	750	100	1600	3000
1800H	M76(3)	3670	1200	970	1500	830	110	1800	
2000H	M76(3)	4050	1300	1150	1600	880	120	2000	
2250H	M76(3)	4400	1400	1300	1700	945	130	2250	
2500H	M76(3)	4860	1500	1560	1800	1000	140	2500	

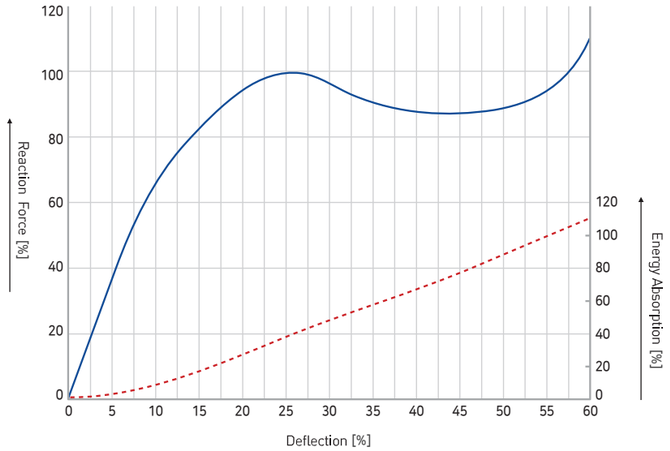
Compression Test



Deflection 0% | Deflection 15% | Deflection 30% | Deflection 57.5%

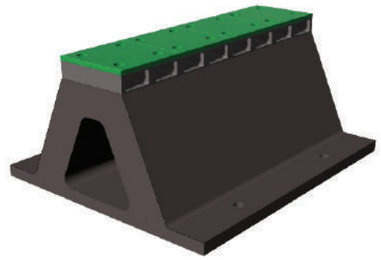
Performance of Intermediate Deflection

Deflection[%]	R·F[%]	E·A[%]
0	0	0
5	33	2
10	58	7
15	80	14
20	94	24
25	100	34
30	96	45
35	90	56
40	87	65
45	86	75
50	89	85
55	94	95
57.5	100	100
60	110	106



Performance Table

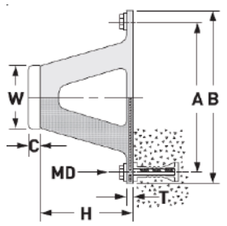
TR		G 1	G 1.2	G 1.4	G 1.6	G 1.8	G 2	G 2.2	G 2.4	G 2.6	G 2.9	G 3	G 3.1
600H	E•A(kJ)	81.5	87.1	93.1	98.7	105	110	117	122	128	140	145	151
	R•F(kN)	317	339	362	384	407	429	453	475	498	544	566	589
800H	E•A(kJ)	144	154	164	174	185	195	205	216	226	246	256	267
	R•F(kN)	422	453	482	513	544	573	604	634	664	724	754	784
1000H	E•A(kJ)	227	243	259	275	292	308	324	340	356	389	405	421
	R•F(kN)	528	566	604	641	679	716	754	792	829	905	943	981
1150H	E•A(kJ)	298	319	340	361	383	404	425	446	467	510	532	553
	R•F(kN)	608	651	694	737	781	824	868	911	954	1,041	1,085	1,128
1300H	E•A(kJ)	384	411	438	466	493	520	548	576	603	658	685	713
	R•F(kN)	687	735	784	833	883	931	981	1,030	1,078	1,177	1,226	1,275
1450H	E•A(kJ)	474	509	543	576	611	644	678	713	746	814	848	882
	R•F(kN)	765	820	876	930	985	1,039	1,094	1,149	1,204	1,313	1,368	1,423
1600H	E•A(kJ)	579	621	663	704	745	786	828	869	910	994	1,035	1,077
	R•F(kN)	845	905	966	1,026	1,086	1,146	1,207	1,267	1,327	1,448	1,509	1,570
1800H	E•A(kJ)	731	784	836	889	941	993	1,045	1,098	1,150	1,254	1,307	1,359
	R•F(kN)	950	1,018	1,086	1,154	1,222	1,290	1,357	1,426	1,493	1,629	1,697	1,765
2000H	E•A(kJ)	907	972	1,036	1,101	1,166	1,231	1,296	1,360	1,426	1,555	1,620	1,684
	R•F(kN)	1,056	1,131	1,207	1,282	1,357	1,433	1,509	1,584	1,660	1,810	1,886	1,961
2250H	E•A(kJ)	1,147	1,230	1,311	1,394	1,477	1,558	1,640	1,722	1,804	1,968	2,050	2,132
	R•F(kN)	1,188	1,273	1,357	1,443	1,529	1,613	1,698	1,782	1,868	2,037	2,122	2,207
2500H	E•A(kJ)	1,419	1,520	1,622	1,723	1,824	1,926	2,027	2,128	2,229	2,431	2,534	2,634
	R•F(kN)	1,320	1,414	1,509	1,603	1,697	1,791	1,886	1,980	2,073	2,262	2,357	2,450

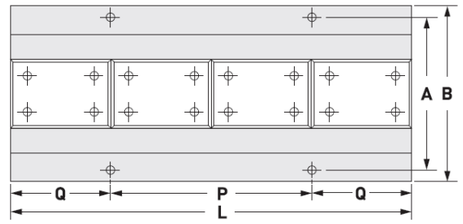


TRS Fender

TRS fender is an improved V type fender which has high energy absorption. R/E ratio is smaller than other Fenders. It is reinforced by an embedded steel plate across the entire bottom as well as the top of the fender. Resin board is attached on the top of the fender in order to protect the rubber body, to gain better performance and to decrease friction force.

TRS-A Type : This type has a synthetic resin board installed on its top.
TRS-B Type : This type has a synthetic resin board, which is not of one piece but divided into separate piece as many as required, installed on its top.
TRS-C Type : This type is the one which has a synthetic resin board installed on top of the I.S. joint (steel made) already fixed.

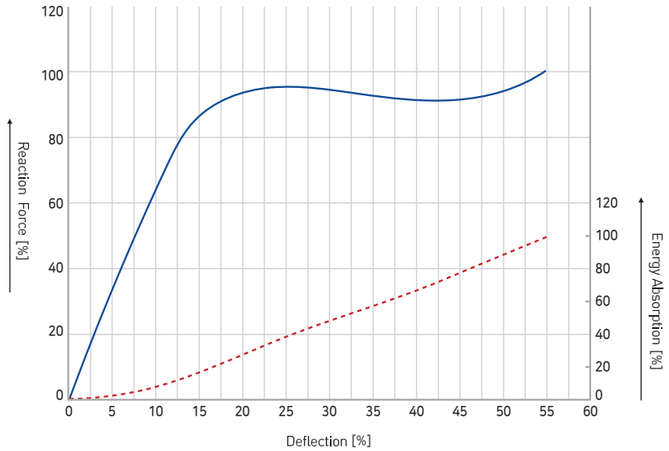




Dimension / Height	MD	A	B	P	Q	T	W
150	M18(3/4)	260	320	500	250	20	100
200	M24(1)	310	380	500	250	25	130
250	M24(1)	400	500	500	250	30	160
300	M30(1 1/4)	530	645	500	250	35	190
400	M36(1 1/2)	710	840	500	250	40	250
500	M36(1 3/4)	860	1000	500	250	45	320
600	M48(2)	1050	1210	500	250	50	380
800	M64(2 1/2)	1350	1550	500	250	60	500
1000	M64(2 1/2)	1600	1800	500	250	70	640

Performance of Intermediate Deflection

Deflection[%]	R·F[%]	E·A[%]
0	0	0
5	36	2
10	65	8
15	84	16
20	93	26
25	95	37
30	93	48
35	92	58
40	90	68
45	91	79
50	93	89
55	100	100



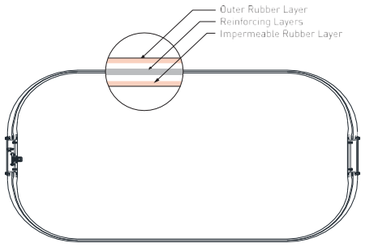
TRS		150H	200H	250H	300H	400H	500H	600H	800H	1000H
G1	E•A(kJ)	6.9	12.7	19.6	28.4	50.0	78.4	113	201	314
	R•F(kN)	108	143	179	215	286	358	429	572	715
G2	E•A(kJ)	7.8	14.7	23.5	33.3	59.8	94.1	135	241	376
	R•F(kN)	129	172	215	257	343	429	515	686	859

Pneumatic Fender

The Pneumatic Fender, which is easy and light to handle and capable of relocation installation at the right place, is a cost-effective alternative, adequate for long-term use. Based on excellent quality, our company manufactures and provides various types of product used in shipyards, warships, and vessels.



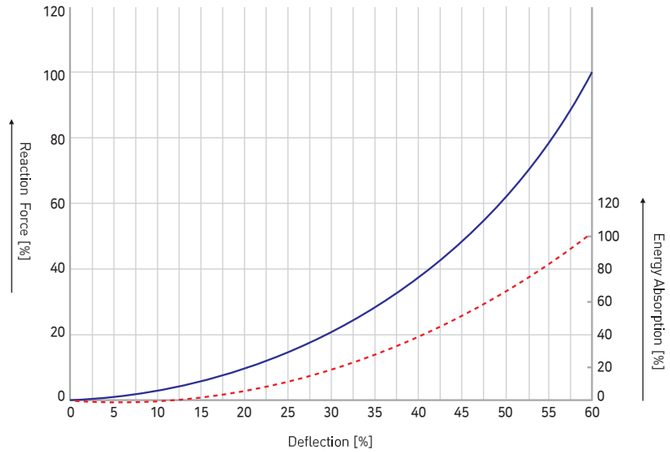
According to KSD 64 10 10 .
If other specifications are requested, special orders are possible.



OUTER AND INNER RUBBER MATERIAL PROPERTIES REQUIREMENTS

Test item	Test method	Required value	
		Outher rubber	Inner rubber
Before Ageing	-	Original	Original
Tensile strength	BS ISO 37	18 MPa or more	10 MPa or more
Elongation	BS ISO 37	400% or more	400% or more
Hardness	ISO 48	60±10 (Durometer hardness Test Type A)	50±10 (Durometer hardness Test Type A)
After ageing	ISO 188	Air oven ageing 70℃±1℃, 96h	Air oven ageing 70℃±1℃, 96h
Tensile strength	BS ISO 37	Not less than 80% of the original property	Not less than 80% of the original property
Elongation	BS ISO 37	Not less than 80% of the original property	Not less than 80% of the original property
Hardness	ISO 48	Not to exceed the original property by more than 8	Not to exceed the original property by more than 8
Tear	BS ISO 34-1	400 N/㎝ or more	No requirement
Compression set	ISO 815	30%(70±1℃, for 22h) or less	No requirement
Static ozone resistance	ISO 1431-1	No cracks after elongation by 20% and exposure to 50 pphm at 40℃ for 96h	No requirement

Performance Curve



Performance of Intermediate Deflection

Deflection[%]	R·F[%]	E·A[%]
0	0	0
5	3	0
10	6	1
15	9	4
20	13	7
25	18	11
30	23	16
35	29	24
40	36	32
45	45	44
50	58	58
55	75	76
60	100	100

Performance Data

DIAMETER x LENGTH (mm x mm)	50 kPa			80 kPa		
	PERFORMANCE DATA			PERFORMANCE DATA		
	GEA (kNmm)	RF AT GEA (kN)	HULL PRESSURE AT GEA (Kn/㎡)	GEA (kNmm)	RF AT GEA (kN)	HULL PRESSURE AT GEA (Kn/㎡)
500x1000	6	64	132	8	85	174
1000x1500	32	182	122	45	239	160
1000x2000	45	257	132	63	338	174
1200x2000	63	297	126	88	390	166
1350x2500	102	427	130	142	561	170
1500x3000	153	579	132	214	761	174
1700x3000	191	639	128	267	840	168
2000x3500	308	875	128	430	1150	168
2500x4000	663	1381	137	925	1815	180
2500x5500	943	2019	148	1317	2653	195
3300x4500	1175	1884	130	1640	2476	171
3300x6500	1814	3015	146	2532	3961	191
3300x10600	3067	5257	158	4281	6907	208
4500x9000	4752	5747	146	6633	7551	192
4500x12000	7984	7984	154	9037	10490	202

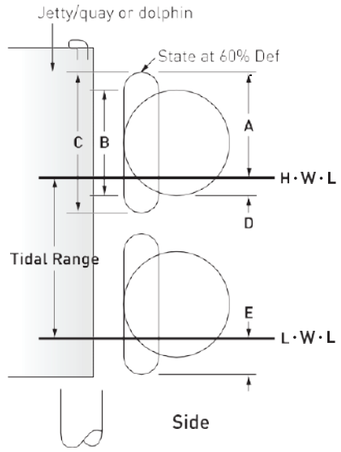
Weight

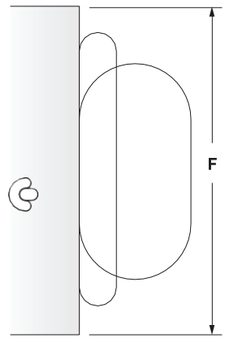
[Unit : mm, kg]

Diameter	300		500		600	700	800		1000		1200		1350	1500		1700	2000			2500		3000	3300				4500	
Length	500	600	800	1000	1000	1500	1200	1500	1500	2000	1800	2000	2500	2500	3000	3000	3000	3500	6000	4000	5500	5000	4500	6500	10600	13000	7000	9000
Fender Body	10	15	25	35	45	80	75	95	140	170	180	200	270	300	350	500	550	650	950	1100	1350	1700	1800	2250	3000	3700	4100	4950
Chain Net	-	-	-	-	-	-	100	110	170	200	210	220	260	400	440	510	880	920	1220	1510	1620	2620	2360	3120	4700	5800	5100	6200
Total	10	15	25	35	45	80	175	205	310	370	390	420	530	700	790	1010	1430	1570	2170	2610	2970	4320	4160	5370	7700	9500	9200	11150

