ISMAT

FENDER SYSTEMS

engineering protection solutions

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ISMAT RUBBER PRODUCTS

Rubber Fenders:

A fender is a bumper used to absorb the kinetic energy of a boat or vessel berthing against a jetty, quay wall or other vessel. Fenders are used to prevent damage to boats, vessels and berthing structures. Fenders are typically manufactured out of rubber, foam elastomer or plastic. Rubber fenders are either extruded or made in a mould.

The type of fender that is most suitable for an application depends on many variables, including dimensions and displacement of the vessel, maximum allowable stand-off, berthing structure, tidal variations and other berth-specific conditions. The size of the fender unit is based on the berthing energy of the vessel which is related to the square of the berthing velocity.

Marine fenders are used at ports and docks on quay walls and other berthing structures. They absorb the kinetic energy of a berthing vessel and thus prevent damage to the vessel or the berthing structure.

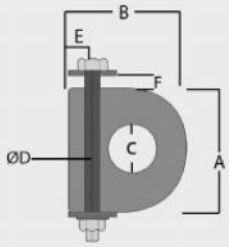
For bunkering operations between two vessels, floating fenders such as pneumatic or foam elastomer fenders are typically used.

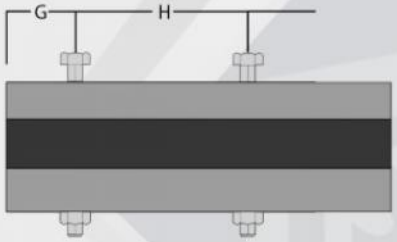
Boat fenders are used on recreational boats, tugboats, ferries, naval vessels, passenger vessels, luxury yachts etc. Boat fenders are also available in different types, such as 'D' fenders, Square fenders, Wing fenders, Keyhole fenders, Tug boat fenders, Lightweight foam elastomer fenders.etc

INDEX

D-O TYPE FENDERS

Ismat manufactures D-Series fenders with either a cylindrical or a "D" shaped bore to provide for varying mounting requirements. Designed for use on tugs and barges, they offer long term durability for applications where repeated compression cycles are encountered in pushing service. They also offer the excellent physical characteristics needed to handle the high loading which occurs both on initial contact,and throughout the service cycle.





DO- Type Fender Dimensions

A	B	C	ØD	E	F	G	H	Flat Bar	Bolt Size	Length
75	75	35	10	25	10	100	200	35x5	M10	3000
100	100	50	15	25	10	100	200	50X6	M12	3000
125	125	60	15	30	12	125	250	50x6	M12	3000
150	150	75	20	30	12	125	250	60x8	M16	3000
200	200	100	25	45	15	175	350	80x10	M20	3000
250	250	125	30	50	20	175	350	100x10	M24	3000
300	300	150	35	60	25	175	350	110x12	M24	3000
350	350	175	35	70	25	175	350	120x12	M30	3000
400	400	200	35	80	30	175	350	130x15	M30	3000
500	500	250	45	100	30	200	400	130x15	M36	3000

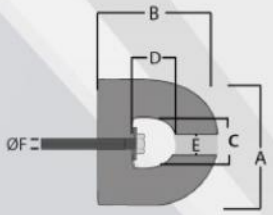
The above table covers our standard sizes only.
However we can design and build to suit
Customer's individual requirements.

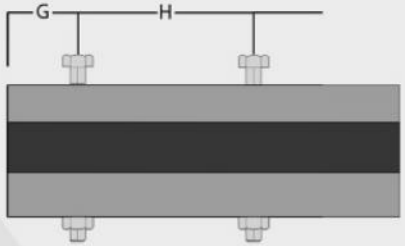
All Dimensions in mm
Overall Dimensional Tolerances ± 5%

D-D TYPE FENDERS

Extruded D-fenders are simple rubber profiles, usually attached with bolts to the structure. Extrusions can be made in virtually any length then cut and drilled to suit each application. Pre-curved sections and special sizes are available on request.

Applications: Jetties and wharves for small craft - Tugs and workboats - Pontoon protection - Inland waterways - General purpose fendering.





DD- Type Fender Dimensions

A	B	C	D	E	ØF	G	H	Flat Bar	Bolt Size	Length
75	75	35	35	30	15	100	200	35x5	M12	3000
100	100	50	50	30	15	100	200	40x5	M12	3000
125	125	60	60	40	20	125	250	50x6	M16	3000
150	150	75	75	40	20	125	250	60x8	M20	3000
200	200	100	100	50	25	175	350	80x10	M24	3000
250	250	125	125	60	30	175	350	90x12	M24	3000
300	300	150	150	60	30	175	350	110x12	M24	3000
350	350	175	175	75	35	175	350	130x15	M30	3000
400	400	200	200	75	35	175	350	150x15	M30	3000
500	500	250	250	90	45	200	400	180x20	M36	3000

