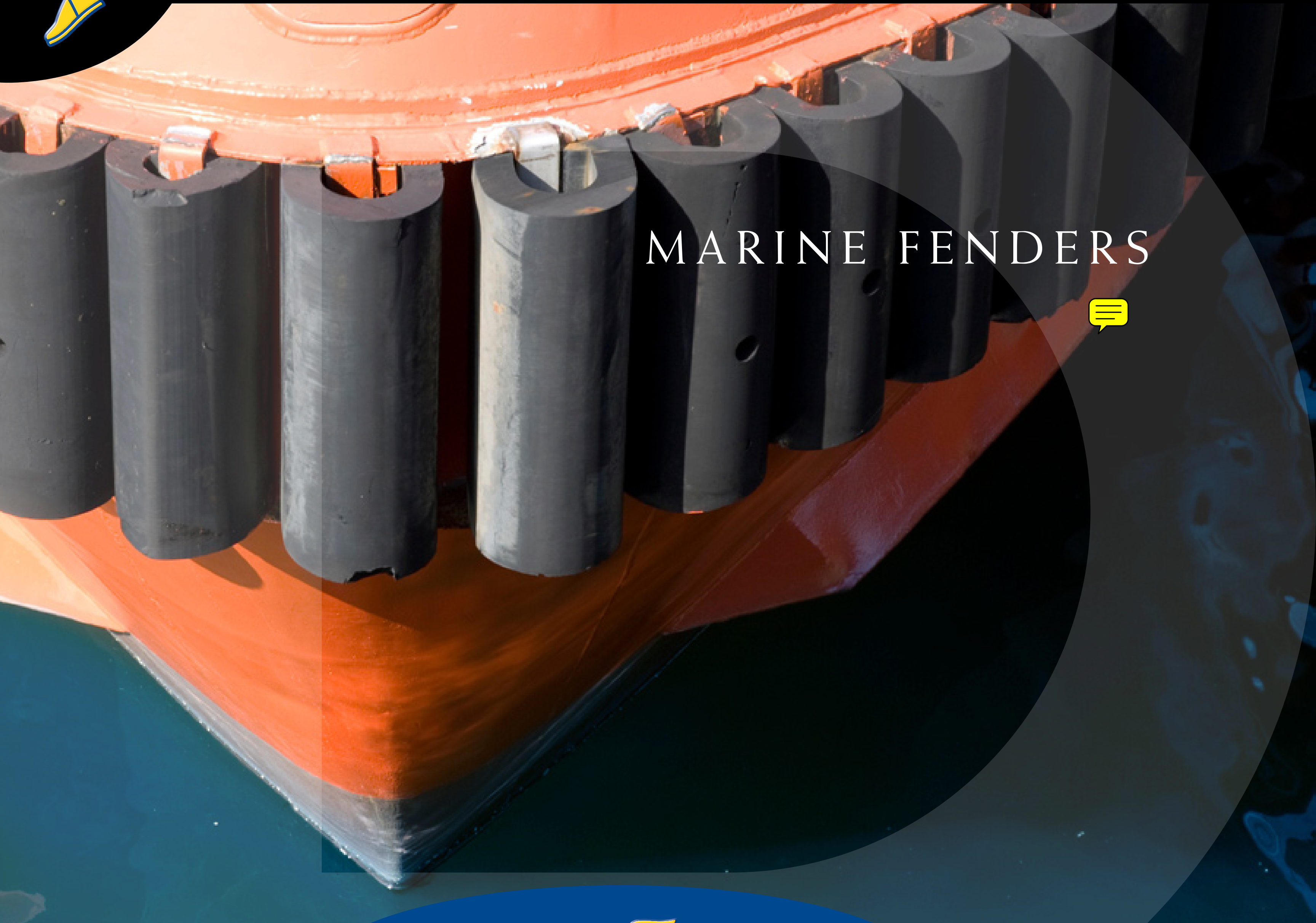


MARINE FENDERS

GOODYEAR
Engineered Products

GOODYEAR **ENGINEERED PRODUCTS**

For 50 years, Goodyear Engineered Products has specialized in moulded and extruded rubber products, particularly dock fenders. The rubber is mixed on site to ensure faultless product quality and uniformity. Cutting edge equipment and Goodyear EP own quality control lab enable the company to equal or exceed the highest industry standards. Our factory is certified ISO 9001 and TS 16949, thus guaranteeing exacting quality assurance. Moreover, we can produce tailored dock fenders of lengths of up to 30 ft. and have the resources to carry through very short turnaround projects.

Veyance Technologies Inc. is the sole authorized manufacturer and seller of Goodyear products.

TECHNICAL **DISCUSSIONS**

Since the purpose of a Dock Fender system is to absorb the energy of a berthing ship, it is necessary to examine the factors that make up the total energy package. These factors are:

1 Weight of the vessel in displacement tons.
2 Berthing velocity normal to the dock.
3 Angle of approach.
5 Dock design.

Experience has shown that even though all of the above factors can and do vary, it is necessary to arrive at a reasonable estimation of the energy to be absorbed by the fenders. The amount of energy that can be absorbed by the fenders can be determined with acceptable accuracy; however, the energy being absorbed by the dock and the vessel itself as well as that being dissipated by the water can only be approximated. We know, for example, that a dolphin supported by piling will absorb a greater percentage of a given amount of energy than a solidly constructed dock. The fact that the piles are free to deflect allows the dolphin to absorb energy. A wharf that is backed by land is not designed to deflect and therefore a greater amount of energy must be dissipated by the fenders themselves.