Dimension of Jetty at Installation







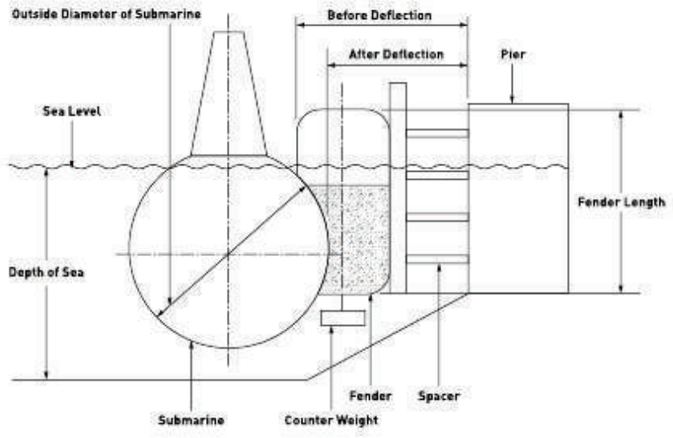
Installation Dimension

[Unit:mm]

Size	A	B	C	D	E	(F)
1000Ø × 1500L	975	950	1350	200	375	2000
1200Ø × 2000L	1200	1140	1620	220	430	2600
1500Ø × 2500L	1525	1420	2050	250	525	3250
2000Ø × 3500L	2050	1900	2700	300	650	4500
2500Ø × 4000L	2490	2380	3380	450	890	5200
3300Ø × 6500L	3380	3140	4460	500	1080	8500
4500Ø × 9000L	4710	4270	6180	800	1470	12000

Typical Fender Arrangement for Submarine





- Submarine Type Fender Performance Table (Initial Pressure : 50kPa)

Size	Ø1700 × 7200L		Ø2000 × 6000L		Ø2500 × 5500L		Ø3300 × 6500L		Ø3300 × 10600L		Ø4500 × 9000L	
DEF (%)	60	45	60	45	60	45	60	45	60	45	60	45
Water Ratio (%)	0.0	65.0	0.0	65.0	0.0	65.0	0.0	60.0	0.0	54.5	0.0	65.0
R · F (kN)	1811	611	1764	599	2035	686	3165	1246	5165	1275	5998	2191
E · A (kJ)	561	134	647	155	927	223	1911	615	3116	589	4949	865

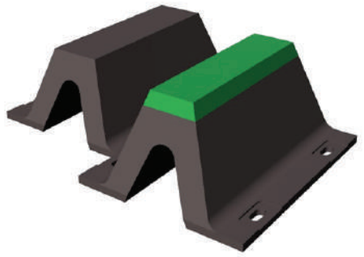
Note
1. R.F (Reacion Force) kN, E.A (Energy Absorption) kJ, Tolerence : ±5% or ±10%
2. Additionally, If other performance grades / tolerance are required for fender, we can manufacture various grades / tolerance to meet your requirement. Please inquire to DRF.
3. The above data can be changed due to the quality improvement of the manufacturer.

PNEUMATIC 50 FENDER PRESSURE REQUIREMENTS

Nominal size diameter × length (mm)	Internal pressure (kPa)		Minimum endurable pressure (kPa)		Safety-valve pressure setting (kPa)	Testing pressure at 0% deflection (kPa)
	at 0% Deflection	at 60% Deflection	at 0% Deflection	at 60% Deflection		
500 x 1000	50	132	300	462	-	200
600 x 1000	50	126	300	441	-	200
700 x 1500	50	135	300	473	-	200
1000 x 1500	50	122	300	427	-	200
1000 x 2000	50	132	300	462	-	200
1200 x 2000	50	126	300	441	-	200
1350 x 2500	50	130	300	455	-	200
1500 x 3000	50	132	300	462	-	200
1700 x 3000	50	128	300	448	-	200
2000 x 3500	50	128	300	448	-	200
2500 x 4000	50	137	350	480	175	250
2500 x 5500	50	148	350	518	175	250
3300 x 4500	50	130	350	455	175	250
3300 x 6500	50	146	350	511	175	250
3300 x 10600	50	158	350	553	175	250
4500 x 9000	50	146	350	511	175	250
4500 x 12000	50	154	350	539	175	250

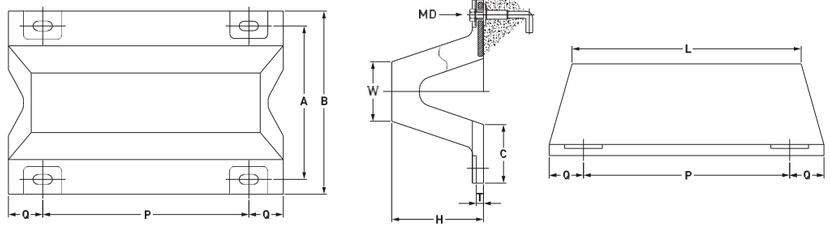
PNEUMATIC 80 FENDER PRESSURE REQUIREMENTS

Nominal size diameter × length (mm)	Internal pressure (kPa)		Minimum endurable pressure (kPa)		Safety-valve pressure setting (kPa)	Testing pressure at 0% deflection (kPa)
	at 0% Deflection	at 60% Deflection	at 0% Deflection	at 60% Deflection		
500 x 1000	80	174	480	609	-	250
600 x 1000	80	166	480	581	-	250
700 x 1500	80	177	480	620	-	250
1000 x 1500	80	160	480	560	-	250
1000 x 2000	80	174	480	609	-	250
1200 x 2000	80	166	480	581	-	250
1350 x 2500	80	170	480	595	-	250
1500 x 3000	80	174	480	609	-	250
1700 x 3000	80	168	480	588	-	250
2000 x 3500	80	168	480	588	-	250
2500 x 4000	80	180	560	630	230	300
2500 x 5500	80	195	560	683	230	300
3300 x 4500	80	171	560	599	230	300
3300 x 6500	80	191	560	669	230	300
3300 x 10600	80	208	560	728	230	300
4500 x 9000	80	192	560	672	230	300
4500 x 12000	80	202	560	707	230	300



AOV Fender

AOV fender is highlighted with its features of high energy absorption, low reaction force. Its arch shape serves well to reduce concentration of stress when the fender is compressed. They are in good quality with four rubber grade. They also have a wide selection of sizes and energy capacities, and equipped with steel mounting plates at the fender bottom and open legs make it easy install fenders at any berthing facility.

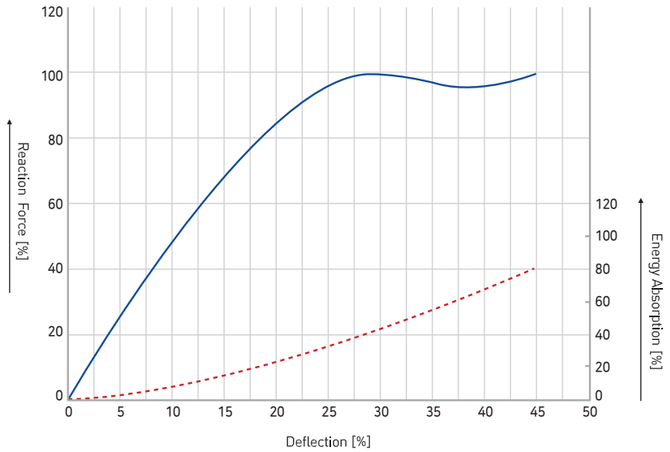


(Unit:mm)

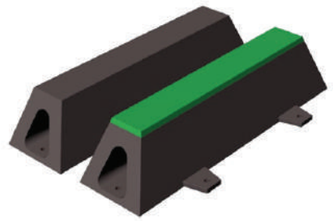
Dimension / Height	MD	A	B	C	T	W	1000L		1500L		2000L		2500L		3000L		3500L	
							P	Q	P	Q	P	Q	P	Q	P	Q	P	Q
150H	M22(7/8)	240	300	96	17	97.5	855	110	675×2	112.5	620×3	107.5	785×3	110	715×4	107.5	671×5	110
200H	M24(1)	320	400	128	17	130	860	120	680×2	120	620×3	120	785×3	122.5	715×4	120	672×5	120
250H	M27(1 1/8)	410	500	160	22	162.5	865	130	680×2	132.5	620×3	132.5	790×3	127.5	715×4	132.5	673×5	130
300H	M30(1 1/4)	490	600	192	23	195	870	140	685×2	140	625×3	137.5	790×3	140	715×4	145	674×5	140
400H	M36(1 1/2)	670	800	256	31	260	900	150	700×2	150	635×3	147.5	800×3	150	725×4	150	680×5	150
500H	M42(1 3/4)	840	1,000	320	34	325	930	160	715×2	160	645×3	157.5	810×3	160	730×4	165	686×5	160
600H	M48(2)	1,010	1,200	384	40	390	960	170	730×2	170	655×3	167.5	820×3	170	740×4	170	692×5	170
800H	M64(2 1/2)	1,340	1,600	501	45	525	1,040	180	770×2	180	680×3	180	845×3	182.5	760×4	180	-	-
1000H	M64(2 1/2)	1,680	2,000	640	49	650	1,100	200	800×2	200	700×3	200	865×3	202.5	775×4	200	-	-

Performance of Intermediate Deflection

Deflection[%]	R·F[%]	E·A[%]
0	0	0
5	26	2
10	50	8
15	69	17
20	85	28
25	96	42
30	100	56
35	97	71
40	96	85
45	100	100

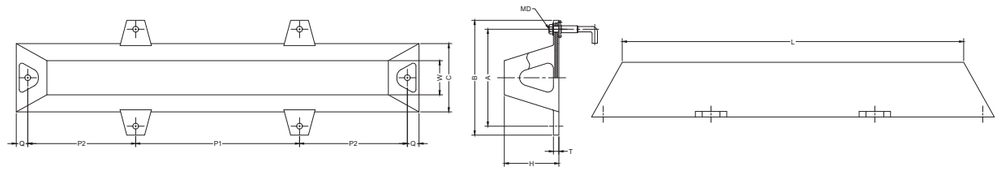


CV		150H	200H	250H	300H	400H	500H	600H	800H	1000H
G1	E•A(kJ)	4.3	8.7	13.8	19.5	35.2	55.2	79.4	141.2	220.7
	R•F(kN)	97.9	133.7	175.5	201.0	267.5	351.0	401.3	535.0	668.8
G2	E•A(kJ)	4.9	9.8	15.4	21.8	39.2	61.4	88.3	157.0	245.3
	R•F(kN)	107.8	147.2	193.1	221.2	294.3	386.2	441.5	588.6	735.8
G3	E•A(kJ)	5.5	11.0	17.2	24.3	43.7	68.3	98.2	174.5	272.7
	R•F(kN)	118.7	162.0	212.5	243.4	323.8	424.9	485.8	647.6	809.5



ACV Fender

ACV fender is the most versatile fender in the world. It is the first fender to be reinforced by an embedded steel plate across the entire bottom of the fender, and the first dynamically stable type fender against outer force in various directions. It is easy in handling and maintaining.

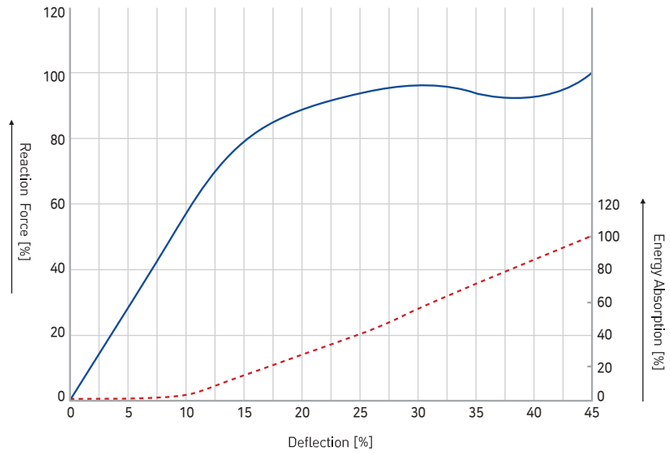


(Unit:mm)

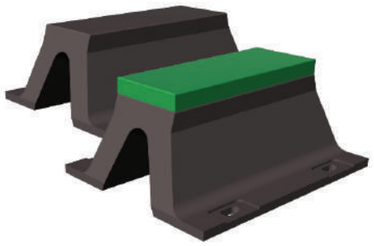
Dimension / Height	MD	A	B	C	T	W	1000L		1500L		2000L			2500L			3000L			3500L		
							P2	Q	P2	Q	P1	P2	Q	P1	P2	Q	P1	P2	Q	P1	P2	Q
200H	M24(1)	350	445	250	25	125	555	70	805	70	900	605	70	900	855	70	900×2	655	70	900×2	905	70
300H	M30(1 1/4)	530	645	375	35	188	600	75	850	75	1000	600	75	1000	850	75	1000×2	600	75	1000×2	850	75
400H	M36(1 1/2)	710	840	500	40	250	640	85	890	85	1200	540	85	1200	790	85	1200×2	440	85	1200×2	690	85
500H	M42(1 3/4)	860	1000	625	40	315	675	100	925	100	1000	675	100	1000	925	100	1000×2	675	100	1000×2	925	100
600H	48(2)	1050	1210	750	50	375	710	115	960	115	1020	700	115	1020	950	115	1020×2	690	115	1020×2	940	115
700H	48(2)	1180	1380	880	55	450	635	115	885	115	1000	635	115	1000	885	115	1000×2	635	115	-	-	-
800H	M64(2 1/2)	1350	1550	1000	60	500	670	130	920	130	1050	645	130	1050	895	130	1050×2	620	130	-	-	-
1000H	M64(2 1/2)	1600	1800	1250	65	625	700	150	950	150	1200	600	150	1200	850	150	1200×2	500	150	-	-	-

Performance of Intermediate Deflection

Deflection[%]	R·F[%]	E·A[%]
0	0	0
5	27	2
10	51	8
15	72	17
20	86	29
25	96	42
30	100	57
35	95	71
40	94	85
45	100	100



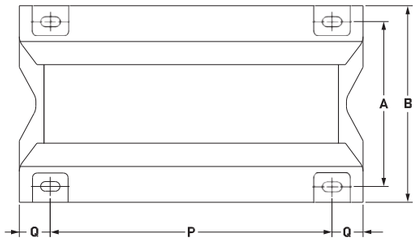
OV		200H	300H	400H	500H	600H	800H	1000H
G1	E•A(kJ)	6.9	15.7	29.4	45.1	63.7	117.6	176.4
	R•F(kN)	117.6	166.6	235.2	294.0	333.2	470.4	588.0
G2	E•A(kJ)	9.8	21.8	39.2	61.4	88.3	157.0	245.3
	R•F(kN)	147.2	221.2	294.3	386.2	441.5	588.6	735.8

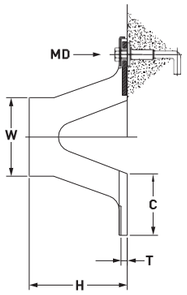


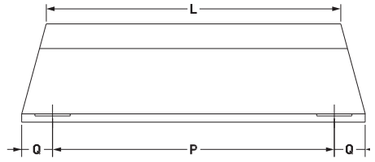
NV Fender

NV fender is newly designed with 15% increased energy absorption capacity when it is compared to other type of fenders of same size with same rubber grades. With the most suitable structures and shape design, compression capacity has been increased from 45% to 52.5%. It is easy to install and replace because it has simple structure and same Anchor bolts holes location as AOV. 17% of reaction force and 32% of surface reaction force have been decreased when NV is compared to existing arch type fenders with same energy absorption capacity.

