



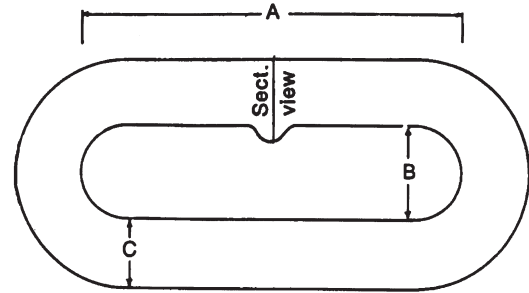
Dock Fender Chain

Chain or wire rope may be used to suspend either cylindrical or rectangular fenders. But chain is more corrosion resistant than wire rope. Chain provides more bearing surface on the I.D. of the fender, thus reducing tear potential at the ends of the fender.

	1/2-inch	5/8-inch	3/4-inch	1-inch
Proof test	15,000*	35,000*	55,000*	100,000*
Av. ult. strength	35,000*	58,000*	105,000*	160,000*
Max. elongation	15%	15%	15%	15%
Brinell hardness	229-277	229-277	331-388	331-388
Links per ft. (per m) nominal	3.2	3.2	3.2	2.9
Wt. per 100 ft. (per m)	205*	320*	446*	814
Max. link width	1.874	2.243	2.700	3.375
A (inside length)	3.75 +.015-0	3.75 +.015-0	3.7500 ±.025	4.125
B (inside length)	.789±.031	.900±.031	1.125±.031	1.375
C (thickness)	.531	.656	.750±.008	1.000
D (max. swell)	.025	.025	-	-

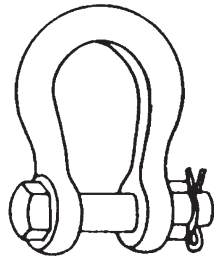
* Strengths and weights in lbs.

The long link chain shown in the specifications below does not restrict fender deflection as much as heavier, shorter link chain would. Experience indicates that ultimate breaking strength of chain is more important than its shock loadability.

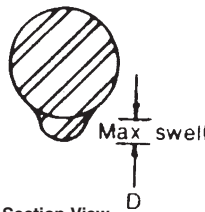


Typical Link

Shackle



Typical Shackle



Section View

The shackle should be high strength, with a greater ultimate strength than that of the chain being used. We recommend a safety anchor pin shackle with an alloy pin, one size larger than the chain being used. These chain and alloy shackle selections permit the eye of the shackle to pass thru the chain's long link; simplifying installation.

Alloy Steel Anchor Shackles (Bow Pattern)



Screw Pin

- Heat Treated
- Alloy Pins



Bolt, Nut and Cotter

- Heat Treated
- Alloy Pins

Code No.	Size Diameter	Max. Working Load Limit in Tons	Approx. Weight per 100 in Pounds	Factory Pack
648A	3/8	1-1/4	30	Bulk
649A	7/16	1-3/4	50	Bulk
650A	1/2	2-1/2	75	Bulk
651A	5/8	4	130	Bulk
652A	3/4	6	225	Bulk
653A	7/8	7-1/2	350	Bulk
654A	1	10	500	Bulk
655A	1-1/8	11-1/2	700	Bulk
656A	1-1/4	14	950	Bulk
666A	1-3/8	16	1250	Bulk
657A	1-1/2	20	1720	Bulk
685A	1-5/8	24	2350	Bulk
677A	1-3/4	30	2770	Bulk
658A	2	40	3900	Bulk