The kinetic energy possessed by a moving vessel can be determined by the following equation:

(1) $KE = \frac{1}{2} (W/g) V_E^2$ where

W = Weight of the vessel in pounds (Displacement tonnage x 2240 lbs.)
V_E = Velocity in feet per second normal to the dock
g = Acceleration due to gravity (32.2 ft/sec)

1. Weight **of Vessel**

It is common to refer to the ship's weight in terms of dead weight tonnage (DWT) or displacement tonnage. Displacement tonnage is the more accurate figure to use in computing kinetic energy because it is the total weight of the ship and its cargo and equipment. If the dead weight tonnage is known, multiply DWT by 1.3 to obtain an accurate approximation of the displacement tonnage.

2. Berthing **Velocity**

Since the kinetic energy possessed by a ship is proportional to the square of the velocity, it is important that the velocity be determined with accuracy. The velocity of a ship approaching a dock is affected by a number of factors:

- the size of the vessel,
- the skill of the crew members,
- the wind and current conditions,
- and whether the ship is making an unassisted berthing or if it is being assisted by tugs.

The angle of approach has a direct bearing on the determination of kinetic energy because the velocity used in equation (1) is that component of the actual velocity that is at a right angle to the pier.

Since the velocity of a ship is usually given in terms of knots, it is necessary to convert that figure into feet per second as follows:

Knots x 1.09 = Feet per second.

The velocity of a ship normal to a dock (effective velocity - VE) is expressed in terms of the actual velocity and the angle of approach. All unassisted vessels will approach the berth at some acute angle, usually 5° to 15°. Large tankers and ore carriers are guided to the docking facility by tugs and their approach angle can be up to 90°. In these cases, the vessel is under control of the tugs and its velocity can be regulated.

The effective velocity of a ship approaching a dock at an angle can be determined by:

(2) V_E = Actual velocity x the sine of the angle of approach.

Example :
A ship approaching a dock at 1½ knots and a 10° angle would have an effective velocity of:

V^E = (1½)(1,09)(sinus 10°) = 0,44 ft/sec

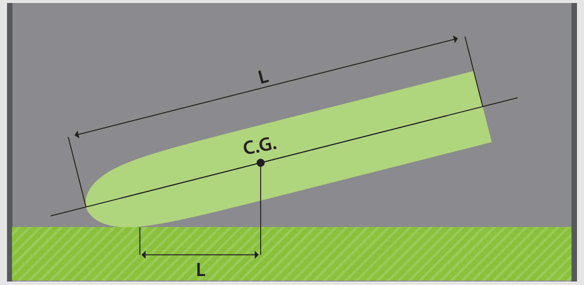
3. Angle **of Approach**

The angle in which a ship approaches a dock not only influences the effective velocity but also affects which part of the ship makes the initial contact with the pier. Generally, the ship will contact the dock at a point near the bow or the stern. In such cases, the reaction force will impart a rotational movement to the ship and this rotational movement will dissipate a portion of the ship's energy.

The proportion of the ship's energy dissipated by rotation can be approximated by the following ratio:

$$E_d = \frac{1}{1 + (L^1/r)^2}$$

Où
L^1 = the distance in feet from the point of contact to the ship's center of gravity measured parallel to the pier.
r = the rotational radius of the vessel from its center of gravity (expressed in feet).



$$E_d = \frac{1}{1 + 1^2} = 0,5$$

Experience has shown that a ship normally contacts the pier at a point of ¼ of its length so that the distance from the point of contact to the ship's center of gravity is also ¼ L. Therefore, the ratio can be established as:

This ratio is often called the berthing coefficient, (C_B).

4. Hydraulic **Effect**

In determining the energy to be absorbed by the fenders, it is also necessary to consider the effect of the water. As a ship makes contact with the dock and its movement is suddenly checked, the mass of water moving with the vessel adds to the energy possessed by the ship. Although there are a number of theories relating to the hydraulic effect, they all deal with the length, beam and draft of the ship.

4. Hydraulic **Effect** (con't)

F. Vasco Costa's formula for the "Hydrodynamic Mass" considers a factor of:

$1 + 2D/B$ where D = draft and B = beam.

The calculated energy should be multiplied by this factor.

Other designers consider the mass of a cylinder of water whose diameter is equal to the draft and whose length equals the length of a ship. The weight of this cylinder is to be added to the ship's displacement when computing the kinetic energy.

These two theories do not result in the same values. Also, the dimensions used for the draft, beam and length will vary because of the different ships and cargo being serviced by the pier. Yet it is desirable to consider the hydraulic effect in the energy computations, and for this reason, it is suggested that an average value be used. By averaging the results obtained by using these two approaches, an approximate factor of 0.35 can be determined. The amount of energy possessed by the vessel should be increased by 35% to include the hydraulic effect (HA). Therefore to compute the total energy to be absorbed by the fenders, including the berthing coefficient and the hydraulic effect, the following formula should be used:

(3) $KE = \frac{\frac{1}{2} W V_E^2 (C_B)(H_A)}{g}$ where W = displacement tonnage, V_E = velocity normal to the dock, g = acceleration due to gravity (32.2 ft/sec), C_B = berthing coefficient, H_A = hydraulic effect

This equation can be simplified to:
(4) $KE = 23{,}48\, W V_E^2$

Sample problem
Determine the energy to be absorbed for the following conditions:

Displacement tonnage = 40,000 tons
Forward velocity = 1 knot
Approach angle = 10°

Using equation (2) $V_E = (1)(1.09)(\sin 10^{\circ}) = 0.29$ ft per second
Using equation (4) $KE = KE = (23.48)(40{,}000)(0.29)^2 = 79{,}000$ ft-lbs



5. Dock **design**

To select the proper size and type of Dock Fender the design of the dock must be considered.