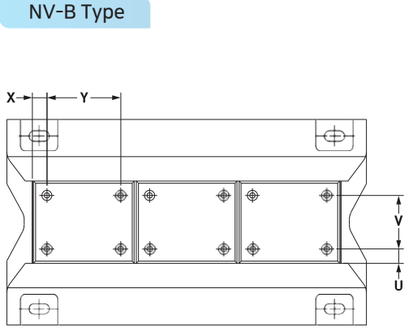
NV-A Type

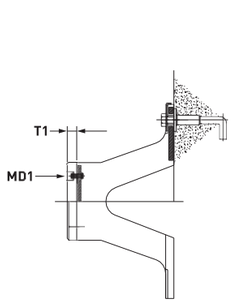


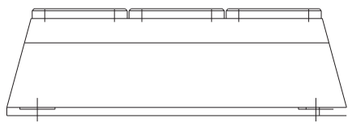




NV-B Type









(Unit:mm)

Dimension / Height	MD	A	B	C	T	W	NV-B Type						1000L		1500L		2000L		2500L		3000L	
							MD1	X	Y	U	V	T1	P	Q	P	Q	P	Q	P	Q	P	Q
150H	M22 (7/8)	240	300	93.5	17	120	M16	60~70	330~410	60	0	30	855	110	675×2	112.5	620×3	107.5	785×3	110	715×4	107.5
200H	M24 (1)	320	400	125	17	160	M16	60~70	330~410	80	0	30	860	120	680×2	120	620×3	120	785×3	122.5	715×4	120
250H	M27 (1 1/8)	410	500	156	22	200	M16	70~85	330~410	45	110	30	865	130	680×2	132.5	620×3	132.5	790×3	127.5	715×4	132.5
300H	M30 (1 1/4)	490	600	187.5	23	240	M16	70~85	330~410	50	140	40	870	140	685×2	140	625×3	137.5	790×3	140	715×4	145
400H	M36 (1 1/2)	670	800	250	28	320	M16	70~85	330~410	60	200	40	900	150	700×2	150	635×3	147.5	800×3	150	725×4	150
500H	M42 (1 3/4)	840	1000	312.5	32	370	M20	70~85	330~410	65	340	50	930	160	715×2	160	645×3	157.5	810×3	160	730×4	165
600H	M48 (2)	1010	1200	375	40	480	M20	70~85	330~410	65	350	50	960	170	730×2	170	655×3	167.5	820×3	170	740×4	170
800H	M64 (2 1/2)	1340	1600	500	45	640	M24	70~85	330~410	100	440	60	1040	180	770×2	180	680×3	180	845×3	182.5	760×4	180
1000H	M64 (2 1/2)	1680	2000	625	49	800	M24	70~85	330~410	100	600	60	1100	200	800×2	200	700×3	200	865×3	202.5	775×4	200

Compression Test


Deflection 0%

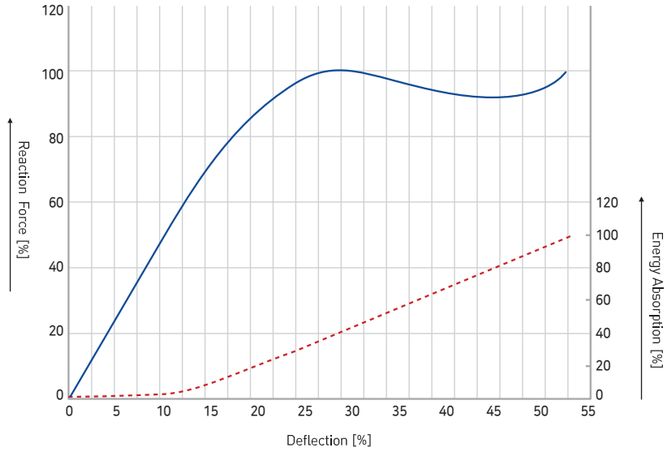

Deflection 15%


Deflection 30%


Deflection 52.5%

Performance of Intermediate Deflection

Deflection[%]	R·F[%]	E·A[%]
0	0	0
5	26	2
10	52	6
15	73	14
20	88	24
25	97	35
30	100	47
35	97	60
40	94	71
45	91	83
50	93	94
52.5	100	100



NV		150H	200H	250H	300H	400H	500H	600H	800H	1000H
G1	E•A(kJ)	5.9	10.8	17.6	25.5	45.0	70.6	100.3	181.0	284.0
	R•F(kN)	107.8	137.2	177.0	216.0	285.6	352.8	424.8	567.0	706.0
G2	E•A(kJ)	6.9	12.7	20.4	29.4	51.0	81.3	115.2	209.0	327.0
	R•F(kN)	117.6	166.6	206.1	245.0	327.0	411.6	493.0	646.8	813.4
G3	E•A(kJ)	8.8	16.7	26.6	38.3	67.0	105.8	152.0	271.7	425.6
	R•F(kN)	161.7	205.8	267.0	324.0	427.0	632.1	635.8	853.0	1,062.0

TEMPERATURE FACTOR

	DY
-30	1.550
-20	1.312
-10	1.156
0	1.079
10	1.032
23	1.000
30	0.977
40	0.946
50	0.917

VELOCITY FACTOR

Time(S)	DY
1	1.015
2	1.005
3	1.004
4	1.003
5	1.003
6	1.002
7	1
8	1
10	1

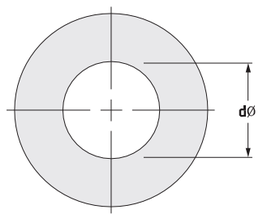
ANGLE FACTOR

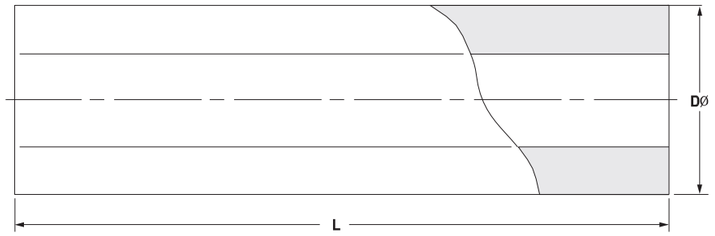
Angle	Angle	
	EA	RF
0	1	1
3	0.96	1
5	0.95	1
8	0.94	1
10	0.92	1
15	0.82	1
20	0.54	1



Cylindrical Fender

It is simply cylindrical construction, and is able to withstand large compressive deformation with low reaction load. It is also freely secured without the necessity of precise anchor bolt arrangements.



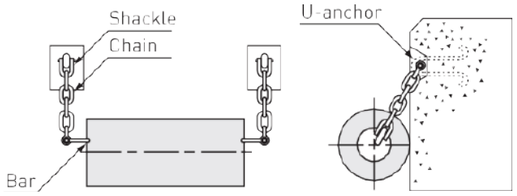


(Unit:mm)

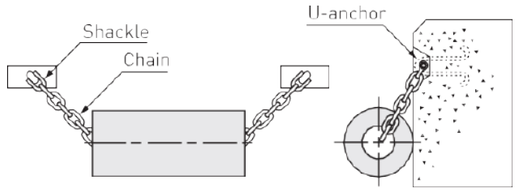
Size	Ø150 ×Ø75	Ø200 ×Ø100	Ø250 ×Ø125	Ø300 ×Ø150	Ø400 ×Ø200	Ø500 ×Ø250	Ø600 ×Ø300	Ø700 ×Ø350	Ø800 ×Ø400	Ø900 ×Ø450	Ø1000 ×Ø500	Ø1100 ×Ø550	Ø1200 ×Ø600	Ø1400 ×Ø700	Ø1500 ×Ø750	Ø1600 ×Ø800	Ø1800 ×Ø900	Ø2000 ×Ø1000
Ø D	150	200	250	300	400	500	600	700	800	900	1000	1100	1200	1400	1500	1600	1800	2000
Ø d	75	100	125	150	200	250	300	350	400	450	500	550	600	700	750	800	900	1000

Installation Example

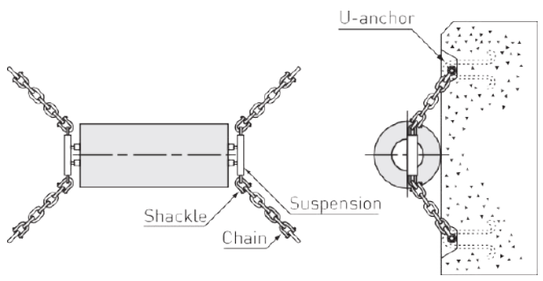
• Fitting chain and bar



• Fitting chain

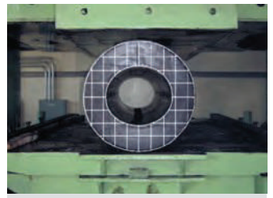


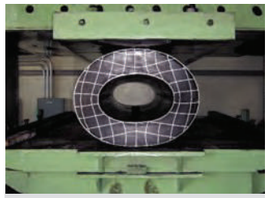
•Ladder

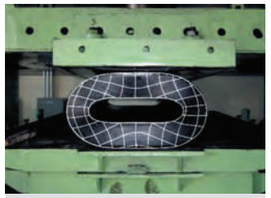


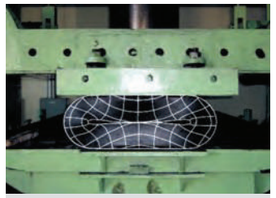


Compression Test


Deflection 0%

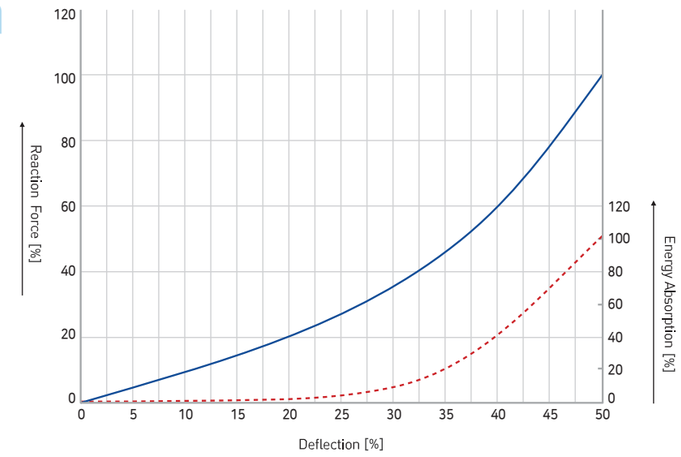

Deflection15%


Deflection 35%


Deflection 50%

Performance of Intermediate Deflection

Deflection[%]	R·F[%]	E·A[%]
0	0	0
5	5	1
10	12	3
15	19	7
20	27	12
25	35	20
30	45	30
35	56	42
40	69	58
45	83	77
50	100	100



Performance Table

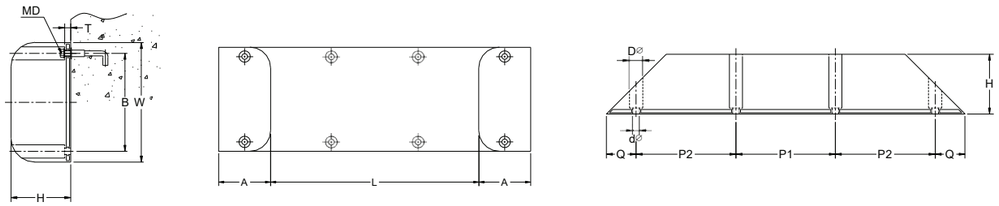
(1m Length)

Cylindrical		150	200	250	300	400	500	600	700	800	900	1000	1100	1200	1400	1500	1600	1800	2000
G1	E•A(kJ)	1.9	3.4	5.5	7.8	14.0	22.0	31.7	43.1	56.3	71.5	88.1	106.7	126.9	172.8	198.4	225.7	285.7	352.7
	R•F(kN)	66.7	89.0	111.3	133.5	178.1	222.6	267.2	311.7	356.3	400.8	445.4	489.9	534.5	623.5	668.1	712.6	801.7	890.8
G2	R•F(kN)	2.2	3.9	6.2	8.8	15.7	24.5	35.3	48.0	62.7	79.5	98.0	118.6	141.1	192.1	220.5	250.9	317.5	392.0
	E•A(kJ)	73.5	98.0	122.5	147.0	196.0	245.0	294.0	343.0	392.0	441.0	490.0	539.0	588.0	686.0	735.0	784.0	882.0	980.0



BP Fender

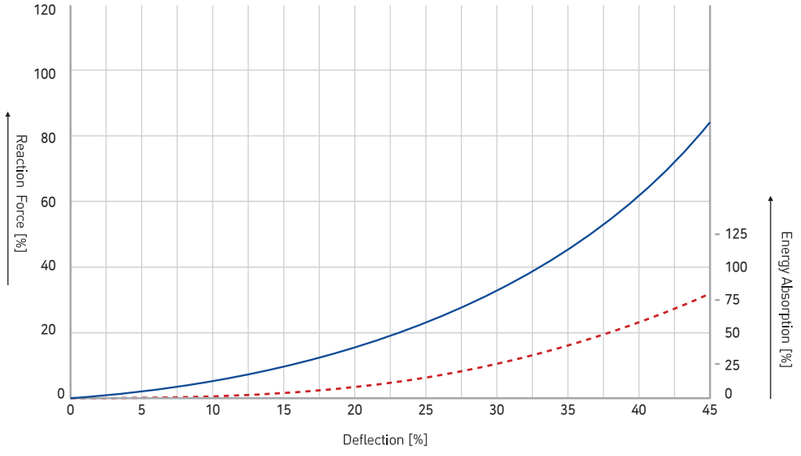
Bumper fender (BP) is suitable for protecting port facilities from lateral berthing load. It keeps the damage of fender at minimum due to an unbreakable shape, and has large contact area with vessel hull. It is suitable for gravity type quay.