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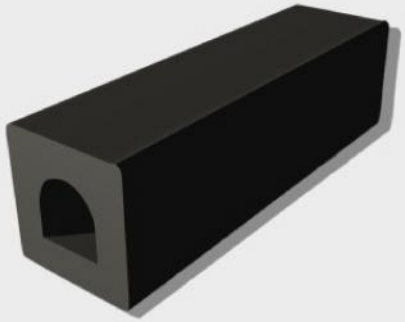
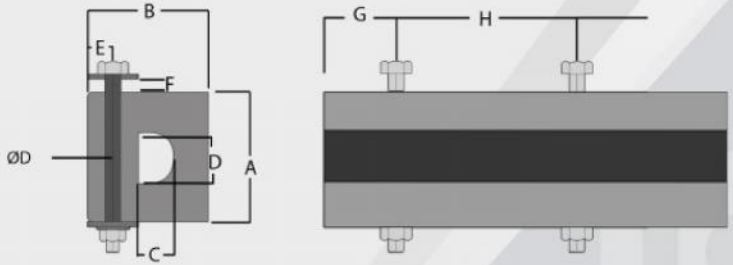
SQUARE FENDER WITH CENTRE D

Square type fenders are used for tugs, barges, work-boats, as side belting and protective fenders against heavy applications. These fenders can also be mounted on quay by means of anchor belts. Square type fenders are supplied with D hole Rounded hollow or solid





Square D- Type Fender Dimensions

A	B	C	D	ØD	E	F	G	H	Flat Bar	Bolt Size	Length
75	75	45	45	10	30	15	100	200	35x5	M10	3000
100	100	50	50	15	30	15	100	200	40x5	M12	3000
125	125	60	60	15	40	20	125	250	40x5	M12	3000
150	150	75	75	20	40	20	125	250	50x8	M16	3000
200	200	100	100	25	50	55	175	350	70x10	M20	3000
250	250	125	125	30	60	30	175	350	90x12	M24	3000
300	300	150	150	35	60	30	175	350	100x12	M24	3000
350	350	175	175	35	75	35	175	350	120x12	M30	3000
400	400	200	200	35	75	35	175	350	150x15	M30	3000
500	500	250	250	45	90	40	200	400	180x20	M36	3000

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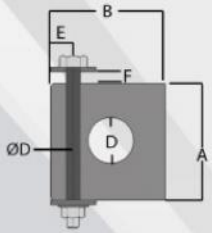
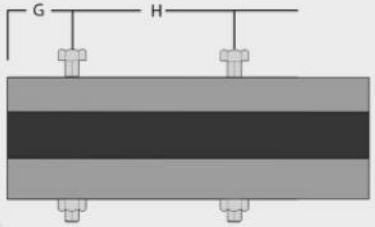
Square fenders are normally used where rigid mounting is desired. They are widely used on tugs, and on harbor structures where tidal conditions do not exist and where berthing is at a low angle. It may be mounted horizontally or vertically behind timbers to provide extra cushioning where dock loading must be kept low. It can be precurved during extrusion for solid mounting on vessels. This versatility in protecting both structures and vessels is enhanced by a wide range of available sizes.





Square O - Type Fender Dimensions

A	B	D	ØD	E	F	G	H	Flat Bar	Bolt Size	Length
75	75	45	10	30	15	100	200	35x5	M10	3000
100	100	50	15	30	15	100	200	50x6	M12	3000
125	125	60	15	40	20	125	250	50x6	M12	3000
150	150	75	20	40	20	125	250	60x8	M16	3000
200	200	100	25	50	55	175	350	80x10	M20	3000
250	250	125	30	60	30	175	350	100x10	M24	3000
300	300	150	35	60	30	175	350	110x12	M24	3000
350	350	175	35	75	35	175	350	120x12	M30	3000
400	400	200	35	75	35	175	350	130x15	M30	3000
500	500	250	45	90	40	200	400	150x20	M36	3000

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SQUARE FENDER WITH CENTRE O

CYLINDRICAL FENDER

Cylindrical fenders are simple, versatile and easy to install, which makes them ideal for berths accomodating large and small vessels. The wide range of available sizes means Cylindrical Fenders can be closely matched to each application.

Features :
Simple and economical design
Easy to install and maintain
Thick wall resists abrasion and wear

Applications:
Bulk cargo berths
General cargo quays
ferry terminals
Fishing and workboat berths
Pontoons and floating structures
Tug havens

Cylindrical Fender Dimensions		
OD	ID	LENGTH
100	50	3000
125	60	3000
150	75	3000
200	100	3000
250	125	3000
300	150	3000
400	200	3000
450	225	3000
500	250	3000
600	300	3000

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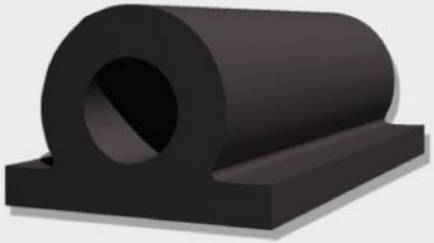
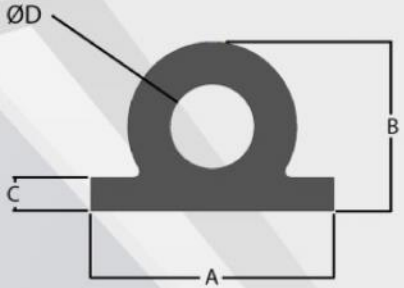
However we can design and build to suit
Overall Dimensional Tolerances ± 5%
Customer's individual requirements.
All Dimensions in mm





Wing-Type fenders offer the high energy absorption required for tugs, barges and other service vessels. Their cross sections are designed for solid mounting and complete coverage.
Wing Type fenders are designed for vessel mounting. They combine the impressive energy absorption capabilities of a cylindrical design with the convenience of wing mounting.
They are also used in pilot boats, heavy tugs, barges and ferries.