If the dock does not have a separate frontal system: the fenders can be mounted directly onto the dock face. Common methods of attaching fenders to this type of dock face include:

A. Festooning cylindrical fenders by suspending them with chain.
B. Directly bolting Rectangular, Wingtype, D Shaped or Trapezoidal fenders to the dock face.

For either attachment method the fenders can be positioned in a horizontal or diagonal pattern depending on the tidal conditions and the type of vessels being serviced by the pier. In areas of relatively high tides, or on piers that will handle barges as well as ships, it is good practice to mount the fenders in a diagonal pattern in order to protect a greater portion of the dock face.

For docks that have a protective frontal system made up of piles and wales: Rectangular or Trapezoidal fenders are generally mounted between the dock face and the wales.

The design strength of the dock also has a bearing on the size and the type of fender to be used. Piers and dolphins which are supported by piles have design limitations with respect to the loads that can be imposed. In these cases, a fender system must be selected that will absorb the energy of the berthing ship and remain within the design limits of the structure.

Having determined the amount of energy to be absorbed and the type of dock to be protected, the next step is to select the proper size and type of fender to specify. Also, the method of attaching the fender can be determined.

Sample Problem
Determine the size and type of fenders to be specified for a pile supported by a pier having a concrete cap. The vertical face of the concrete cap is 5 feet. The maximum load the dock is designed to take is 20,000 pounds per foot. Using the previous example, the energy to be absorbed is 79,000 ft-lbs.

Experience has shown that a vessel in the 40,000 ton class would contact a minimum of 20 feet of dock face. Therefore, we can determine that the energy to be absorbed per foot of fender will be:
79,000 ft-lbs/20 ft = 3950 ft-lbs/ft

Referring to the Energy-Deflection and Load-Deflection curves, the following information can be found:

Cylinder Fender Values

Size	Deflection	Energy	Load
15" x 7½"	7¾"	4,000 ft-lbs/ft	37,000 lb/ft
18' x 9"	9"	4,000 ft-lbs/ft	15,000 lb/ft

Rectangular Fender Values

Size	Deflection	Energy	Load
10' x 10"	3½"	4,000 ft-lbs/ft	40,000 lb/ft
12" x 12"	3¾"	4,000 ft-lbs/ft	28,000 lb/ft

Trapezoidal Fender Values

Size	Deflection	Energy	Load
10"	4¾"	4,000 ft-lbs/ft	28,000 lb/ft
13"	4½"	4,000 ft-lbs/ft	17,000 lb/ft

From a study of these figures, it can be seen that either an 18" x 9" Cylindrical Fender or a 13" Trapezoidal Fender would absorb the energy and remain within the load limitation of the structure.

The most economical and effective means of mounting Cylindrical fenders would be to suspend them by chain along the dock face. Trapezoidal fenders would be rigidly mounted by bolting.
Because of the adaptability of the Goodyear Engineered Products Dock Fenders, mounting patterns and methods can be varied to solve your particular fendering problems. Assistance is available by contacting Goodyear Engineered Products.

DEFINITIONS :
UNITS OF SHIP'S WEIGHT

Displacement Tonnage
is the weight in tons (2,240 lbs/ton) of the water displaced by the immersed part of the ship and is equal to the weight of the ship and everything on board (men, fuel oil, supplies, etc.) The density of sea water averages 64 lbs/cu. ft. or 35 cu. ft./ton, hence, the displacement in sea water is measured by the immersed volume in cubic feet, divided by 35. (For fresh water divide by 36.)

Dead Weight Tonnage
is the weight of cargo, stores, fuel, water, personnel and effects that the ship can carry when loaded to a specific load draft. Dead weight is equal to the load displacement minus the weight of the equipped ship, commonly expressed as long tons (2,240 lbs), or the difference in weight of the ship when empty and fully laden.

Gross Tonnage
is based on cubic capacity of the ship below the tonnage deck, plus allowances for certain compartments above, which are used for cargo, passengers, crew and navigating gear. One gross ton equals 100 cu. ft. of enclosed space.

Net Tonnage
is gross tonnage minus deduction of spaces for propelling machinery, crew quarters, and other non-earning spaces. One net ton is equal to 100 cu. ft. of volume.
For tankers as a rough estimate, the dead weight tonnage figure is about 50% greater than the gross tonnage, also the loaded displacement is approximately one-third greater than the dead weight.

GUIDELINES
FOR DOCK FENDER SELECTION

There are many service factors which must be taken into consideration when making a decision on which type and size of fender is best suited for a given application: type of pier structure, type and size of vessel, berthing velocity of vessel, method of berthing, sea currents and wave action.

Some of the most common applications of the various types of fenders offered by Goodyear Engineered Products are as follows:

Cylindrical Fenders
are normally used where tidal conditions and flexible mounting is desired. Cylindrical fenders are usually suspended on a chain for easy installation.

Rectangular Fenders
are normally used where rigid mounting is desired. For example on tugs, or where tidal conditions do not exist and berthing is at a low angle.

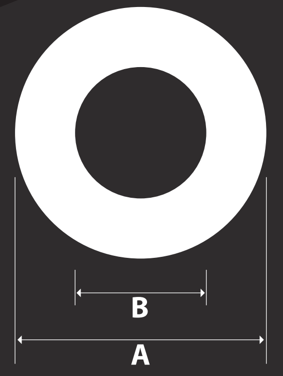
Rectangular fenders are also used in combination with wood facing on light concrete structures where the load imparted to the dock structure must be kept low. The wood facing spreads the berthing impact over the surface to avoid concentrated loads on any one point.

Trapezoidal Fenders
are used with or without timber facing where the dock structure and/or the vessel are unable to withstand large reaction loads. Because Goodyear Engineered Products trapezoidal design is engineered to efficiently utilize more of the elasticity naturally inherent in rubber, a smaller section of trapezoidal fendering will absorb a greater amount of impact when compared to other cross sections.