(Unit:mm)

Dimension / Height	MD	A	B	DØ	dØ	Q	T	W	1000L P1	1000L P2	1500L P1	1500L P2	2000L P1	2000L P2	2500L P1	2500L P2	3000L P1	3000L P2
200H	M30 (1 1/4)	200	290	75	40	100	30	400	-	600	-	850	730	735	900	900	800X2	800
250H	M30 (1 1/4)	250	380	80	40	125	35	500	-	625	-	875	750	750	910	920	815X2	815
300H	M36 (1 1/2)	300	470	90	45	150	35	600	-	650	-	900	760	770	930	935	825X2	825
400H	M36 (1 1/2)	400	640	90	45	200	40	800	-	700	-	950	800	800	960	970	850X2	850
500H	M42 (1 3/4)	500	820	110	55	250	50	1000	-	750	-	1000	830	835	1000	1000	875X2	875
600H	M48 (2)	600	920	125	60	300	60	1200	-	800	-	1050	860	870	1030	1035	900X2	900
800H	M64 (2 1/2)	800	1240	145	75	400	80	1600	-	900	-	1150	930	935	1100	1100	950X2	950

Performance Curve



Performance Table

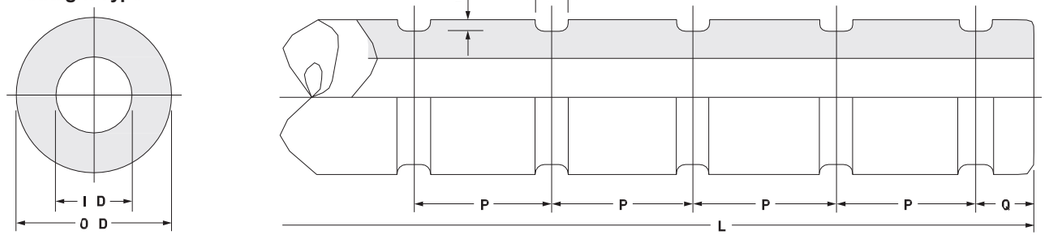
Size / Performance		150H	200H	250H	300H	400H	500H	600H	800H
DEF.45%	E•A(kJ)	6.3	11.1	17.3	24.9	44.3	68.6	100	177.4
	R•F(kN)	251	333	417	500	666	833	1000	1333



BC Fender

BC fender has no damage to the paint as well as ship hull due to low face pressure and it is adjustable to any variety of shape with the flexibility. It is easy to install the grooved body with simple chain, wire or rope.

Straight Type



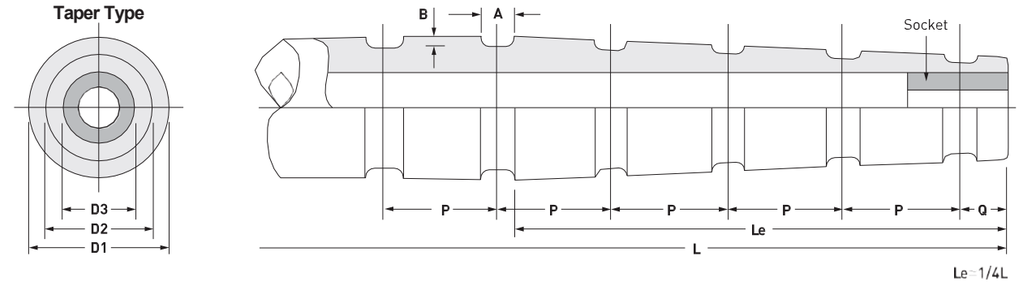
● Dimension (Use:For Side)

(Unit:mm)

Size	Ø100 ×Ø50	Ø150 ×Ø75	Ø200 ×Ø100	Ø250 ×Ø125	Ø300 ×Ø150	Ø350 ×Ø175	Ø400 ×Ø200	Ø500 ×Ø250	Ø600 ×Ø300	Ø700 ×Ø350
O·D	100	150	200	250	300	350	400	500	600	700
I·D	50	75	100	125	150	175	200	250	300	350
A	30	30	50	50	50	70	70	70	85	85
B	10	10	15	15	15	20	20	30	30	40
P	600~900	600~900	600~900	600~900	600~900	600~900	600~900	600~900	600~900	600~900
Q	100	100	150	150	200	200	200	250	250	300

- Maximun length available is 20m.

Taper Type



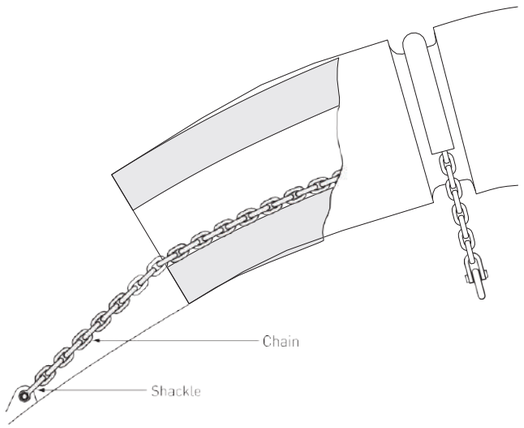
● Dimension (Use:For Bow and Stern)

(Unit:mm)

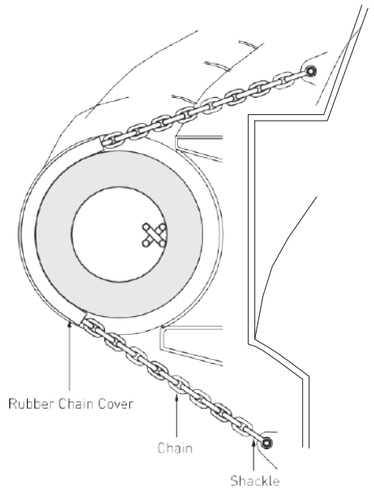
Size		Ø200 ×Ø100	Ø250 ×Ø125	Ø300 ×Ø150	Ø350 ×Ø175	Ø400 ×Ø200	Ø500 ×Ø250	Ø600 ×Ø300	Ø700 ×Ø350	Ø800 ×Ø400
D1		200	250	300	350	400	500	600	700	800
D2		150	190	225	260	300	375	450	525	600
D3		100	125	150	175	200	250	300	350	400
A		50	50	50	70	70	70	85	85	85
B		15	15	15	20	20	30	30	40	40
P		600~900	600~900	600~900	600~900	600~900	600~900	600~900	600~900	600~900
Q		150	150	200	200	200	250	250	300	300
Socket	O·D	-	-	-	-	202	252	303	354	404
	I·D	-	-	-	-	100	100	150	150	150
	Length	-	-	-	-	300	350	400	400	400

- Maximun length available is 20m.

Method of Installation-Inside



Method of Installation-Groove



● Size of Fitting

Size of Fender	Chain		Shackle	Turnbuckle
	For Inside	For Groove		
Less than Ø600	Ø16	Ø16	SC-16	Ø19
Including and over Ø600	Ø19	Ø19	SC-20	Ø22

SC : Straight shackle with screwed bolt - Fittings are to be galvanized



● Bending Radius(R) should be larger than 4 times of outer diameter

(Unit:mm)

O.D	Ø200	Ø300	Ø400	Ø500	Ø600	Ø800
Permissible Bending Radius(R)	800	1200	1600	2000	2400	3200



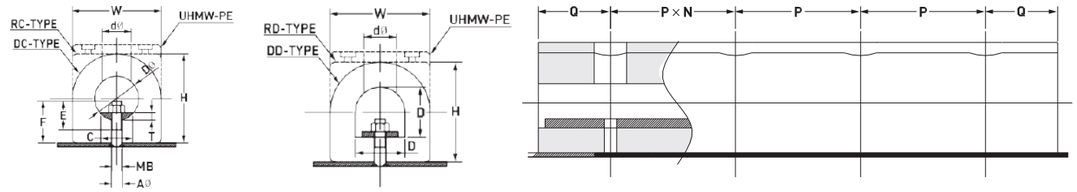




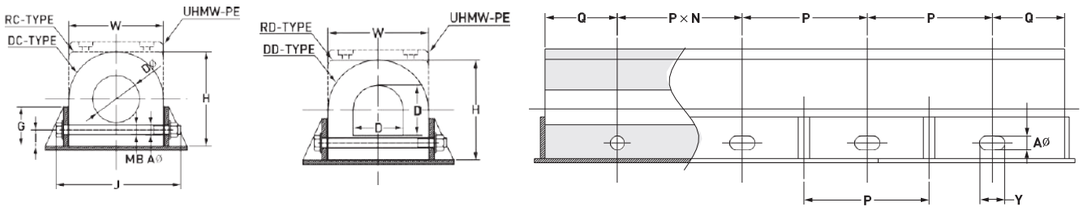
RC, RD, DC, DD Fender

The volumes of energy absorption and reaction force of this fender are greater than those of hollow cylindrical fender. The side for attachment is flat so that it can be secured more firmly than cylindrical fender.

● Vertical Fitting Bolt Method



● Cross Fitting Bolt Method



● Dimension

(Unit:mm)

Size		DC 150H×Ø75	DC 200H×Ø100	DC 250H×Ø125	DC 300H×Ø150	DC 400H×Ø200	DC 500H×Ø250
Fender	D Ø	75	100	125	150	200	250
	d Ø	55	65	70	70	90	100
	C	50	65	80	90	100	120
	G	60	75	100	125	150	175
	H	150	200	250	300	400	500
	I	22	30	43	52	70	88
	J	220	280	350	400	520	640
	T	16	19	22	25	28	32
	W	150	200	250	300	400	500
Frame	A Ø	20	25	28	28	36	42
	MB	M16(5/8)	M20(3/4)	M24(1)	M24(1)	M30(11/4)	M36(11/2)
	E	40	50	60	70	80	90
	F	80	95	112	132	180	210
	Y	32	38	42	48	54	62
	P	250~350					
	Q	150~200					

● Performance Table

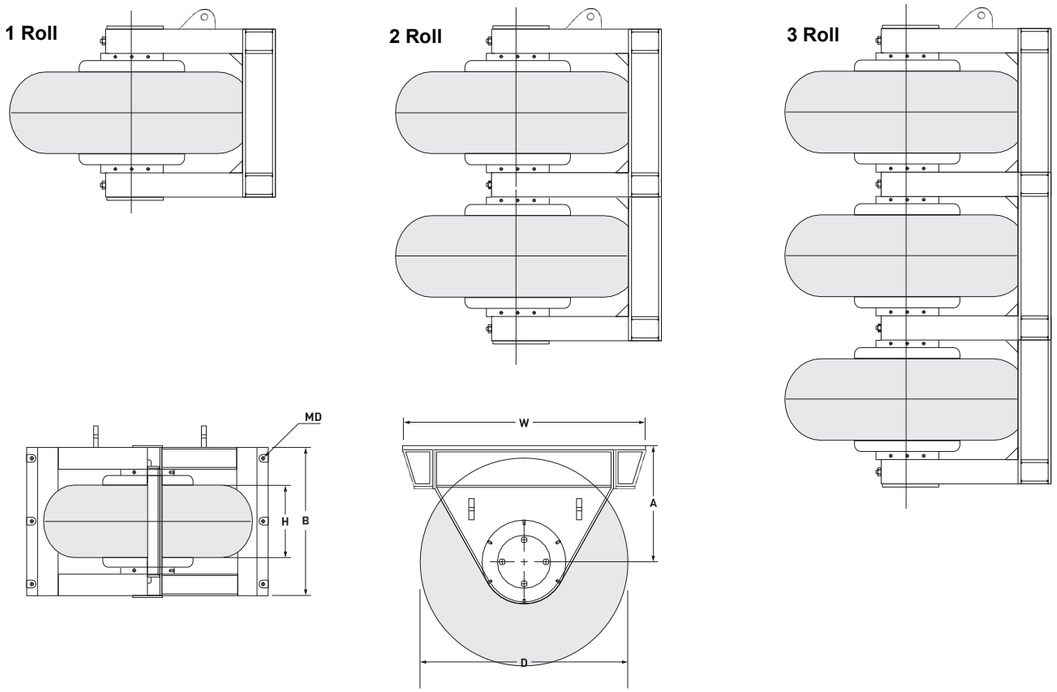
(1m Length)

Size / Performance		150H×Ø75	200H×Ø100	250H×Ø125	300H×Ø150	400H×Ø200	500H×Ø250
DD-Type	E·A(kJ)	3.5	5.7	8.9	12.9	23.0	35.9
	R·F(kN)	115.0	153.0	191.0	230.0	306.0	383.0
DC-Type	E·A(kJ)	4.2	7.5	11.7	16.9	29.4	46.0
	R·F(kN)	235.0	314.0	392.0	471.0	628.0	785.0
RD-Type	E·A(kJ)	6.4	11.3	17.6	25.5	45.2	70.7
	R·F(kN)	206.0	275.0	343.0	412.0	589.0	736.0
RC-Type	E·A(kJ)	6.4	11.3	17.7	25.5	45.1	70.5
	R·F(kN)	259.0	345.0	431.0	518.0	690.0	863.0



Roller Fender

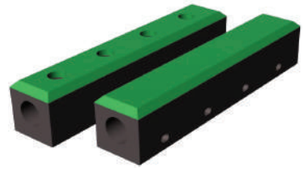
The fixed axle roller is a simple and effective fender suitable for high reactive loads with moderated deflection, and limited kinetic energy absorption characteristics. It is designed specifically for assisting in maneuvering vessels in confined spaces such as dry docks and pontoon. Units of this type are installed in building and dry docks which are in exposed conditions. With a pattern of simple rollers, the ships are allowed to positively contact one fenders, and the ship can then be rolled out safely with very little friction resistance.