Wing-Type Fender Dimensions				
A	B	C	ØD	Length
120	65	15	25	2000
140	45	15	20	2000
160	100	25	50	2000
177	80	20	38	2000
180	100	25	50	2000
215	150	30	75	2000
245	150	30	75	2000
280	200	40	100	2000
320	200	40	100	2000
330	250	50	125	2000
350	200	40	100	2000
370	250	50	100	2000
410	250	50	100	2000
410	250	50	125	2000

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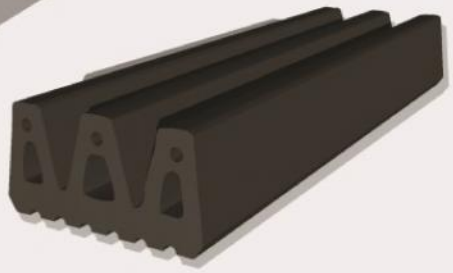
All Dimensions in mm
Overall Dimensional Tolerances ± 5%

WING-TYPE FENDER

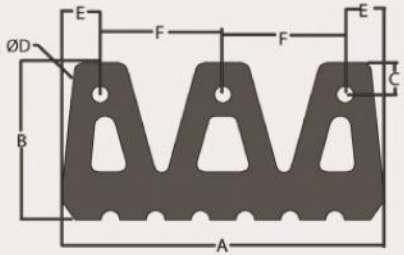
M-TYPE FENDER



M Type fenders are installed on to the bow of Ocean going vessels and tugs to protect the hull against damages caused during heavy operations. These fenders are installed in similar manner as those of key Hole Fenders.

Features:
Heavy duty design
Grooved for extra grip
Fits around tight bends
Triple leg attachment

Applications:
All types of tugs
Pontoon protection



W-Fender Dimensions

A	B	C	ØD	E	F	ØPin	FlatBar	Length
400	200	40	23	50	150	20	100x15	2000
500	250	50	27	60	190	24	125x20	2000
600	300	60	33	70	230	30	150x20	2000

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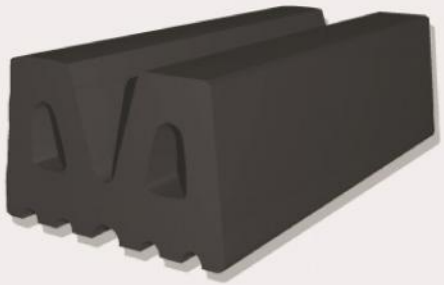
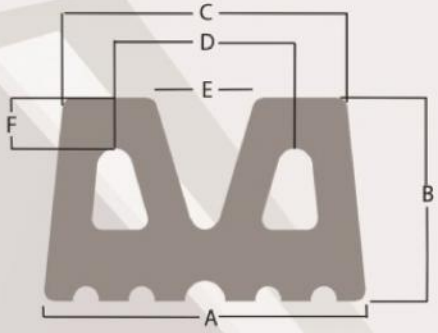
All Dimensions in mm
Overall Dimensional Tolerances ± 5%



W Type fenders are installed on to the bow of Ocean going tugs, to protect the hull against damages caused during pushing and pulling operations / towage . These fenders are installed in similar manner as those of key Hole Fenders.

Features
Extreme-duty design
Twin-leg attachment
Open bone for easy installation

Applications
Ocean-going tugs
Icebreakers
Large harbour tugs



W-Type Fenders Dimensions

A	B	C	D	E	F	Ø Pin	Flat Bar	length
320	200	280	180	100	50	25	100x20	2000
400	250	350	220	110	55	30	120x20	2000
480	300	426	269	135	65	40	140x20	2000
500	450	420	255	90	75	40	150x20	2000

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All Dimensions in mm
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W-TYPE FENDER

TUG FENDERS

Large cylindrical fenders are often used as the primary pushing fenders on the bow or stern of modern tugs. Their round shape is ideal for working with large bow flares (like container ships), but are equally good for pushing flat-sided vessels. Tug Cylindricals come In long lengths with spigot-joints at regular intervals along the lengths. A longitudinal chain runs down the centre of the fender, supplemented by circumferential straps or chains which are recessed into grooves. Tapered ends are also available.

Tug Fender Dimensions						
ØD	Ød	A	B	C	ØG	ØJ
250	125	200	570	500	190	75
300	150	225	600	700	225	75
380	190	280	650	800	280	100
400	200	300	670	800	300	100
450	225	300	700	850	350	100
500	250	300	730	900	375	100
600	300	350	800	900	450	125

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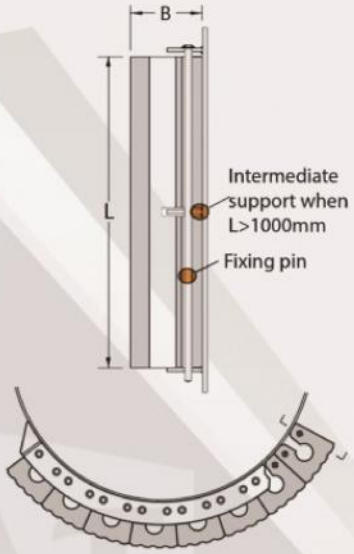
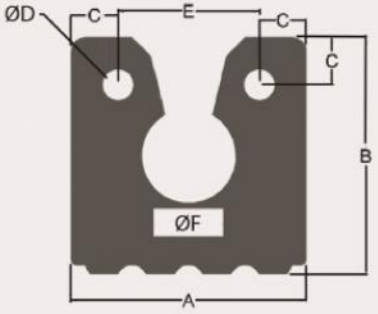
Overall Dimensional Tolerances ± 5%