D Shape and M Series Fenders
are normally used on tugs or barges. Their cross sections are designed for solid mounting and complete coverage as well as high energy absorption.

Wingtype
Wingtype dock fenders are used with or whithout timber facing. Wingtype fenders are engineered to efficiently utilize more of the elasticity naturally inherent in rubber. They may be used for solid mounting and for complete coverage on tugs and barges.

Note : A physical property of rubber is that it has to be "broken in". On the initial compression of a rubber fender, the load required for a given deflection is relatively high. During this first compression the rubber molecules re-align themselves. For subsequent compression cycles, the load to deflect the fender a given amount will be less than the first compression and will remain consistent throuthout the life of the fender. The data used for the load and energy curves on the following pages was developed from fender samples that were broken in.



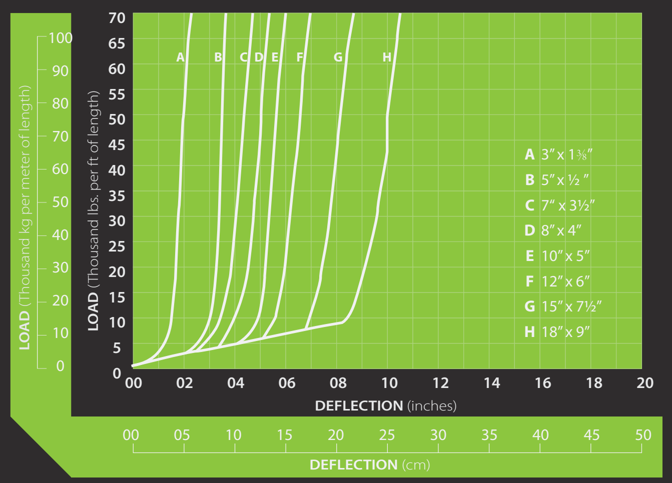
CYLINDRICAL

Standard tolerances are ±4% on exterior dimensions, ± 8% on interior dimensions and the greater of +2%, -1½ % or ± 1" on length. Contact the factory if closer tolerances are required.

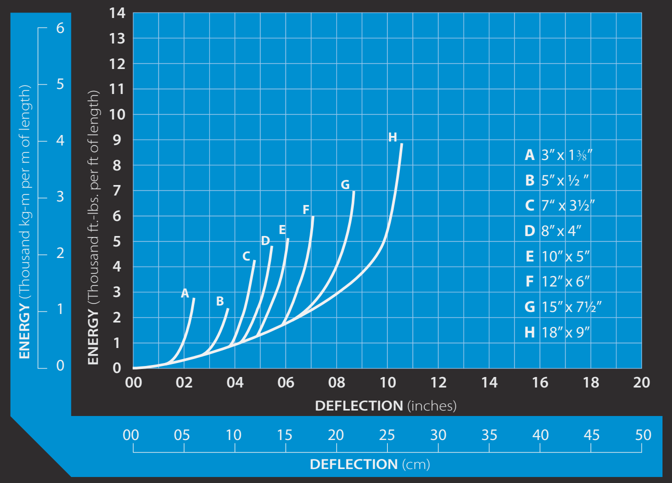
For load and energy deflection data not shown, please contact factory.

Specification	A inches (mm)	B inches (mm)	Standard Length ft (m)	Minimum Order Quantity ft (m)	Weight lbs/ft (kg/m)
4106-5152	3 (76)	1⅜(35)	30 (9,1)	360 (110)	3,0 (4,5)
4106-5160	4 (102)	2 (51)	30 (9,1)	360 (110)	5,0 (7,4)
4106-5178	5 (127)	2½(64)	30 (9,1)	300 (91)	7,4 (11,0)
4106-5954	6 (152)	3 (76)	30 (9,1)	210 (64)	10,0 (14,9)
4106-5186	7 (178)	3 (76)	30 (9,1)	210 (64)	15,0 (22,3)
4106-5194	7 (178)	3½(89)	30 (9,1)	210 (64)	14,7 (21,9)
4106-5202	8 (203)	3½(89)	30 (9,1)	180 (55)	21,0 (31,2)
4106-5210	8 (203)	4 (102)	30 (9,1)	180 (55)	19,2 (28,6)
4106-5962	9 (229)	4 (102)	30 (9,1)	180 (55)	26,0 (38,7)
4106-5749	10 (254)	4 (102)	30 (9,1)	120 (37)	31,0 (46,1)
4106-5228	10 (254)	5 (127)	30 (9,1)	120 (37)	30,0 (44,6)
4106-6499	12 (305)	5 (127)	30 (9,1)	120 (37)	45,0 (67,0)
4106-5236	12 (305)	6 (152)	30 (9,1)	120 (37)	44,0 (65,5)
4106-6732	14 (356)	7 (178)	30 (9,1)	90 (27)	58,0 (86,3)
4106-5269	15 (381)	7½(191)	30 (9,1)	90 (27)	66,0 (98,2)
4106-5285	18 (457)	9 (229)	30 (9,1)	90 (27)	95,0 (141,3)

APPROXIMATIVE LOAD DEFLECTION CURVES : GOODYEAR EP MARINE FENDERS : CYLINDRICAL TYPE



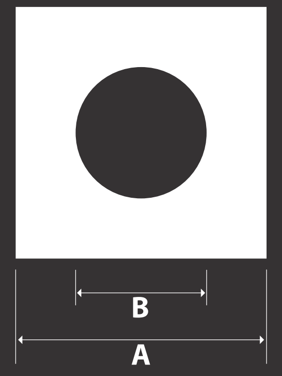
APPROXIMATIVE ENERGY DEFLECTION CURVES : GOODYEAR EP MARINE FENDERS : CYLINDRICAL TYPE