● Dimension

(Unit:mm)

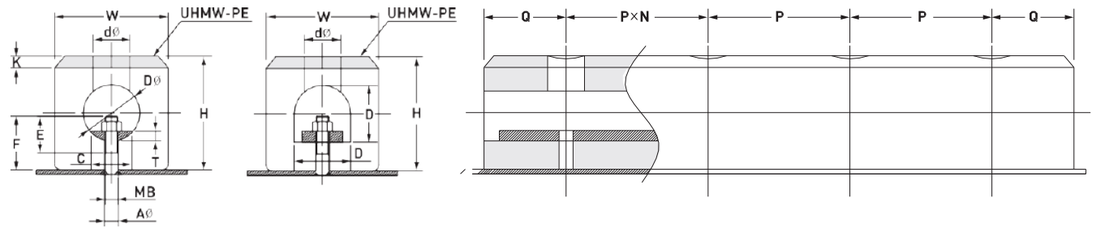
Type / Size	MD	Roller Fender		Frame				
		D	H	A	W	1Roll - B	2Roll - B	3Roll - B
R600	M22 (7/8)	600	200	350	695	420	780	1120
R750	M22 (7/8)	750	250	420	870	510	935	1360
R900	M24 (1)	900	300	520	1040	610	1120	1630
R1200	M27 (1 1/8)	1200	400	670	1380	820	1500	2180
R1400	M30 (1 1/4)	1400	400	772	1400	820	1500	2180
R1500	M30 (1 1/4)	1500	500	850	1740	1010	1850	2690
R1800	M36 (1 1/2)	1800	600	960	2080	1210	2215	3220
R2100	M42 (1 3/4)	2100	700	1155	2440	1410	2590	3770
R2400	M48 (2)	2400	800	1280	2770	1610	2950	4290
R2700	M56 (2 1/44)	2700	900	1440	3130	1810	3300	4790
R3000	M64 (2 1/2)	3000	1000	1600	3480	2010	3660	5310



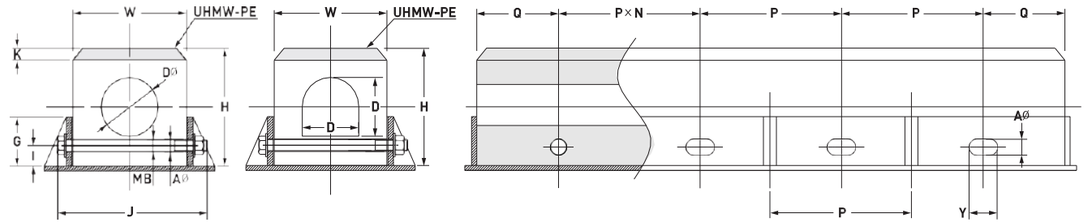
Composite Fender

Composite fenders are applicable to installation on workboats and narrow waterways. The benefit of composite fender is a great energy absorption with low friction properties owing to the fact that rubber body and UHMW-PE are made into a single moulded product. The special manufacturing technique is applied to make strong adhesion between the elastomer section and UHMW-PE during vulcanization process. Therefore no more mechanical fixings are needed.

Vertical Fitting Bolt Method



Cross Fitting Bolt Method



● Dimension

(Unit:mm)

Size	Fender											Frame					
	C	DØ	dØ	G	H	I	K	P	Q	T	W	AØ	MB	E	F	J	Y
150H×75Ø	50	75	60	60	150	26	20	250 ~ 350	150~ 200	16	150	22	M16 (5/8)	40	80	220	32
200H×100Ø	65	100	65	75	200	35	25			19	200	25	M20 (3/4)	50	95	280	38
250H×125Ø	80	125	70	100	250	43	30			22	250	28	M24 (1)	60	112	350	42
300H×150Ø	90	150	80	125	300	52	30			25	300	32	M24 (1)	70	132	400	48

SM-Type Fender



Lord-Type Fender



Turtle-Type Fender



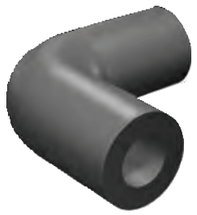
Corner Fender



BP -Type



AOV -Type



CYL -Type

Seal



Meeting Face



D Shaped Seal



P-Type Seal



Bearing Pad



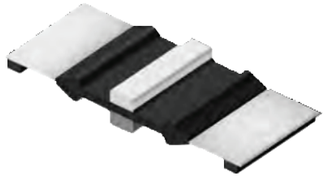
Soft Type Seal



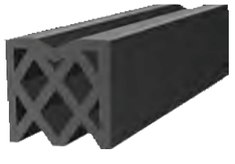
Bottom Seal



Omega Seal



Water Stop



Water Seal

Rubber Properties

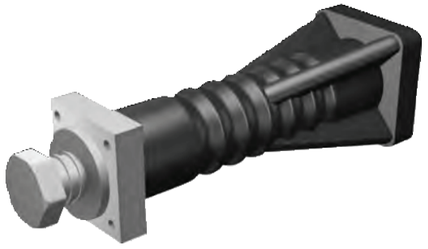
Property	Testing Standard	Condition	Requirement	Applicability
Tensile Strength	ISO 37	Before Ageing	≥ 16.0 MPa(Min.)	All
	ISO 188	Aged for 96 hours at 70℃	≥ 12.8 MPa(Min.)	All
		Aged for 168 hours at 70℃	≥ 12.8 MPa(Min.)	Applications above 40 degrees Celsius site temperature
Elongation at Break	ISO 37	Before Ageing	350%	All
	ISO 188	Aged for 96 hours at 70℃	≥ 280 %	All
		Aged for 168 hours at 70℃	≥ 260 %	Applications above 40 degrees Celsius site temperature
Tensile product (Tensile strenth X Elongation @break)	-	Before Ageing	≥ 6000 MPa.%	All
		After Ageing	≥ 4800 MPa.%	All
Compression Set	ISO 815-1	22 hours at 70℃	≤ 30%	All
Tear Resistance	ISO 34-1, method C procedure b	Original	≥ 70kN/m	All
Static Ozone Resistance	ISO 1431-1	50pphm, 100 jours, 20% strain, 40℃	No cracks	All
Dynamic Fatigue	ISO 132	15000 cycles	Grade 0-2	All
Bond Strength	ISO 813	Rubber to steel	≥ 7N/mm and failure in the rubber.	Optional to metal inserted in a fender body
Seawater Resistance	ISO 1817	28 days at 85℃, refer DIN 50905-4 for the preparation and composition of sea water	Volume change : ≤ +10/-5%	Ooptional to fenders 100% submersed in sea water all the time
Abrasion loss	ISO 4649	Original	≤ 150㎣	Optional to direct contact of vessels and fenders
Heavy Oil resistance	ISO 1817	72h at 23℃ in IRM oil #901	Volume change : ≤ ±10%	Optional to fenders exposed to heavy oil (e.g., under marine loading arm)
Hardness	ISO 48-4	Original Value (Shore A)	≤ 78	Standard
			≤ 75	Applications above 40 degrees Celsius site temperature
		Aged for 96 hours at 70℃	Increase from the original value : ≤ 8 points	-
Low-temperature brittleness	ISO 812 : procedure c	Rubber specimens to be exposed to -40℃ for 3±0.5 minutes.	No cracks, fissures or holes visible to the naked eye and no complete separation into two or more pieces.	Optional to fenders used for very low ttemperature applications

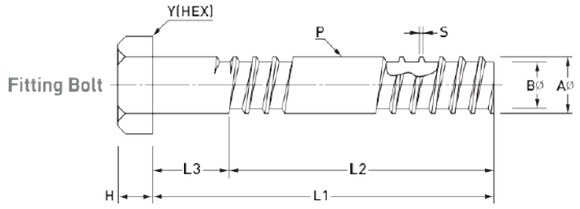
Rubber Content

Property	Testing Standard	Requirement
Density	ISO 2781	≥ 1.2 g/㎤
Polymer	ISO 9924-1~3	≤ 45%
Cabon Black	ISO 9924-1~3	≤ 20%
Ash	ISO 9924-1~3	≥ 5%

Resin Anchor Bolt

TR Unit (1000H~1300H), TR-S (150H~1000H), ACV (200H~1300H)



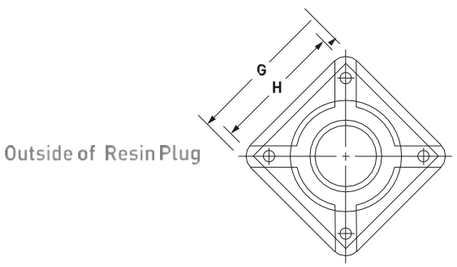


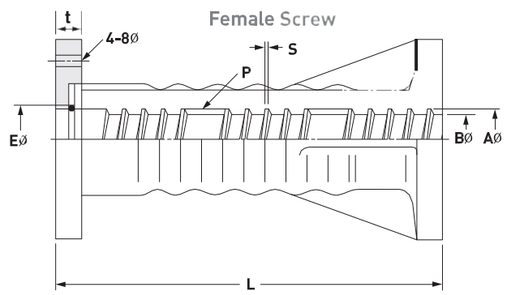
Parts	Material	Remarks
Fitting Bolt	Stainless Steel	-
Plug	Resin	-

● Fitting Bolt Dimension

(Unit:mm)

WD	H	Y	L1	L2	L3	AØ	BØ	S	P (pitches/inch)
3/4	13	30	160	105	55	19	14	2.0	2 3/4
1	18	41	210	145	65	25	18	2.0	2 1/2
1 1/4	22	50	270	185	85	32	24	2.5	2
1 1/2	27	58	330	235	95	38	30	2.5	2
1 3/4	32	67	330	235	95	44	35	3.0	1 3/4
2	36	77	395	265	130	50	40	3.5	1 1/2
2 1/2	45	95	410	275	135	65	53	4.0	1 1/4
3	55	110	440	305	135	76	62	4.5	1





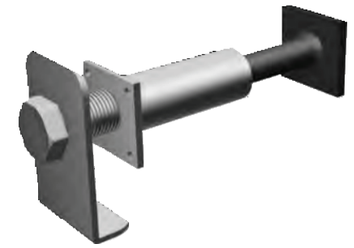
● Resin Plug Dimension

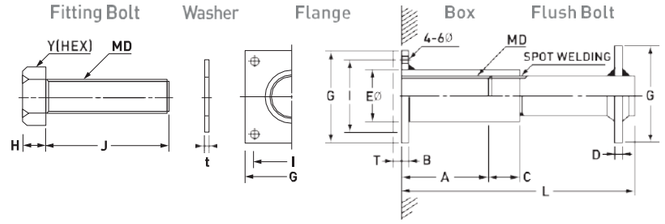
(Unit:mm)

WD	Outside of Resin Plug Body					Female Screw			
	EØ	G	H	t	L	AØ	BØ	S	P (pitches/inch)
3/4	27.0	60	55	25	150	21	16	3	2 3/4
1	35.5	63	75	25	200	26	19	3	2 1/2
1 1/4	42.5	100	80	30	250	33	25	3	2
1 1/2	50.0	120	110	30	300	40	31	3.5	2
1 3/4	57.0	120	110	30	300	46	36	3.5	1 3/4
2	63.0	160	150	30	360	53	41.5	4	1 1/2
2 1/2	78.0	160	150	30	360	68	54.5	4.5	1 1/4
3	88.0	180	170	30	400	79	64	5	1

I-Type Anchor Bolt

SSP Fender / General, Especially AOV, NV & SBP Fender





Parts	Material	Remarks
Fitting Bolt, Flange, Box	Stainless Steel	-
Flush Bolt	Rolled Steel	-

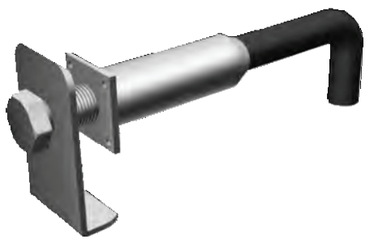
● Dimension

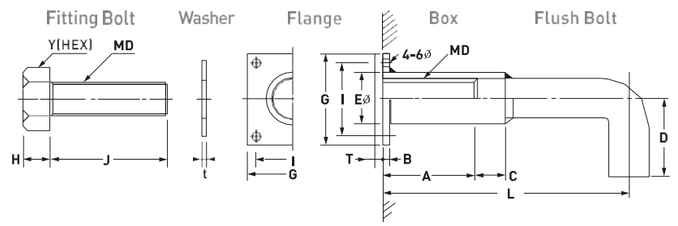
(Unit:mm)

MD	Fitting Bolt				Flange, Box, Flush Bolt							
	H	Y	Z	J	A	B	C	D	EØ	G	I	L
M22 (7/8)	14(15)	32(35)	30	t+T+Z (round up to nearest 5mm)	50	6	25	6	28	65	50	165
M24 (1)	15(18)	36(41)	35		55	6	25	6	32	70	55	175
M27 (1 1/8)	17(20)	41(46)	37		60	6	30	9	35	75	60	200
M30 (1 1/4)	19(22)	46(50)	40		65	6	30	9	38	75	60	225
M36 (1 1/2)	23(27)	55(58)	45		70	6	35	9	45	85	70	270
M42 (1 3/4)	26(32)	65(67)	50		75	6	40	12	55	90	75	325
M48 (2)	30(36)	75(77)	60		85	6	45	12	65	120	95	360
M56 (2 1/4)	35(40)	85(85)	70		90	6	55	16	75	125	100	435
M64 (2 1/2)	40(45)	95(95)	75		100	6	60	16	80	130	105	475
M76 (3)	45(55)	110(110)	80		120	6	75	19	95	155	120	550

J-Type Anchor Bolt

SSP Fender / General, Especially AOV, NV & SBP Fender





Parts	Material	Remarks
Fitting Bolt, Flange, Box	Stainless Steel	-
Flush Bolt	Rolled Steel	-