Key Hole Fenders are used as an alternative to W-fenders incase of extremely heavy loads. The keyhole cross-section is very tough but can be curved around the hull. Fixing / mounting is very simple with this type of fender.
Features:
Heavy duty design
Traditional, proven shape
Grooved or plain surface
Fits around bends





KEY HOLE FENDER DIMENSIONS								
A	B	C	ØD	E	ØF	Ø Pin	Flat Bar	Length
200	200	35	28	130	90	25	100x15	2000
250	250	50	33	150	100	30	125x20	2000
300	300	60	33	180	115	30	150x20	2000
350	350	70	33	210	125	30	175x25	2000

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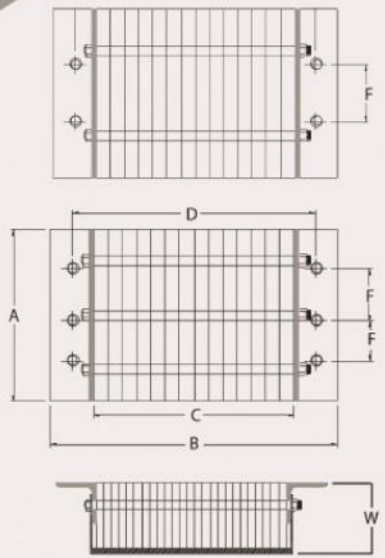
KEY HOLE FENDER

LAMINATED DOCK FENDERS



Laminated dock bumper are weather resistant, easily installed and long lasting to protect dock equipment, building wall and truck cargo from potential damage. Bumper projection should be specified at not less than 4".
For recessed docks or special applications, additional projection may be required.
Assembly-Installation:
All laminated dock bumpers are assembled with two 3" x 3" x ¼" thick steel angles. The angles are fastened with threaded rod and nut. All exposed metal parts are factory painted.
We recommend all bumpers be installed 1" to 2" below deck level. Use ¾" or 5/8" expansion bolts with a minimum length of 3".

	Thickness out From Dock (W)		Over all size (A x B)		Rubber Surface (A X C)		PCD (Length) (D)		PCD (Width) (F)	
Code	Inches	mm	Inches	mm	Inches	mm	Inches	mm	Inches	mm
D 110	4.5	114	6 x 16	152 x 405	6 x 11	152 x 280	14	355	3	75
D 111	4.5	114	6 x 26	152 x 660	6 x 21	152 x 535	24	610	3	75
D 112	4.5	114	6 x 38	152 x 965	6 x 33	152 x 840	36	915	3	75
D 113	4.5	114	10 x 16	254 x 405	10 x 11	254 x 280	14	355	6	152
D 114	4.5	114	10 x 20	254 x 510	10 x 15	254 x 380	18	455	6	152
D115	4.5	114	10 x 26	254 x 660	10 x 21	254 x 535	24	610	6	152
D 116	4.5	114	10 x 38	254 x 965	10 x 33	254 x 840	36	915	6	152
D 117	4.5	114	12 x 16	305 x 405	12 x 11	305 x 280	14	355	4	100
D 118	4.5	114	12 x 20	305 x 510	12 x 15	305 x 380	18	455	4	100
D 119	4.5	114	12 x 26	305 x 660	12 x 21	305 x 535	24	610	4	100
D 120	4.5	114	12 x 38	305 x 965	12 x 33	305 x 840	36	915	4	100
D 121	4.5	114	20 x 13	510 x 330	20 x 8	510 x 205	11	280	7	175
D 122	4.5	114	24 x 13	610 x 330	24 x 8	610 x 205	11	280	9	230
D 123	4.5	114	36 x 13	915 x 330	36 x 8	915 x 205	11	280	10	254
D 124	6	152	10 x 16	254 x 405	10 x 11	254 x 280	14	355	6	152
D 125	6	152	10 x 26	254 x 660	10 x 21	254 x 535	24	610	6	152
D 126	6	152	10 x 38	254 x 965	10 x 33	254 x 840	36	915	6	152
D 127	6	152	20 x 13	510 x 330	20 x 8	510 x 205	11	280	7	175
D 128	6	152	12 x 16	305 x 405	12 x 11	305 x 280	14	355	4	100
D 129	6	152	12 x 26	305 x 660	12 x 21	305 x 535	24	610	4	100
D 130	6	152	12 x 38	305 x 965	12 x 33	305 x 840	36	915	4	100
D 131	6	152	24 x 13	610 x 330	24 x 8	610 x 205	11	280	9	230
D 132	6	152	36 x 13	915 x 330	36 x 8	915 x 205	11	280	10	254

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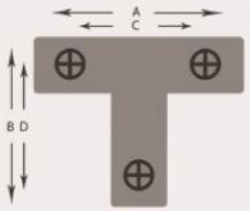
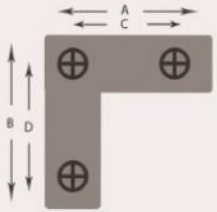
MOULDED BUMPERS