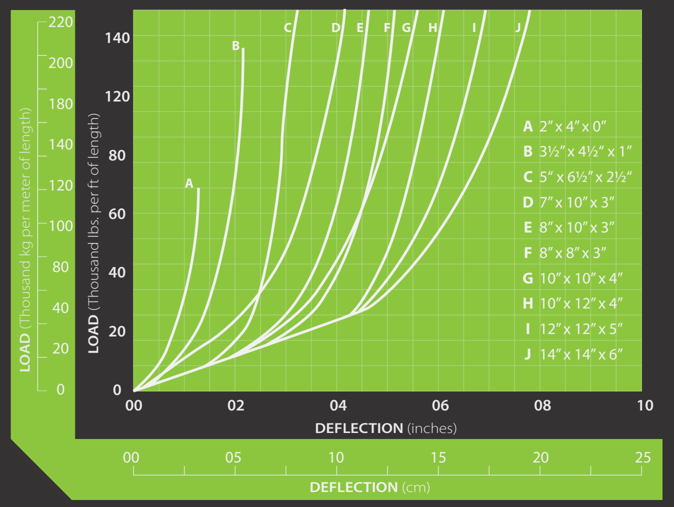
RECTANGULAR

Standard tolerances are ±4% on exterior dimensions, ± 8% on interior dimensions and the greater of +2%, -1½ % or ± 1" on length. Contact the factory if closer tolerances are required.

For load and energy deflection data not shown, please contact factory.



APPROXIMATIVE LOAD DEFLECTION CURVES : GOODYEAR EP MARINE FENDERS : RECTANGULAR TYPE



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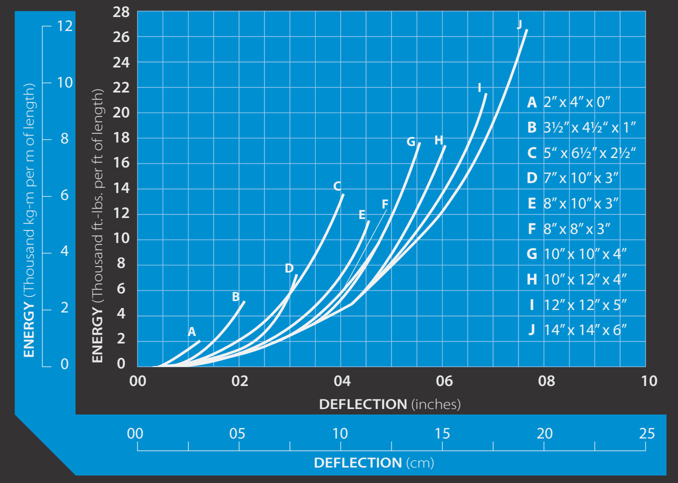
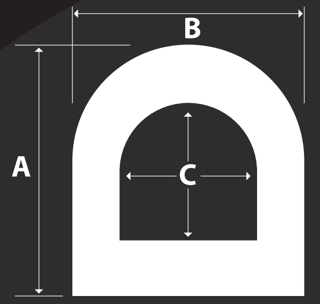
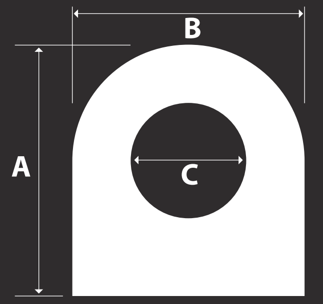


Specification	A inches (mm)	B inches (mm)	C inches (mm)	Standard Length ft (m)	Minimum Order Quantity ft (m)	Weight lbs/ft (kg/m)
4106-5293	2 (51)	4 (102)	0	30 (9.1)	360 (110)	3.9 (5.8)
4106-5806	3½(89)	3½ (89)	1 (25)	30 (9.1)	270 (82)	6.0 (8.9)
4106-5319	3½(89)	4½ (114)	1 (25)	30 (9.1)	240 (73)	7.4 (11.0)
4106-5814	4 (102)	4 (102)	1 (25)	30 (9.1)	150 (46)	7.0 (10.4)
4106-5327	5 (127)	6½ (165)	2½ (64)	30 (9.1)	150 (46)	16.0 (23.8)
4106-5335	7 (178)	10 (254)	3 (76)	30 (9.1)	150 (46)	31.4 (46.7)
4106-5343	7 (178)	10 (254)	3½ (89)	30 (9.1)	150 (46)	30.5 (45.4)
4106-5350	8 (203)	8 (203)	3 (76)	30 (9.1)	150 (46)	28.0 (41.7)
4106-5376	8 (203)	10 (254)	3 (76)	30 (9.1)	120 (37)	36.0 (53.6)
4106-5384	10 (254)	10 (254)	4 (102)	30 (9.1)	120 (37)	42.0 (62.5)
4106-5392	10 (254)	10 (254)	5c (127)	30 (9.1)	120 (37)	40.3 (60.0)
4106-5400	10 (254)	12 (305)	4 (102)	30 (9.1)	120 (37)	55.0 (81.8)
4106-5418	10 (254)	12 (305)	5 (127)	30 (9.1)	120 (37)	50.6 (75.3)
4106-5.822	12 (305)	7 (178)	*2 (51)	30 (9.1)	120 (37)	40.0 (60.0)
4106-5426	12 (305)	12 (305)	5 (127)	30 (9.1)	120 (37)	64.0 (95.2)
4106-5442	14 (355)	14 (355)	6 (152)	30 (9.1)	90 (27)	88.0 (130.9)