● Dimension

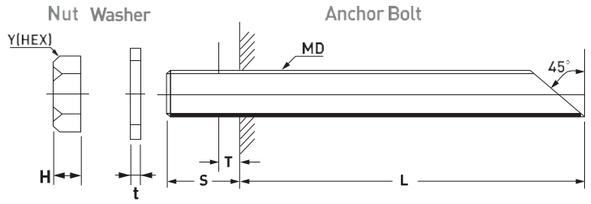
(Unit:mm)

MD	Fitting Bolt				Flange, Box, Flush Bolt							
	H	Y	Z	J	A	B	C	D	EØ	G	I	L
M22 (7/8)	14(15)	32(35)	30	t+T+Z (round up to nearest 5mm)	50	6	25	50	28	65	50	175
M24 (1)	15(18)	36(41)	35		55	6	25	50	32	70	55	185
M27 (1 1/8)	17(20)	41(46)	37		60	6	30	75	35	75	60	210
M30 (1 1/4)	19(22)	46(50)	40		65	6	30	85	38	75	60	230
M36 (1 1/2)	23(27)	55(58)	45		70	6	35	100	45	85	70	255
M42 (1 3/4)	26(32)	65(67)	50		75	6	40	100	55	90	75	290
M48 (2)	30(36)	75(77)	60		85	6	45	120	65	120	95	325
M56 (2 1/4)	35(40)	85(85)	70		90	6	55	140	75	125	100	350
M64 (2 1/2)	40(45)	95(95)	75		100	6	60	160	80	130	105	375
M76 (3)	45(55)	110(110)	80		120	6	75	160	95	155	120	450

Stud-Type Anchor Bolt

General, Especially AOV, NV & SBP Fender





Parts	Material	Remarks
Anchor Bolt	Stainless Steel	-

● Dimension

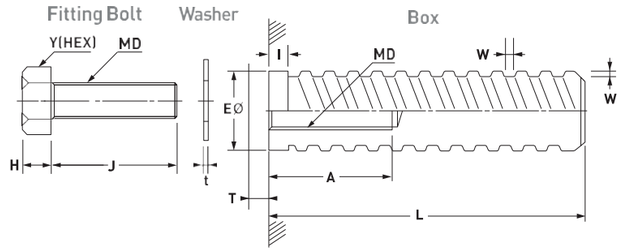
(Unit:mm)

MD	Nut			Anchor Bolt	
	H	Y	Z	L	S
M22 (7/8)	18(18)	32(35)	8	145	H+t+T+Z (Roundedup to nearest 5mm)
M24 (1)	19(20)	36(41)	10	175	
M27 (1 1/8)	22(22)	41(46)	10	210	
M30 (1 1/4)	24(25)	46(50)	11	210	
M36 (1 1/2)	29(30)	55(58)	12	250	
M42 (1 3/4)	32(35)	65(67)	13	320	
M48 (2)	38(40)	75(77)	15	320	
M56 (2 1/4)	45(45)	85(85)	18	400	
M64 (2 1/2)	51(50)	95(95)	20	450	
M76 (3)	61(62)	110(110)	20	550	

Chemical-Type Anchor Bolt

General, Especially AOV, NV & SBP Fender





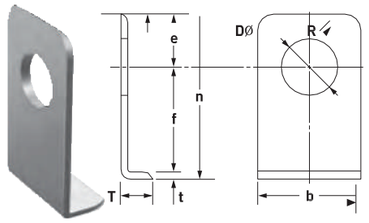
Parts	Material	Remarks
Fitting Bolt	Stainless Steel	-
Box		

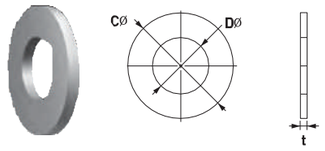
● Dimension

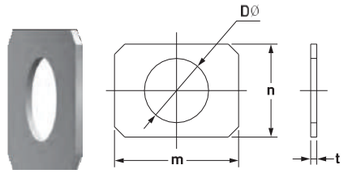
(Unit:mm)

MD	Fitting Bolt				Box				
	H	Y	Z	J	A	I	E	L	W
M22 (7/8)	14(15)	32(35)	30	t+T+Z (round up to nearest 5mm)	100	15	32	200	2
M24 (1)	15(18)	36(41)	35		100	15	35	250	2
M27 (1 1/8)	17(20)	41(46)	37		100	15	40	250	2
M30 (1 1/4)	19(22)	46(50)	40		100	15	45	250	2
M36 (1 1/2)	23(27)	55(58)	45		120	15	55	300	2.5
M42 (1 3/4)	26(32)	65(67)	50		120	15	60	350	2.5
M48 (2)	30(36)	75(77)	60		120	15	65	350	2.5
M56 (2 1/4)	35(45)	85(85)	70		120	15	70	400	2.5
M64 (2 1/2)	40(45)	95(95)	75		120	15	80	450	2.5
M76 (3)	45(55)	110(110)	80		150	15	95	450	2.5

Washer







● L-Type Washer Dimension

(Unit:mm)

MD	AOV, NV Fender								
	Size	b	D	e	f	n	R	T	t
M22 (7/8)	150H	68	25	23	32	59.5	10	12	4.5
M24 (1)	200H	74	29	33	42	79.5	10	14	4.5
M27 (1 1/8)	250H	88	34	42	48	94.5	10	16	4.5
M30 (1 1/4)	300H	100	37	47	58	109.5	10	19	4.5
M36 (1 1/2)	400H	119	43	52	68	126	10	22	6
M42 (1 3/4)	500H	127	49	56	83	145	10	25	6
M48 (2)	600H	139	56	61	98	165	10	28	6
M64 (2 1/2)	800H	195	70	100	134	242	10	32	8
	1000H	215	70	110	164	282	10	36	8

● Round Washer Dimension

(Unit:mm)

MD	General			TR Unit,TR-S, ACV		
	C	D	t	C	D	t
M20 (3/4)	-	-	-	80	24	6
M22 (7/8)	44	26	5	-	-	-
M24 (1)	52	28	5	90	28	6
M27 (1 1/8)	58	31	5	-	-	-
M30 (1 1/4)	62	35	5	90	35	6
M36 (1 1/2)	72	41	8	130	41	9
M42 (1 3/4)	82	47	8	140	47	9
M48 (2)	95	54	8	160	54	12
M64 (2 1/2)	115	70	10	180	70	12
M76 (3)	135	82	10	180	82	12

● Rectangle Washer Dimension

(Unit:mm)

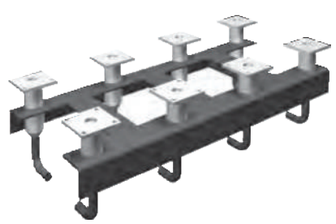
MD	General				SSP-TYPE Fender			
	m	n	D	t	m	n	D	t
M20 (3/4)	50	45	24	5	45	40	22	5
M22 (7/8)	70	50	26	5	-	-	-	-
M24 (1)	75	55	28	5	65	50	28	5
M27 (1 1/8)	85	60	31	5	85	60	31	5
M30 (1 1/4)	100	65	35	5	85	60	35	5
M36 (1 1/2)	115	75	41	8	100	65	41	8
M42 (1 3/4)	140	90	47	8	105	90	47	8
M48 (2)	165	100	54	8	130	110	54	8
M56 (2 1/2)	185	125	62	8	120	100	62	8
M64 (2 1/2)	210	135	70	10	140	110	70	10
M64 (2 1/2)	-	-	-	-	160	120	70	10
M76 (3)	230	150	80	10	-	-	-	-

Chain & U-Anchor

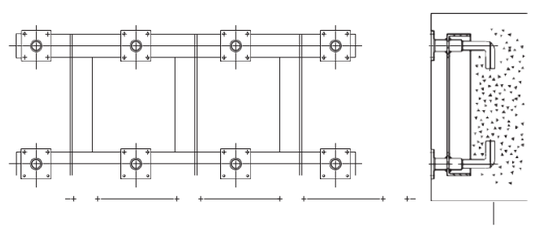




Template



- Template can be used for all type of fenders. This can be imbedded in a newly constructed dock. This would ensure precise fitting of the fenders.





Rubber Ladder

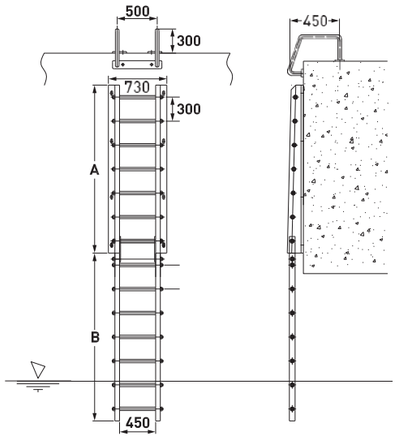
Rubber ladders are flexible, corrosion resistant and can withstand most accidental impacts from smaller vessels. Therefore, rubber ladder is completely free from maintenance. The rubber ladders are combined with extensions and a variety of optional handrails to suit many applications.

● Specifications

Total Width	730mm
Length of Rungs	450mm
Interval of Rungs	300mm

● Dimension

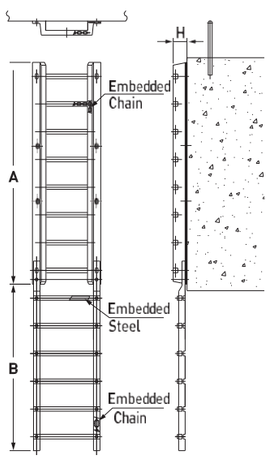
Slope Type Ladder			
A (Main) Length(mm)	B (Joint) Length(mm)	Number of Rungs	Number of Anchors
1200	600	4	2 X 3
1500	900	5	2 X 3
1800	1200	6	2 X 3
2100	1500	7	2 X 4
2400	1800	8	2 X 4
2700	2100	9	2 X 4
3000	2400	10	2 X 5



● Other Type Ladder

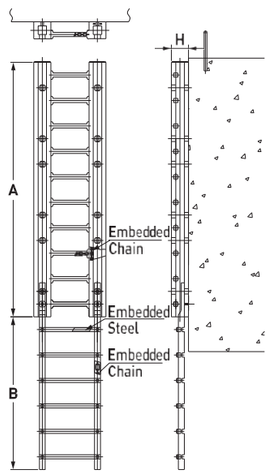
Height 150H

A (Main) Length(mm)	B (Joint) Length(mm)
600	600
900	
1200	900
1500	
1800	1200
2100	
2400	1500
2700	
3000	1800



Height 200H

A (Main) Length (mm)	B (Joint) Length (mm)
900	600
1200	900
1500	
1800	1200
2100	1500
2400	
2700	1800



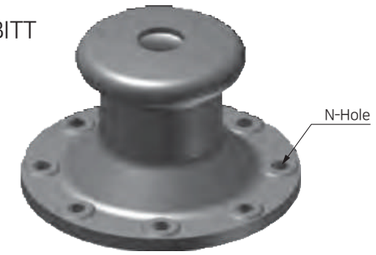
Bollard

Bollard



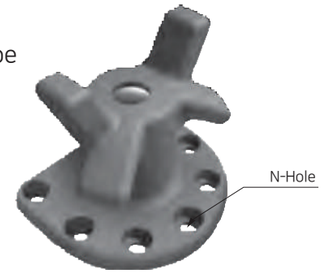
ton	5	10	15	25	35	50	70	100	150	200
N	4	4	4	4	6	6	6	6	6	6

BITT



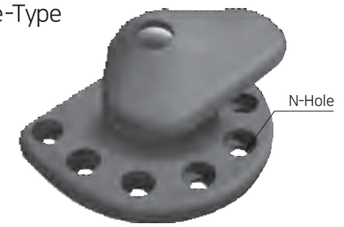
ton	15	25	35	50	70	100	150	200
N	4	6	6	6	6	8	8	8

Horn-Type



ton	10	15	20	30	50	75	100	125	150	200
N	4	4	5	5	5	6	7	7	7	8

Tee-Type

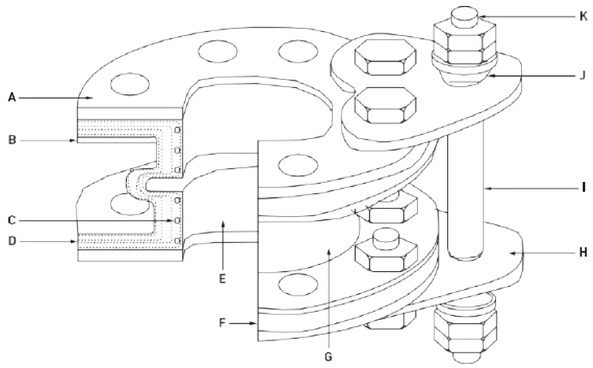


ton	10	15	20	30	50	75	100	125	150	200
N	4	4	5	5	5	6	7	7	7	8



Expansion Joint

DRF Rubber Expansion Joints which are designed to avoid excessive stress and to absorb vibration plus eliminate noises on pipe connections are made of a high quality rubber compound for the maximum in flexibility, plus the cover rubber is oil and ozone resistant. This compound is combined with a strong synthetic fabric for vacuum and the carcass of the joint is reinforced with steel wire. All Expansion joints are made of superior quality rubber and the steel reinforcement is resistant to corrosion, abrasion and water with good flexibility, maintaining high pressure resistance.



A : Matching Flange
B : Split Metal Retaining Ring
C : Carcass Metal Reinforcing
D : Carcass Fabric Reinforcing
E : Tube
F : Rubber Expansion Joint
G : Cover
H : Control Rod Plate
I : Pipe Sleeve
J : Ball Seat
K : Control Rod Stud Bolt

Tube

A protective, leak proof lining made of synthetic or natural rubber as the application dictates. This is a seamless tube that extends through the bore to the outside edges of the flanges. Its purpose is to eliminate the possibility of the materials being handled penetrating the carcass and weakening the fabric.

Cover

The exterior surface of the joint is formed from natural or synthetic rubber, depending on service requirements.

Reinforcing Fabric

The carcass reinforcing fabric is the flexble and supporting member between the inner tube and outer cover. Standard constructions normally utilize high quality synthetic fabric.

Reinforcing Wire

Reinforcing Wire imbedded in the carcass are frequently used as strengthening member of the joint. The use of metal sometimes raises the rated working pressure and can supply rigidity to the joint for vacuum service.