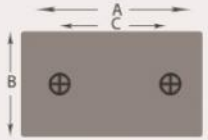


IRB110

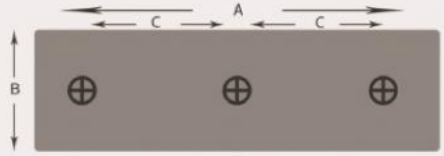


IRB111

IRB112



IRB114



IRB120

IRB113

IRB116

IRB117

IRB115

IRB118

IRB119

Ismat Rubber bumpers are manufactured for heavy duty protection of walls, rails, docks, truck bumpers, utility trailers, carts, forklifts, corners and other places where metal to surface contact is harsh and continuous.
Made with high tensile, abrasion-resistant rubber compounds, in moulded and extruded shapes and styles.
Containing the correct amount of resiliency to absorb pressure and impact shock without damage to truck or dock. Unique design and construction achieves high impact resistance and long life.
Immune to all weather conditions and is maintenance free.

	Moulded Fender Dimensions						
Code	A (Length)	B (Width)	C (PCD)	D (PCD)	No of Holes	Hole Size	Thickness
IRB 110	560	560	355	355	3	50	75
IRB 111	450	450	260	260	3	60	100
IRB 112	610	305	455	150	4	50	75/100/150
IRB 113	330	305	235	175	4	40	100
IRB 114	330	255	180	-	2	75	100
IRB 115	450	255	255	-	2	75	100
IRB 116	560	255	370	140	4	50	100
IRB 117	760	255	500	140	4	50	100
IRB 118	455	200	255	-	2	75	50
IRB 119	450	255	255	-	2	75	75
IRB 120	780	255	300	-	3	75	100

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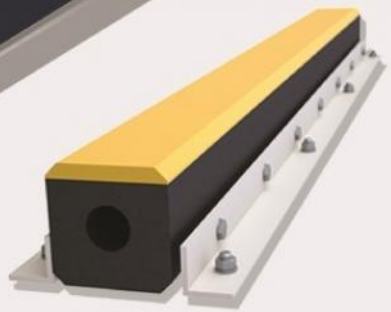
All Dimensions in mm
Overall Dimensional Tolerances ± 5%

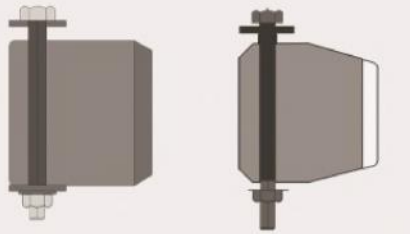
UHMW-PE-Rubber Fenders

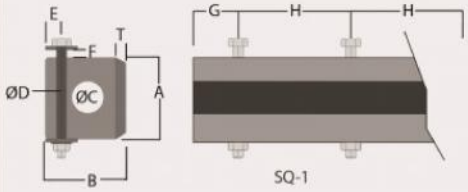


Construction:
UHMW-PE – Rubber Fenders are manufactured using the latest molecular bonding technology to combine the energy absorbing qualities of a rubber fender with the low friction benefits of a polyethylene facing.

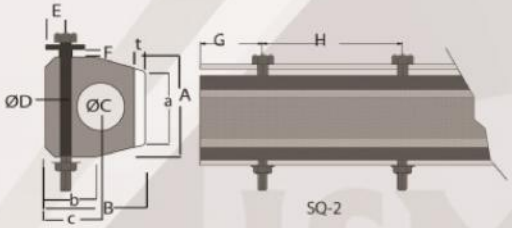
Key benefits:
UHMW-PE face offers a low friction, hard wearing, durable contact facing; while the rubber elements are produced from marine quality compounds which are highly resistant to the effects of ozone degradation, UV radiation and water-borne oil pollution.

Applications:
UHMW-PE – Rubber Fenders are ideal for most side fendering and guiding applications and any installation requiring a simple Extruded Fender with low shear forces. Because of its low friction capabilities there will be less wear in the fenders. They are ideal for mounting on quay structures where tidal conditions exist. It allows vessels to rise and fall with tide levels without damaging the fender or the vessel.





SQ-1



SQ-2

SQ-1 Fender:UHMW-PE – Rubber Fender Dimensions

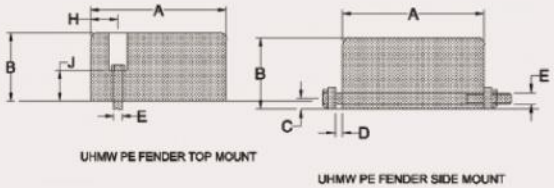
A	B	ØC	T	ØD	E	F	G	H	Flat Bar	Bolt Size	Length
100	100	30	20	15	25	10	100	200	50x6	M12	3000
150	150	65	20	20	30	12	100	200	60x8	M16	3000
200	200	75	25	25	45	20	100	200	80x10	M20	3000
250	250	100	30	30	50	25	100	200	100x10	M24	3000
300	300	125	30	30	60	30	100	200	110x12	M24	3000

SQ-2 Fender:UHMW-PE – Rubber Fender Dimensions

A	B	ØC	a	b	c	t	ØD	E	F	G	H	Flat Bar	Bolt Size	Length
80	80	42	60	40	44	10	15	25	6	100	200	45x6	M12	3000
100	100	45	74	50	56	10	15	25	8	100	200	45x6	M12	3000
120	120	62	88	60	67	12	20	30	10	100	200	60x8	M16	3000
150	150	73	110	75	83	15	20	30	12	100	200	60x8	M16	3000

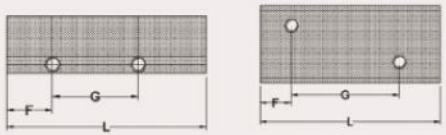
The above table covers our standard sizes only.
However we can design and build to suit
Customer's individual requirements.