* 2 – 2" (51 mm) dia. holes





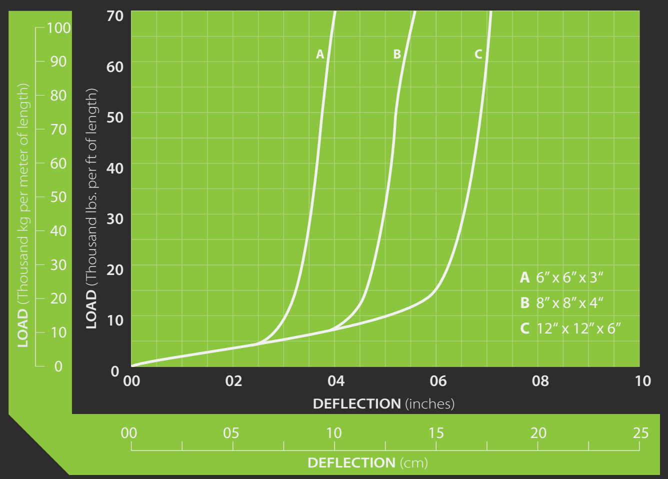
D SERIES

Standard tolerances are ±4% on exterior dimensions, ± 8% on interior dimensions and the greater of +2%, -1½ % or ± 1" on length. Contact the factory if closer tolerances are required.

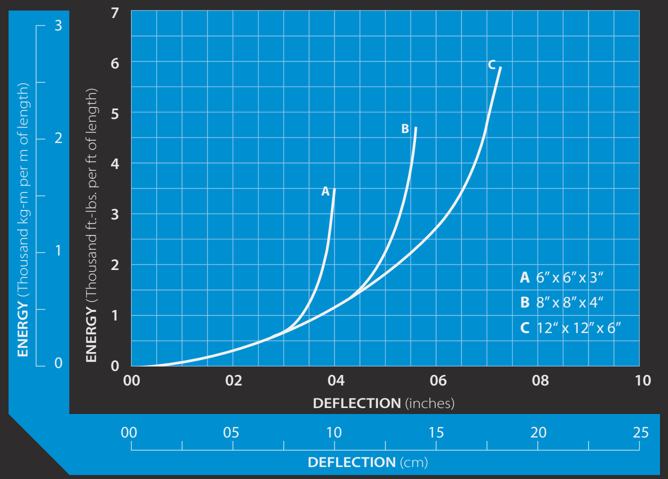
For load and energy deflection data not shown, please contact factory.

Specification	A inches (mm)	B inches (mm)	C inches (mm)	Standard Length ft (m)	Minimum Order Quantity ft (m)	Weight lbs/ft (kg/m)
Cylindrical Bore						
4106-5574	6 (152)	6 (152)	3 (76)	30 (9.1)	210 (64)	13.9 (20.7)
4106-5475	8 (203)	8 (203)	3 (76)	30 (9.1)	180 (55)	26.5 (39.4)
D Shaped Bore						
4106-5483	6 (152)	6 (152)	3 (76)	30 (9.1)	240 (73)	11.8 (17.6)
4106-5459	8 (203)	8 (203)	4 (102)	30 (9.1)	180 (55)	22.1 (32.9)
4106-5624	10(254)	10 (254)	4 (102)	30 (9.1)	150 (46)	37.0 (57.1)
4106-5467	12(305)	12 (305)	6 (152)	30 (9.1)	120 (37)	47.2 (70.2)

APPROXIMATIVE LOAD DEFLECTION CURVES : GOODYEAR EP MARINE FENDERS : D SERIES with D BORE



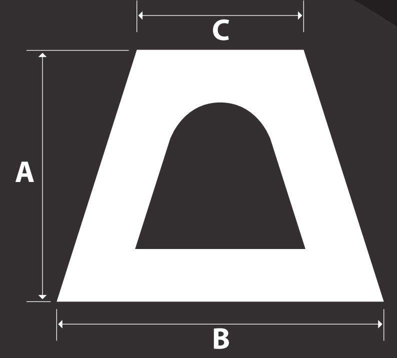
APPROXIMATIVE ENERGY DEFLECTION CURVES : GOODYEAR EP MARINE FENDERS : CYLINDRICAL TYPE

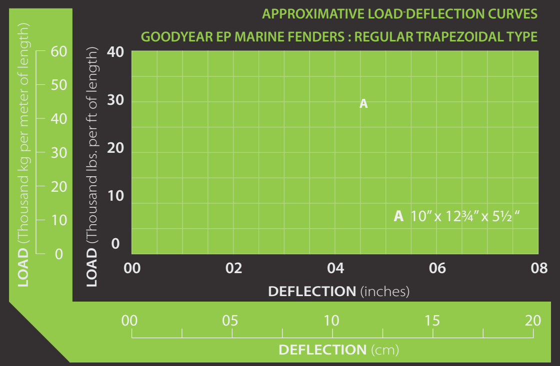


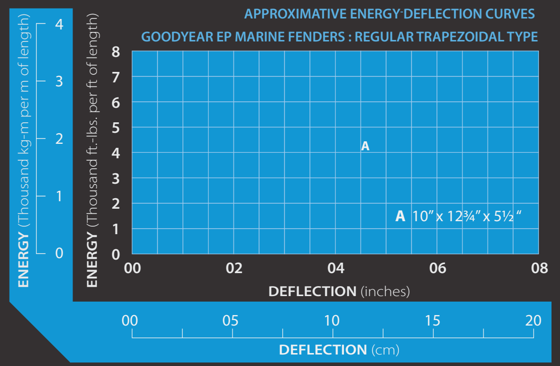
TRAPEZOIDAL

Standard tolerances are ±4% on exterior dimensions, ± 8% on interior dimensions and the greater of +2%, -1½ % or ± 1" on length. Contact the factory if closer tolerances are required.