● Rubber

Rubber		Hardness(HS)		Tensile strength(kg/cm²)		Elongation(%)	
Cover	Tube	Cover	Tube	Cover	Tube	Cover	Tube
CR	CR	Max.70	Max.70	Min.120	Min.120	Min.400	Min.400
CR	NR	Max.70	Max.70	Min.120	Min.160	Min.400	Min.400
CR	NBR	Max.70	Max.70	Min.120	Min.80	Min.400	Min.350
CIIR	CIIR	Max.70	Max.70	Min.100	Min.100	Min.350	Min.350
EPDM	EPDM	Max.70	Max.70	Min.80	Min.80	Min.300	Min.300
CR	FDA-NBR	Max.70	Max.70	Min.120	Min.100	Min.400	Min.400

● Reinforcing Fabric

Nominal Size I·D (Inch)	Fabric	Density (E·P·I)	Tensile Strength (kg/cm)	Elongation(%)	Shrinkage 150℃×30min(%)	Weight (g/m²)
18~	PolyesterT/C1000D/3	26	Min.180	Min.15	Max.6	430

● Retaining Ring & Control Unit

Item	KS	Comparison	
		JIS	ASTM
Heavy Hex Bolt & Control Rod Stud Bolt	D3755.SNB7	G41007.SNB7	A193.B7
	D3503.3SS400	G3101.SS400	A307.B
	D3706.STS304	G4303.SUS304	A276.304
	D3706.STS316	G4303.SUS316	A276.316
	- -	- -	A193.B8(304)
	- -	- -	A193.B8M(316)
Heavy Hex Nut & Jam Nuts	D3752.SM45C	G4051.S45C	A194.2H
	D4101.SC42	G5101.SC42	A563.A
	D3706.STS304	G4303.SUS304	A276.304
	D3706.STS316	G4303.SUS316	A276.316
	- -	- -	A194.8N(304N)
	- -	- -	A194.8MN(316N)
Pipe Sleeve	D3562.SPPS42	G3454.STPG42	A53.B
	D3570.SPHT42	G3456.STPT42	A106.B
	D3576.STS316TP	G3456.SUS316TP	A358.316
	D3576.STS304TP	G3459.SUS304TP	A358.304
Control Rod Plate & Ball Seat & Retaining Ring	D3503.SS400	G3101.SS400	A36
	D3706.STS304	G4303.SUS304	A276.304
	D3706.STS316	G4303.SUS316	A276.316

● Anticorrosive Coating

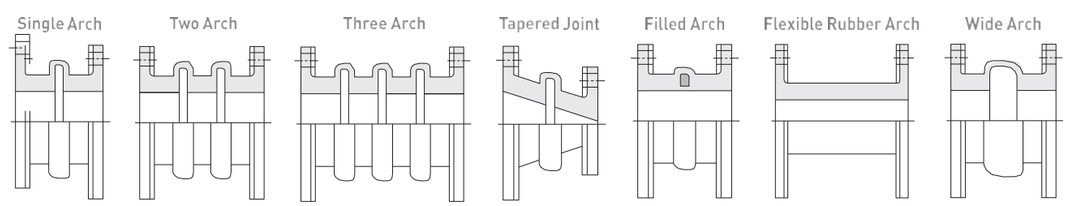
Item	Coating	KS	Comparison	
			JIS	ASTM
Retaining Ring & Pipe Sleeve	ZINC Hot Dip Galvanizing	D8308.HDZ40 (MIN. 400g/m²)	H8641.HDZ40 (MIN. 400g/m²)	A123 (MIN. 458g/m²)
Other Steel Part	Electroplated Coating of Zincon Iron and Steel	D8304.ZP3 (THK. MIN. 8μm)	H8610.ZP3 (THK. MIN. 8μm)	B633 (THK. MIN. 8μm)

● Pressure Characteristics of Rubber Expansion Joint

EXP-J Nominal Size I·D (Inch)			42~66	68~96	98~108	114
Design of Expansion Joint Construction	Positive	PSIG	80	70	60	50
		kg/cm²	5.6	4.9	4.2	3.5
	Negative	In.of Hg	26	26	26	26
		mmHg	660.4	660.4	660.4	660.4

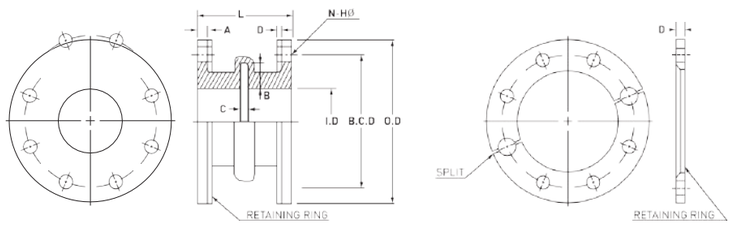
● Minimum Face-To-Face Dimension

Nominal Size I·D (Inch)	Single Arch (mm)	Nominal Size I·D (Inch)	Double Arch(mm)	Nominal Size I·D (Inch)	Triple Arch(mm)
42 ~ 114	305(12")	22 ~ 78	356 (14")	22 ~ 96	457 (18")
		84 ~ 108	406 (16")	102 ~ 114	508 (20")



● Expansion Joint Dimension

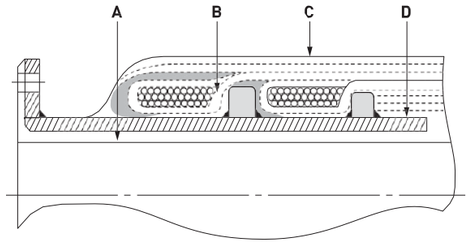
Size		L		I·D	B.C.D		O.D		N		H			A	B	C	D
					ANSI & AWWA	JIS	ANSI & AWWA	JIS	ANSI & AWWA	JIS	ANSI& AWWA CL.D	AWWA CL.B	JIS				
mm	inch	mm	inch	mm	mm	mm	mm	mm			mm	mm	mm	mm	mm	mm	mm
25	1.0	152	6	25	79	90	108	125	4	4	16	-	19	14	32	12	10
32	1.25	152	6	32	89	100	118	135	4	4	16	-	19	14	32	12	10
40	1.5	152	6	38	98	105	127	140	4	4	16	-	19	14	32	12	10
50	2	152	6	51	121	120	152	155	4	4	19	-	19	14	32	12	10
65	2.5	152	6	64	140	140	178	175	4	4	19	-	19	14	32	12	10
75	3	152	6	76	152	-	191	-	4	-	19	-	-	14	32	12	10
90	3.5	152	6	89	178	160	216	195	8	8	19	-	19	14	32	12	10
100	4	152	6	102	191	175	229	210	8	8	19	19	19	14	32	12	10
125	5	152	6	127	216	210	254	250	8	8	22	19	23	16	32	12	10
150	6	152	6	152	241	240	279	280	8	8	22	19	23	19	32	12	10
200	8	152	6	203	298	290	343	330	8	12	22	19	23	19	38	19	10
250	10	203	8	254	362	355	406	400	12	12	25	19	25	19	38	19	10
300	12	203	8	305	432	400	483	445	12	16	25	19	25	22	38	19	10
350	14	203	8	356	476	445	533	490	12	16	29	22	25	22	51	19	10
400	16	203	8	406	540	510	597	560	16	16	29	22	28	25	51	19	10
450	18	254	10	457	578	565	635	620	16	20	32	22	27	28	51	19	10
500	20	254	10	508	635	620	699	675	20	20	32	22	27	28	51	22	10
550	22	254	10	559	692	680	749	745	20	20	35	22	33	28	51	22	10
600	24	254	10	610	749	730	813	795	20	24	35	22	33	28	51	22	10
650	26	254	10	660	806	780	870	845	24	24	35	22	33	28	57	25	10
700	28	254	10	711	864	840	927	905	28	24	35	22	33	28	57	25	10
750	30	254	10	762	914	900	984	970	28	24	35	25	33	28	57	25	10
800	32	254	10	813	978	950	1060	1020	28	28	41	25	33	28	57	25	10
850	34	254	10	864	1029	1000	1111	1070	32	28	41	25	33	28	57	25	10
900	36	254	10	914	1086	1050	1168	1120	32	28	41	25	33	28	57	25	10
950	38	254	10	965	1149	-	1238	-	32	28	41	25	-	28	57	25	10
1000	40	254	10	1016	1200	1160	1289	1235	36	28	41	25	39	28	57	25	10
1050	42	305	12	1067	1257	-	1346	-	36	-	41	29	-	30	64	28	10
1100	44	305	12	1118	1314	-	1403	-	40	-	41	29	-	30	64	28	10
1150	46	305	12	1168	1365	-	1454	-	50	-	41	29	-	30	64	28	10
1200	48	305	12	1219	1422	-	1511	-	44	-	41	29	-	30	64	28	10
1250	50	305	12	1270	1480	-	1568	-	44	-	48	32	-	30	64	28	10
1300	52	305	12	1321	1537	-	1626	-	44	-	48	32	-	32	64	28	10
1350	54	305	12	1372	1594	-	1683	-	44	-	48	32	-	32	64	28	10
1400	56	305	12	1422	1651	-	1746	-	48	-	48	32	-	32	64	28	10
1450	58	305	12	1473	1708	-	1803	-	48	-	48	32	-	32	64	28	10
1500	60	305	12	1524	1759	-	1854	-	52	-	48	35	-	32	64	28	10
1550	62	305	12	1575	1823	-	1924	-	52	-	48	35	-	32	64	28	10
1650	66	305	12	1676	1930	-	2032	-	52	-	48	35	-	32	64	28	10
1700	68	305	12	1727	1988	-	2089	-	56	-	48	35	-	32	64	28	10
1800	72	305	12	1829	2096	-	2197	-	60	-	48	35	-	34	64	28	15
2000	78	305	12	1981	2261	-	2362	-	64	-	54	41	-	34	64	28	15
2150	84	305	12	2134	2426	-	2534	-	64	-	54	41	-	34	64	28	15
2300	90	305	12	2286	2591	-	2705	-	68	-	60	48	-	38	64	28	15
2450	96	305	12	2438	2756	-	2877	-	68	-	60	48	-	38	64	28	15
2600	102	305	12	2591	2908	-	3048	-	72	-	67	54	-	45	70	28	15
2750	108	305	12	2743	3067	-	3219	-	72	-	67	54	-	45	70	28	15
2900	114	305	12	2896	3220	-	3391	-	76	-	73	60	-	45	70	28	15



● Tolerance

(Unit:mm)

Nominal Size I·D (mm)	I·D	B·C·D	O·D	A	H	L			
						0"~6" (0~152)	7"~12" (178~305)	14"~18" (356~457)	20"~ (508~)
24"~46" (600~1150)	ω9	ω7	ω12	ω2	ω1	ω4	ω4	-6 ~ +4	ω6
48"~70" (1200~1778)	-12 ~ +9	ω9	-12 ~ +19	ω2	ω1	ω6	ω9	ω9	ω9
72"~ & (1800~)	-15 ~ +9	ω12	-19 ~ +25	ω2	ω1	ω6	ω9	ω9	ω9



A : Inner Rubber (Synthetic Rubber)
B : Reinforcement
C : Outer Cover (Synthetic Rubber)
D : Steel Flange

Sleeve Hose

DRF produces dredging sleeve Hose for transporting liguids, slurries and dry materials. This hose is used as a flexible connection in dredging applications.
Inner Rubber : Black NR/SBR rubber blend. This material is resistant to wear, cutting, weathering and seawater.
Reinforcement : Synthetic high tensile tire cord resistant to high pressure
Outer Cover : Black NR/SBR rubber blend. This cover protects the reinforcement from seawater, solar radiation and mechanical damage.
Steel Flange : These include parts of nipples, flanges and suction ring. All are sandblasted to be free from rust and then chemically treated to ensure complete bonding with the rubber.





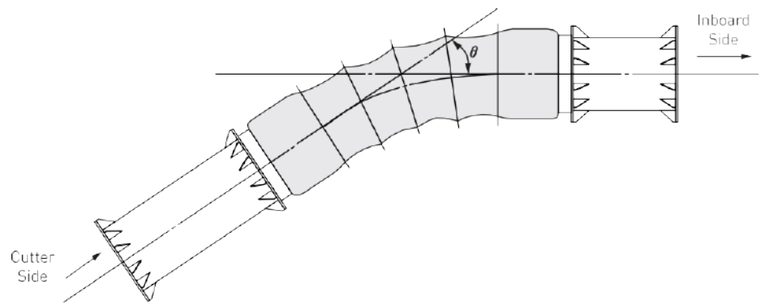
● Sleeve Hose Standard Dimension

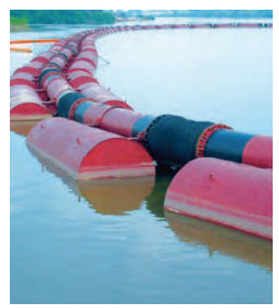
(Unit:mm)

Inside Diameter	Overall Length	Inner Tube Thickness	Outer Cover Thickness	Flange Thickness	Nipple Thickness
450	1300	15	5	19	9
500	1300	15	5	19	9
600	1500	20	5	22	9
650	1600	20	5	22	9
685	1600	20	5	25	9
700	1700	20	5	28	9
750	1900	20	5	28	9
800	2000	25	5	32	12
850	2000	25	5	32	12
900	2000	25	5	32	12

● Sleeve Hose Performance Table

Item		Standard	Test Condition
Resisting Pressure	LongitudinalElongation	± 10%	Working Pressure
		± 15%	Test Pressure
	CircumferentialElongation	± 5%	Working Pressure
		± 7.5%	Test Pressure
Bending Angle (θ)		Min.10°	-



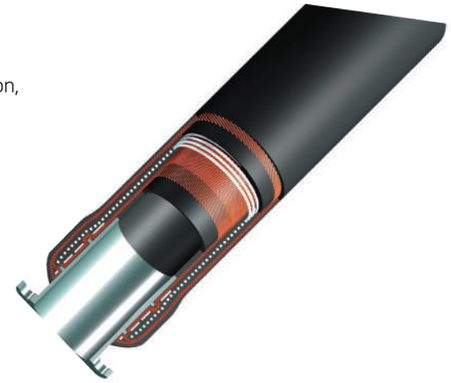


Oil Suc. & Dis. Hose With Flange (S10, S15 Type)