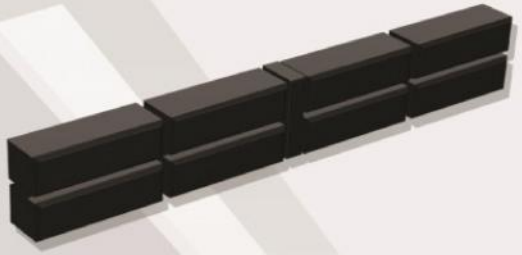
All Dimensions in mm
Overall Dimensional Tolerances ± 5%



UHMW PE FENDER TOP MOUNT

UHMW PE FENDER SIDE MOUNT





Key benefits: UHMW-PE Fenders are an environmentally responsible alternative to tropical hardwoods and are fully recyclable. They also provide the benefits of higher wear resistance (even greater than steel) and lower maintenance; as they do not split or rot and are fully resistant to infestation from marine borers. The low friction coefficient and high abrasion resistance of UHMW-PE provides an ultra smooth surface for the vessel to slide easily along the face of the Fender.

Applications: UHMW-PE Sliding Fenders are used in many applications including the replacement of timber piles, beams and dolphins, as well as other applications where lumber would have been the traditional fendering material. They are also ideal wherever the equipment is for a durable sliding surface rather than energy absorption.

Construction: Sliding Fenders are UHMW-PE rubbing strips manufactured and machined in sizes to suit your application. Extremely hard wearing and highly resistant, they are an environmentally beneficial alternative to timber or rubber facings as well as providing a low maintenance, low friction and low cost solution.

Energy/Technical: UHMW-PE Sliding Fenders can be supplied pre-drilled for easy installation, and chamfered to avoid snagging .

UHMW-PE Sliding Pad Dimensions

A	B	L- Max	C	D	E	F	G	H	J	Flat Bar	Bolt Size
70	50	2000			M16	60	120	35	15		M16
80	60	2000			M16	60	120	40	18		M16
100	50	2000			M16	60	120	50	15		M16
100	65	2000			M16	60	120	50	20		M16
100	100	2000			M16	60	120	50	30		M16
120	80	2000			M16	60	300	60	24		M16
120	120	2000			M16	60	300	60	36		M16
140	70	2000	30	10	M20	100	300	70	21	80x10	M20
160	70	2000	30	10	M20	100	300	80	21	80x10	M20
170	120	2000	35	10	M20	100	300	85	36	80x10	M20
180	70	2000	35	10	M20	100	300	90	21	80x10	M20
190	110	2000	35	10	M20	130	400	90	33	80x10	M20
200	75	2000	50	10	M20	130	400	60	23	80x10	M20
200	100	2000	50	10	M20	130	400	60	30	80x10	M20
200	150	2000	50	10	M20	130	400	60	45	80x10	M20
250	150	2000	50	10	M24	150	500	60	45	80x10	M24

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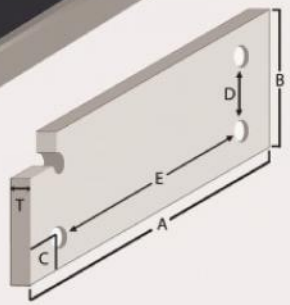
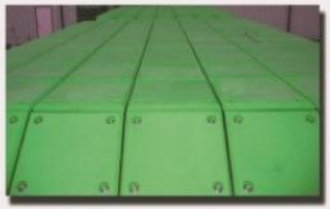
All Dimensions in mm
Overall Dimensional Tolerances ± 5%

UHMW-PE Sliding Pads

UHMW-PE Fender plates





Benefits: UHMW-PE Fender Plates are resilient pads designed for quays where small vessels are moored, protecting both the quay face and vessel from abrasion. UHMW-PE Fender Plates provide the benefits of higher wear resistance and lower maintenance, as they do not split or rot and are highly resistant to infestation from marine borers.

Applications: The low friction coefficient and high abrasion resistance of UHMW-PE provides an ultra smooth surface for the vessel to berth easily along the face of the Fender.

Options: UHMW-PE Fender Plates can be manufactured and machined in sizes to suit the panel and can be supplied with pre-drilled holes with chamfered edges for easy installation.