Specification	A inches (mm)	B inches (mm)	C inches (mm)	Standard Length ft (m)	Minimum Order Quantity ft (m)	Weight lbs/ft (kg/m)
4106-5509	10 (254)	12¾ (324)	5½ (135)	30 (9.1)	120 (37)	35.0 (52.1)





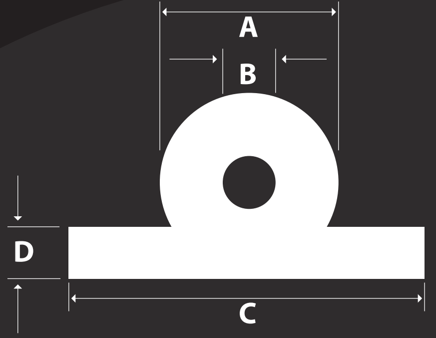


SOLID RECTANGULAR

Specification	A inches (mm)	B inches (mm)	Standard Length ft (m)	Minimum Order Quantity ft (m)	Weight lbs/ft (kg/m)
4106-5293	2 (51)	4 (102)	30 (9.1)	360 (110)	3.9 (5.8)
4106-5301	3 (76)	4 (102)	30 (9.1)	270 (82)	6.0 (8.9)
4106-6507	2⅞ (73)	11½ (292)	30 (9.1)	120 (37)	17.0 (25.3)
4106-5889	4 (102)	6 (152)	30 (9.1)	240 (73)	12.0 (17.9)
4106-6358	5½ (140)	5½ (140)	30 (9.1)	240 (73)	15.5 (23.1)
4106-5913	6 (152)	6 (152)	30 (9.1)	240 (73)	18.0 (26.8)
4106-5921	6 (152)	8 (203)	30 (9.1)	180 (55)	23.0 (34.2)
4106-5582	6 (152)	10 (254)	30 (9.1)	150 (46)	27.0 (40.2)
4106-5764	8 (203)	8 (203)	30 (9.1)	180 (55)	30.0 (44.6)
4106-6549	9 (229)	9 (229)	30 (9.1)	150 (46)	42.0 (62.5)

Standard tolerances are ±4% on exterior dimensions, ± 8% on interior dimensions and the greater of +2%, -1½ % or ± 1" on length. Contact the factory if closer tolerances are required.

For load and energy deflection data not shown, please contact factory.

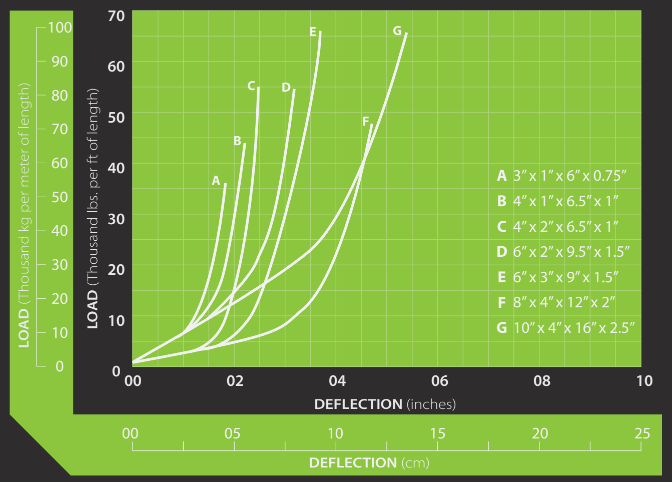


WINGTYPE

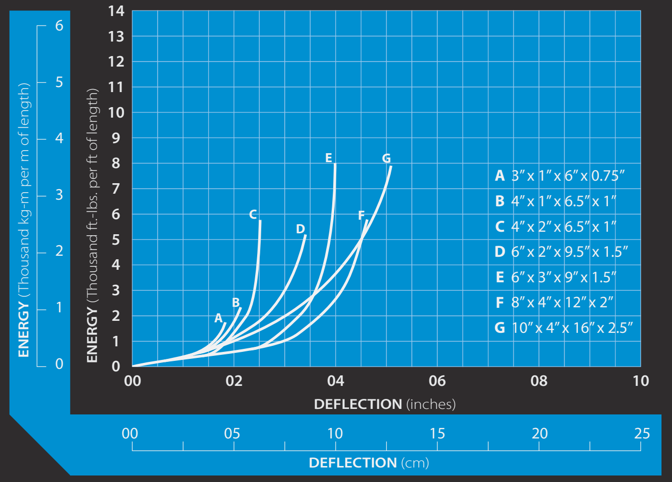
Standard tolerances are ±4% on exterior dimensions, ± 8% on interior dimensions and the greater of +2%, -1½ % or ± 1" on length. Contact the factory if closer tolerances are required.

Specification	A inches (mm)	B inches (mm)	C inches (mm)	D inches (mm)	Standard Length ft (m)	Minimum Order Quantity ft (m)	Weight lbs/ft (kg/m)
4106-1011	3 (76)	1 (25)	6 (152)	¾ (19)	30 (9.1)	240 (73)	5.0 (7.4)
4106-1029	4 (102)	2 (51)	6½ (165)	1 (25)	30 (9.1)	420 (128)	7.0 (10.4)
4106-1037	4 (102)	1 (25)	6½ (165)	1 (25)	30 (9.1)	420 (128)	9.0 (13.0)
4106-1045	6 (152)	2 (51)	9½ (241)	1½ (38)	30 (9.1)	150 (46)	16.7 (24.9)
4106-5640	6 (152)	3 (76)	9 (229)	1½ (38)	30 (9.1)	90 (27)	14.0 (20.8)
4106-5731	8 (203)	4 (102)	12 (305)	2 (51)	30 (9.1)	60 (18)	26.0 (38.8)
4106-5491	10 (254)	4 (102)	16 (406)	2½ (64)	30 (9.1)	60 (18)	45.7 (68.0)