Transportation of gasoline, petroleum, and oil with aromatic content up to 50% / mainly used in offshore landing stations, ships, and barges

Product structure

Interior rubber: Oil resistant RMA class A Nitrile Butadiene Rubber (NBR)
Reinforcing layer: High strength synthetic fiber and hard steel wire formation, high strength synthetic fiber spiral and static preventing wire formation
Exterior rubber: Abrasion/oil/weathering/ozone-resistant synthetic rubber



Product information

Usage temperature: -30℃ ~ 80℃ (-20℉ ~ 180℉)
Vacuum: 737mmHg / 29inHg
Maximum production length: 20m / 66ft

PartNo.	Hose interior diameter		Hose exterior diameter		Maximum usage pressure		Minimum rupture pressure		Curve radius		Product weight	
	inch	mm	inch	mm	bar	psi	bar	psi	inch	mm	kg/m	lb/ft
OB10SBK (Black exterior)											※Weight: Hose section	
OB10SBK-402	4	101.6	4.92	125.0	10	150	40	600	24	600	8.10	5.44
OB10SBK-604	6	152.4	7.05	179.0	10	150	40	600	34	850	14.20	9.54
OB10SBK-804	8	203.2	9.41	239.0	10	150	40	600	44	1,100	23.00	15.46
OB10SBK-1008	10	254.0	11.54	293.0	10	150	40	600	54	1,350	31.40	21.10
OB10SBK-1210	12	304.8	13.66	347.0	10	150	40	600	64	1,600	38.70	26.00
OB10SBK-1412	14	355.6	15.83	402.0	10	150	40	600	84	2,100	48.80	32.79
OB15SBK (Black exterior)											※Weight: Hose section	
OB15SBK-404	4	101.6	5.00	127.0	15	225	60	900	24	600	8.90	5.98
OB15SBK-604	6	152.4	7.13	181.0	15	225	60	900	34	850	14.60	9.81
OB15SBK-806	8	203.2	9.49	241.0	15	225	60	900	44	1,100	23.90	16.06
OB15SBK-1010	10	254.0	11.61	295.0	15	225	60	900	54	1,350	33.10	22.24
OB15SBK-1212	12	304.8	13.74	349.0	15	225	60	900	64	1,600	40.70	27.35
OB15SBK-1414	14	355.6	15.91	404.0	15	225	60	900	84	2,100	51.10	34.34

Oil Suc. & Dis. Hose With Flange (L10, L15 Type)

Transportation of gasoline, petroleum, and oil with aromatic content up to 50% / mainly used in offshore landing stations, ships, and barges (for discharge)

Product structure

Interior rubber: Oil resistant RMA class A Nitrile Butadiene Rubber (NBR)
Reinforcing layer: high strength synthetic fiber spiral and static preventing wire formation
Exterior rubber: Abrasion/oil/weathering/ozone-resistant synthetic rubber



Product information

Usage temperature: -30℃ ~ 80℃ (-20℉ ~ 180℉)
Maximum production length: 20m / 66ft

PartNo.	Hose interior diameter		Hose exterior diameter		Maximum usage pressure		Minimum rupture pressure		Curve radius		Product weight	
	inch	mm	inch	mm	bar	psi	bar	psi	inch	mm	kg/m	lb/ft
OB10LBK (Black exterior)											※Weight: Hose section	
OB10LBK -402	4	101.6	4.49	114.0	10	150	40	600	-	-	2.90	1.95
OB10LBK -604	6	152.4	6.61	168.0	10	150	40	600	-	-	5.50	3.70
OB10LBK -806	8	203.2	8.82	224.0	10	150	40	600	-	-	9.50	6.38
OB10LBK -006	10	254.0	10.91	277.0	10	150	40	600	-	-	12.30	8.27
OB10LBK -1208	12	304.8	13.03	331.0	10	150	40	600	-	-	19.50	13.10
OB10LBK -1410	14	355.6	15.24	387.0	10	150	40	600	-	-	26.30	17.67
OB15LBK (Black exterior)											※Weight: Hose section	
OB15LBK -404	4	101.6	4.61	117.0	15	225	60	900	-	-	3.60	2.42
OB15LBK -606	6	152.4	6.73	171.0	15	225	60	900	-	-	6.50	4.37
OB15LBK -808	8	203.2	8.98	228.0	15	225	60	900	-	-	12.50	8.40
OB15LBK -1010	10	254.0	11.14	283.0	15	225	60	900	-	-	17.60	11.83
OB15LBK -1210	12	304.8	13.15	334.0	15	225	60	900	-	-	21.50	14.45
OB15LBK -1412	14	355.6	15.35	390.0	15	225	60	900	-	-	28.50	19.15

AIR SUCTION HOSE (CUF ED END)

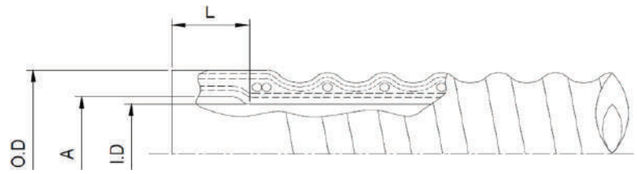
Used as hose for Air & Water in various industries and construction sites

Product structure

Interior rubber: High strength synthetic fiber and hard steel wire formation
Reinforcing layer: Synthetic rubber with high abrasion, weathering, and ozone resistance
Exterior rubber: Synthetic rubber with high abrasion, weathering, and ozone resistance

Product information

Usage temperature: -30℃ ~ 80℃ (-20℉ ~ 180℉)
Vacuum: 737mmHg / 29inHg
Maximum production length: 20m / 66ft



PartNo.	Hose interior diameter		Hose exterior diameter		Maximum usage pressure		Minimum rupture pressure		Curve radius		Product weight	
	inch	mm	inch	mm	bar	psi	bar	psi	inch	mm	kg/m	lb/ft
ASCE											※Exterior shape: recoil	
ASCE-302	3	76.2	3.76	95.4	10	150	30	450	12	300	3.59	2.41
ASCE-402	4	101.6	4.76	120.8	10	150	30	450	20	500	4.64	3.12
ASCE-502	5	127.0	5.76	146.2	10	150	30	450	25	650	5.65	3.80
ASCE-602	6	152.4	6.88	174.8	10	150	30	450	36	900	7.83	5.26
ASCE-802	8	203.2	9.03	229.4	10	150	30	450	56	1,400	12.33	8.29
ASCE-102	10	254.0	11.20	284.6	10	150	30	450	70	1,800	17.49	11.75

※Min/max measurement

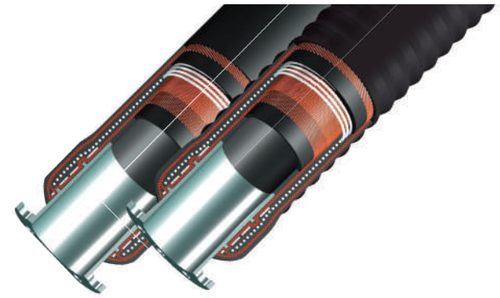
Class	3"	4"	5"	6"	8"	10"
A	Ø89.1	Ø114.3	Ø139.8	Ø165.2	Ø216.3	Ø267.4
O.D	Ø104.0	Ø134.0	Ø156.4	Ø184.0	Ø237.7	Ø291.2
L	260mm					

WATER SUC. & DIS.HOSE

Used to transport industrial water through various industrial areas

Product structure

Interior rubber: NR/SBR branding synthetic rubber with good mechanical properties (lining or non-lining shape)
Reinforcing layer: Synthetic rubber with high abrasion, weathering, and ozone resistance
Exterior rubber: Synthetic rubber with high abrasion, weathering, and ozone resistance



Product information

Usage temperature: -30℃ ~ 80℃ (-20℉ ~ 180℉)
Vacuum: 737mmHg / 29inHg
Maximum production length: 20m / 66ft

PartNo.	Hose interior diameter		Hose exterior diameter		Maximum usage pressure		Minimum rupture pressure		Curve radius		Product weight	
	inch	mm	inch	mm	bar	psi	bar	psi	inch	mm	kg/m	lb/ft
WBLS											※ Exterior shape: flat / Weight: Hose section	
WBLS-13	11/4	31.8	1.93	49.0	15	225	60	900	7	180	1.45	0.97
WBLS-15	11/2	38.1	2.17	55.0	15	225	60	900	9	230	1.69	1.14
WBLS-20	2	50.8	2.72	69.0	15	225	60	900	14	350	2.47	1.66
WBLS-25	2 1/2	63.5	3.23	82.0	15	225	60	900	16	400	2.97	2.00
WBLS-30	3	76.2	3.82	97.0	15	225	60	900	18	450	4.12	2.77
WBLS-40	4	101.6	5.00	127.0	15	225	60	900	24	600	8.51	5.72
WBLS-50	5	127.0	6.02	153.0	15	225	60	900	30	750	10.33	6.94
WBLS-60	6	152.4	7.13	181.0	15	225	60	900	34	850	14.08	9.46
WBLS-80	8	203.2	9.37	238.0	15	225	60	900	44	1,100	21.33	14.33
WBLS-100	10	254.0	11.54	293.0	15	225	60	900	54	1,350	30.71	20.64
WBLS-120	12	304.8	13.70	348.0	15	225	60	900	64	1,600	39.66	26.65
WBLC											※ Exterior shape: recoil / Weight: Hose section	
WBLC-13	11/4	31.8	2.05	52.0	15	225	60	900	5	130	1.31	0.88
WBLC-15	11/2	38.1	2.28	58.0	15	225	60	900	6	150	1.57	1.05
WBLC-20	2	50.8	2.87	73.0	15	225	60	900	8	200	2.29	1.54
WBLC-25	2 1/2	63.5	3.39	86.0	15	225	60	900	10	250	2.76	1.85
WBLC-30	3	76.2	4.02	102.0	15	225	60	900	12	300	3.65	2.45
WBLC-40	4	101.6	5.24	133.0	15	225	60	900	16	400	6.33	4.25
WBLC-50	5	127.0	6.42	163.0	15	225	60	900	20	500	7.72	5.19
WBLC-60	6	152.4	7.60	193.0	15	225	60	900	30	750	10.55	7.09
WBLC-80	8	203.2	9.92	252.0	15	225	60	900	40	1,000	16.73	11.24
WBLC-100	10	254.0	12.20	310.0	15	225	60	900	50	1,300	23.72	15.94
WBLC-120	12	304.8	14.49	368.0	15	225	60	900	60	1,500	31.34	21.06

CERAMIC DISCHARGE HOSE

Used to transport (discharge) metal casting, steel, stone, etc.

Product structure

Interior rubber: NR/SBR branding synthetic rubber with good abrasion resistance & ceramic bowl
Reinforcing layer: High strength synthetic fiber spiral formation
Exterior rubber: Synthetic rubber with good abrasion, wearing, and ozone resistance



Product information

Usage temperature: -30°C ~ 80°C (-20°F ~ 180°F)
Maximum production length: 20m / 65ft

PartNo.	Hose interior diameter		Hose exterior diameter		Maximum usage pressure		Minimum rupture pressure		Curve radius		Product weight	
	inch	mm	inch	mm	bar	psi	bar	psi	inch	mm	kg/m	lb/ft
CEMD												※ Exterior shape: flat
CEMD-132	11/4	31.8	2.18	55.4	10	150	40	600	-	-	2.60	1.75
CEMD-152	11/2	38.1	2.43	61.7	10	150	40	600	-	-	3.30	2.22
CEMD-202	2	50.8	2.97	75.4	10	150	40	600	-	-	4.70	3.16
CEMD-252	21/2	63.5	3.47	88.1	10	150	40	600	-	-	5.60	3.76
CEMD-302	3	76.2	4.01	101.8	10	150	40	600	-	-	6.60	4.43
CEMD-404	4	101.6	5.06	128.6	10	150	40	600	-	-	8.70	5.85

CERAMIC SUCTION HOSE

Used to transport (discharge) metal casting, steel, stone, etc.

Product structure

Interior rubber: NR/SBR branding synthetic rubber with good abrasion resistance & ceramic bowl
Reinforcing layer: High strength synthetic fiber and hard steel wire formation
Exterior rubber: Synthetic rubber with good abrasion, wearing, and ozone resistance



Product information

Usage temperature: -30°C ~ 80°C (-20°F ~ 180°F)
Vacuum: 737mmHg / 29inHg
Maximum production length: 20m / 65ft

PartNo.	Hose interior diameter		Hose exterior diameter		Maximum usage pressure		Minimum rupture pressure		Curve radius		Product weight	
	inch	mm	inch	mm	bar	psi	bar	psi	inch	mm	kg/m	lb/ft
CEMS												※ Exterior shape: flat
CEMS-152	11/2	38.1	2.56	65.0	10	150	40	600	12	300	4.00	2.69
CEMS-202	2	50.8	3.15	80.0	10	150	40	600	16	400	5.60	3.76
CEMS-252	21/2	63.5	3.58	91.0	10	150	40	600	20	500	6.90	4.64
CEMS-302	3	76.2	4.09	104.0	10	150	40	600	24	600	8.00	5.38
CEMS-404	4	101.6	5.28	134.0	10	150	40	600	32	800	10.20	6.85

MUD SUC. & DIS. HOSE WITH FLANGE

Used to transport dirt in construction sites

Product structure

Interior rubber: NR/SBR branding synthetic rubber with good abrasion resistance & ceramic bowl
Reinforcing layer: High strength synthetic fiber and hard steel wire formation
Exterior rubber: Synthetic rubber with good abrasion, wearing, and ozone resistance



Product information

Usage temperature: -30°C ~ 80°C (-20°F ~ 180°F)
Vacuum: 737mmHg / 29inHg
Maximum production length: 20m / 65ft

PartNo.	Hose interior diameter		Hose exterior diameter		Maximum usage pressure		Minimum rupture pressure		Curve radius		Product weight	
	inch	mm	inch	mm	bar	psi	bar	psi	inch	mm	kg/m	lb/ft
MUDS												※ Weight: Hose section
MUDS-60	6	152.4	8.39	213.0	7	100	28	400	34	300	20.65	13.88
MUDS-80	8	203.2	9.84	250.0	7	100	28	400	44	800	26.88	18.06