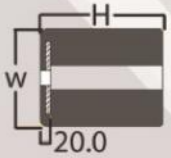
UHMW-PE Fender Plates Dimensions

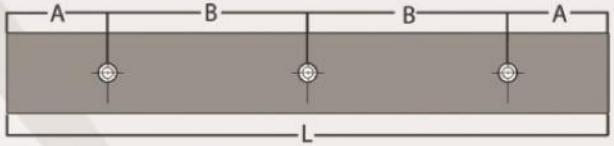
A	B	C	T	D	E	Anchors
1000	500	100	50	300	800	4 x M20
	600	150			700	
	750			450		
1500	500	100	50	300	650	6 x M20
	600	150			600	
	750	100		450		
1000	500	100	75	300	800	4 x M20
	600	150			700	
	750			450		
1500	500	100	75	300	650	6 x M20
	600	150			600	
	750	100		450		
1000	500	100	100	300	800	4 x M20
	600	150			700	
	750			450		
1500	500	100	100	300	650	6 x M20
	600	150			600	
	750	100		450		
1000	500	100	125	300	800	4 x M20
	600	150			700	
	750			450		
1500	500	100	125	300	650	6 x M20
	600	150			600	
	750	100		450		
1000	500	100	150	300	800	4 x M20
	600	150			700	
	750			450		
1500	500	100	150	300	650	6 x M20
	600	150			600	
	750	100		450		

The above table covers our standard sizes only.
However we can design and build to suit
Customer's individual requirements.

All Dimensions in mm
Overall Dimensional Tolerances ± 5%

All Fender Bars can resist high impacts and are suitable for a wide range of general purpose applications.
Their applications are everything from ferry berths to bumpers on barges. The vulcanized internal steel plate provides very strong fixing points and reduces bending moments in the bolts.





Bar Fender Dimensions

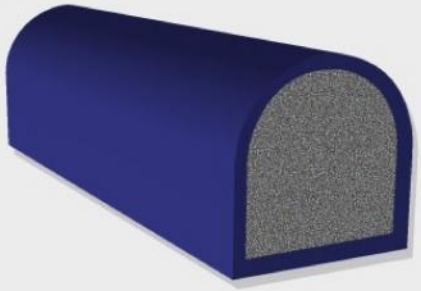
W	H	L	A	B	Anchors
150	150	1000	250	500	2 x M24
150	150	1500	250	500	3 x M24
150	200	1000	250	500	2 x M24
150	200	1500	250	500	3 x M24
200	200	1000	250	500	2 x M30
200	200	1500	250	500	3 x M30
200	250	1000	250	500	2 x M30
200	250	1500	250	500	3 x M30
200	300	1000	250	500	2 x M30
200	300	1500	250	500	3 x M30

The above table covers our standard sizes only.
However we can design and build to suit
Customer's individual requirements.

All Dimensions in mm
Overall Dimensional Tolerances ± 5%

BAR FENDERS

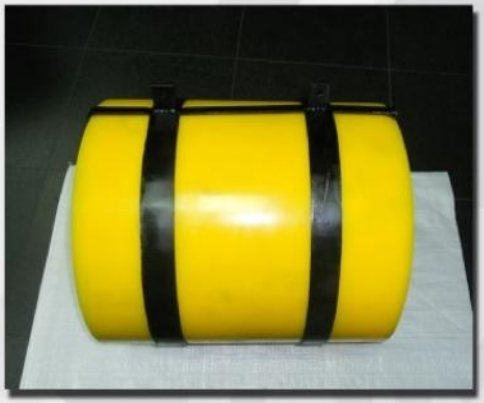
PU FOAM APPLICATIONS



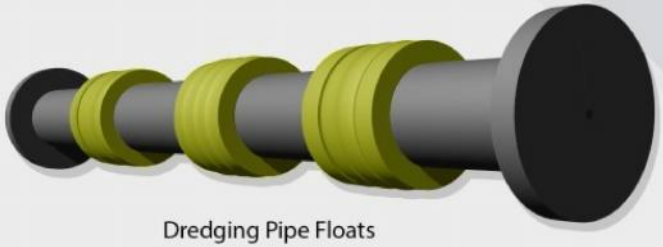
PU Foam with integrated skin

PU Floats

Boat Fenders



Dredging Pipe Floats



Dredging Pipe Floats

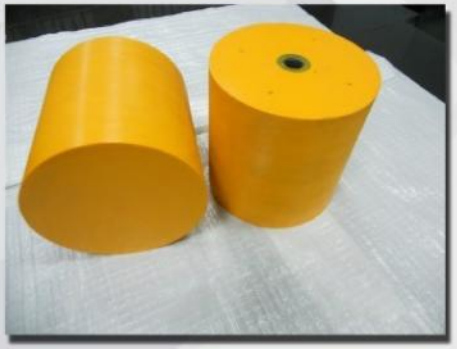
FEATURES:

Wear & abrasion resistant outer skin.
Impact absorbing technology prevents damage to buoy or vessels
Closed cell foam core fill prevents loss of buoyancy if punctured
Corrosion resistant construction
Easy to handle.
Lighter than conventional rubber fenders

CONSTRUCTION:
Tough, thick heavy duty urethane skin with nylon re-inforced fabric.
Impact absorbing closed cell outer foam core
The Foam Fenders and Buoys have a construction based on a closed-cell polyethylene foam core and an outer skin of reinforced polyurethane elastomer. The closed cell foam structure makes punctures a thing of the past. Every cell is separate and so water cannot migrate into the foam. Skins are non-marking and available in many colours.