APPROXIMATIVE LOAD DEFLECTION CURVES : GOODYEAR EP MARINE FENDERS : WING TYPE

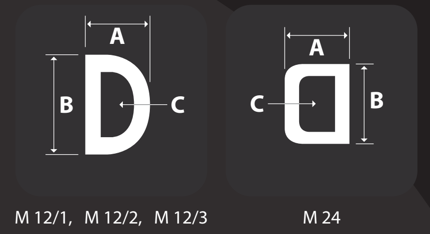


APPROXIMATIVE ENERGY DEFLECTION CURVES : GOODYEAR EP MARINE FENDERS : WING TYPE



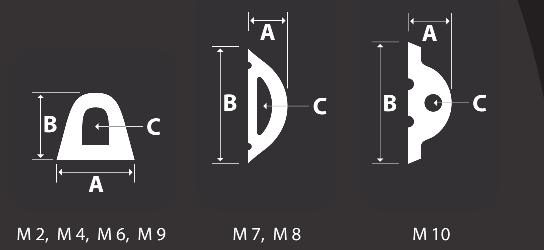
LIGHT CRAFT FENDERING

Specification	Type	A inches (mm)	B inches (mm)	C inches (mm)	Standard Length ft (m)	Minimum Order Quantity ft (m)	Weight lbs/ft (kg/m)
4106-5970	M12/1	⅝ (16)	15/16 (24)	⅜ x ⅝ (16 x 10)	13 (4.0)	1000 (305)	0.6 (0.9)
4106-5988	M12/2	15/16 (24)	1¼ (32)	7/16 x 5/16 (24 x 11)	13 (4.0)	1000 (305)	2.2 (3.3)
4106-5996	M12/3	1¼ (32)	1⅞ (48)	1⅛ x ⅝ (29 x 16)	30 (9.1)	630 (192)	0.7 (1.0)
4106-6598	M24	2½ (64)	3 (89)	2½ x 1½ (64 x 38)	13 (4.0)	360 (110)	2.5 (3.7)



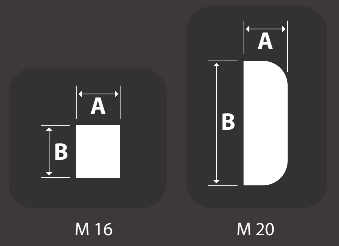
SMALL 'D' SECTION FENDER

Specification	Type	A inches (mm)	B inches (mm)	C inches (mm)	Standard Length ft (m)	Minimum Order Quantity ft (m)	Weight lbs/ft (kg/m)
4106-5772	M2	2¼ (57)	1⅞ (48)	1 x 1⅛ (25 x 29)	15 (4.6)	520 (158)	1.5 (2.2)
4106-1052	M4	4½ (114)	3¾ (95)	2 x 2¼ (51 x 59)	15 (4.6)	210 (64)	4.4 (6.6)
4106-5566	M6	6¾ (171)	6 (152)	2⅞ x 3 (73 x 76)	30 (9.1)	210 (64)	12.8 (19.1)
4106-6168	M9	8" (203)	4½ (114)	3⅛ x 2⅛ (79 x 54)	30 (9.1)	150 (46)	10.0 (14.9)
4106-6069	M7	2⅛ (54)	6⅜ (162)	1 (25)	30 (9.1)	180 (55)	3.0 (4.5)
4106-6077	M8	3¼ (83)	9 (229)	1¼ (32)	30 (9.1)	210 (64)	9.0 (13.4)
4106-6051	M10	2¼ (57)	6¼ (159)	1 x 3 (25 x 76)	30 (9.1)	180 (55)	3.3 (4.9)



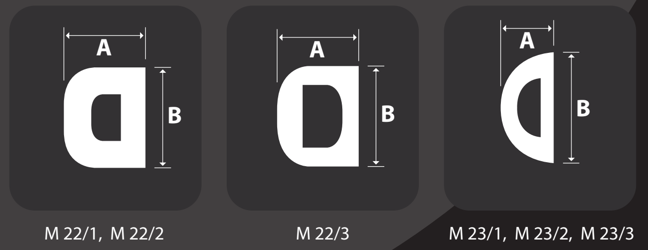
SEALING SRTIP

Specification	Type	A inches (mm)	B inches (mm)	Standard Length ft (m)	Minimum Order Quantity ft (m)	Weight lbs/ft (kg/m)
4106-6085	M16	1¼ (32)	1½ (39)	30 (9.1)	810 (247)	1.0 (1.5)
4106-6093	M20	1⅝ (41)	5 (133)	30 (9.1)	270 (82)	4.0 (6.0)



LARGE 'D' SECTION

Specification	Type	A inches (mm)	B inches (mm)	Standard Length ft (m)	Minimum Order Quantity ft (m)	Weight lbs/ft (kg/m)
4106-6002	M22/1	6 (152)	8 (203)	30 (9.1)	270 (82)	15.0 (22.3)
4106-5780	M22/2	8 (203)	10 (203)	30 (9.1)	210 (64)	24.0 (35.7)
4106-6010	M22/3	10 (254)	12 (305)	30 (9.1)	90 (27)	40.0 (59.5)
4106-6028	M23/1	5 (127)	10 (254)	30 (9.1)	120 (37)	16.0 (23.8)
4106-6036	M23/2	5 (127)	12 (305)	30 (9.1)	90 (27)	19.0 (28.3)
4106-6044	M23/3	6 (152)	12 (305)	30 (9.1)	90 (27)	21.0 (31.2)



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