Cushion Rollers

Crane Stoppers



Buffers

PU Fenders

PU FOAM APPLICATIONS

Specfications

Rubber Properties	Moulded		
Raw Material	EPDM		
Properties	Test Method	Unit	Value
Hardness	ASTM D 2240-97	Shore A	70-75
Tensile Strength	ASTM D412-98a	Psi	1845
Elongation@ Break	ASTM D412-98a	%	324
Compression Set (70°C / 22h)	ASTM D395-98	%	23
Ageing Test (70°C / 168h)	ASTM D573-99		
Hardness Change	ASTM D 2240-97	Shore A	(+)3
Tensile Strength Change	ASTM D412-98a	%	-8
Elongation @ Break Change	ASTM D412-98a	%	-19
Specific Gravity			1.1
Resilience	ASTM D2632	%	45
Abrasion Index	ASTM D5963-97a		407
Tear Resistance	ASTM D 624		60kN/m (min)
Ozone Resistance	ASTM D1149	50pphm @ 20% strain, 40°C, 100 h	No Cracks

Rubber Properties	Extruded		
Raw Material	EPDM		
Properties	Test Method	Unit	Value
Hardness	ASTM D 2240-97	Shore A	70-75
Tensile Strength	ASTM D412-98a	Psi	1645
Elongation@ Break	ASTM D412-98a	%	190
Compression Set (70°C / 22h)	ASTM D395-98	%	21
Ageing Test (70°C / 168h)	ASTM D573-99		
Hardness Change	ASTM D 2240-97	Shore A	(+)2
Tensile Strength Change	ASTM D412-98a	%	-12
Elongation @ Break Change	ASTM D412-98a	%	12
Specific Gravity			1.19
Resilience	ASTM D2632	%	33
Abrasion Index	ASTM D5963-97a		46
Tear Resistance	ASTM D 624		60kN/m (min)
Ozone Resistance	ASTM D1149	50pphm @ 20% strain, 40°C, 100 h	No Cracks

Rubber Properties	Moulded		
Raw Material	Natural / SBR		
Properties	Test Method	Unit	Value
Hardness	ASTM D 2240-97	Shore A	70-75
Tensile Strength	ASTM D412-98a	Psi	2940
Elongation@ Break	ASTM D412-98a	%	524
Compression Set (70°C / 22h)	ASTM D395-98	%	24
Ageing Test (70°C / 168h)	ASTM D573-99		
Hardness Change	ASTM D 2240-97	Shore A	(+)1
Tensile Strength Change	ASTM D412-98a	%	-8
Elongation @ Break Change	ASTM D412-98a	%	-30
Specific Gravity			1.19
Resilience	ASTM D2632	%	36
Abrasion Index	ASTM D5963-97a		322
Tear Resistance	ASTM D 624		85kN/m (min)
Ozone Resistance	ASTM D1149	50pphm @ 20% strain, 40°C, 100 h	No Cracks

Rubber Properties	Extruded		
Raw Material	Natural / SBR		
Properties	Test Method	Unit	Value
Hardness	ASTM D 2240-97	Shore A	70-75
Tensile Strength	ASTM D412-98a	Psi	2125
Elongation@ Break	ASTM D412-98a	%	300
Compression Set (70°C / 22h)	ASTM D395-98	%	5.2
Ageing Test (70°C / 168h)	ASTM D573-99		
Hardness Change	ASTM D 2240-97	Shore A	(+)1
Tensile Strength Change	ASTM D412-98a	%	-16
Elongation @ Break Change	ASTM D412-98a	%	-28
Specific Gravity			1.29
Resilience	ASTM D2632	%	32
Abrasion Index	ASTM D5963-97a		120
Tear Resistance	ASTM D 624		70 kN/m (min)
Ozone Resistance	ASTM D1149	50pphm @ 20% strain, 40°C, 100 h	No Cracks

UHMW-PE Properties			
Raw Material	PE-HMW		
Properties	Test Method	Unit	Value
Molecular weight (Average molar mass)		g/mol	o.5 Mio
Mechanical properties			
Density	DIN 53479	g/cm³	0.96
Tensile strength	DIN 53455	N/mm²	27
Shore D hardness, 15s – Value	DIN 53505	Skala D	~ 70
Ball indentation hardness, 30s – Value	DIN ISO 2039 Part1	N/mm²	46
Ultimate tensile strength	DIN 53455	N/mm²	25
Elongation at Break	DIN ISO /R 527	%	100
Modulus of electricity	DIN 53457	N/mm²	1.060
Notched impact strength (Sharply)	DIN 53453	Kj/m²	o.Br.
Abrasion	Sand slurry method	%	> 250
Coefficient of friction		µ	0,1 - 0,2
Thermal properties			
Dimensional stability under heat	DIN 53461	°C	47
Vicat softening temperature	DIN 53460	°C	80
Crystalline melting range	DTA	°C	130 – 135
Thermal conductivity at 23 °C	DIN 52612	W/ (K * m)	0.41
Specific heat at 23°C		Kj/ (K * Kg)	1.8
Coefficient of linear expansion at 23 °C	DIN 53752	10^{-5} * (1/K)	~ 20
Fire behaviour	UL 94		HB
Application temperature (min.)		°C	-100
Application temperature (constant		°C	+80
Moisture absorption		%	< 0,01
Electrical properties			
Specific volume resistance	DIN 53482	Ω * cm	$< 10^{15}$
Surface resistance	DIN 53482	Ω	$< 10^{13}$
Dielectric strength	DIN 53481	kV/mm	40
Dielectric constant at 50 Hz	DIN 53485		2.9