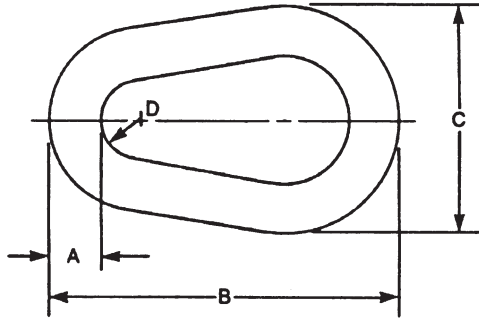
Code No.	Size Diameter	Max. Working Load Limit in Tons	Approx. Weight per 100 in Pounds	Factory Pack
850A	1/2	2-1/2	84	Bulk
851A	5/8	4	175	Bulk
852A	3/4	6	250	Bulk
853A	7/8	7-1/2	400	Bulk
854A	1	10	550	Bulk
855A	1-1/8	11-1/2	750	Bulk
856A	1-1/4	14	1100	Bulk
866A	1-3/8	16	1350	Bulk
857A	1-1/2	20	1850	Bulk
885A	1-5/8	24	2600	Bulk
877A	1-3/4	30	3100	Bulk
858A	2	40	4200	Bulk

Add suffix "G" when ordering galvanized



Hardware

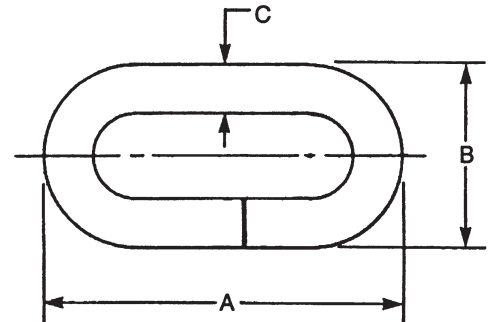
Pear Ring



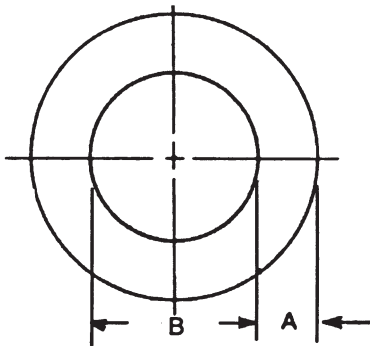
Chain Size		Dimensions								Weight	
		Inches				mm					
mm	Inches	A	B	C	D	A	B	C	D	Kg	Lbs.
42	1-5/8	2.10	8.30	3.90	1.30	53	211	99	33	12	26
44	1-3/4	2.25	11.50	4.19	1.38	57	292	106	35	17	38
51	2	2.50	13.73	4.91	1.64	64	349	125	42	26	57
58	2-1/4	2.75	14.50	5.37	1.73	70	368	136	44	33	73
64	2-1/2	3.00	16.16	5.92	1.92	76	410	150	49	43	95
70	2-3/4	3.50	17.70	6.47	2.11	89	450	164	54	65	143
76	3	3.75	19.21	6.82	2.28	95	488	173	58	80	176
89	3-1/2	4.25	23.90	8.77	2.85	108	607	223	72	127	280
102	4	4.75	26.22	9.61	3.13	121	666	244	80	175	385

End Link

Chain Size		Dimensions						Weight	
		Inches			mm				
mm	Inches	A	B	C	A	B	C	Kg	Lbs.
42	1-5/8	10.97	6.50	1.95	279	165	50	9	20
44	1-3/4	11.81	6.91	2.10	300	176	53	11	24
51	2	13.50	7.90	2.40	343	201	61	17	37
58	2-1/4	15.19	8.89	2.70	386	226	69	24	53
64	2-1/2	16.88	9.88	3.00	429	251	76	32	71
70	2-3/4	18.56	10.86	3.30	471	276	84	43	95
76	3	20.25	11.85	3.60	514	301	91	55	122
89	3-1/2	23.65	13.83	4.20	601	351	107	90	197
102	4	27.00	15.80	4.80	686	401	122	133	292



Ring



Chain Size		Dimensions				Weight	
		Inches		mm			
mm	Inches	A	B	A	B	Kg.	Lbs.
42	1-5/8	3.16	8.15	80	207	36	78
44	1-3/4	3.41	8.78	87	223	45	100
51	2	3.66	10.24	93	260	59	130
58	2-1/4	5.25	11.70	133	297	147	325
64	2-1/2	5.25	11.70	133	297	147	325
70	2-3/4	5.25	11.70	133	297	147	325
76	3	5.50	13.16	140	334	180	396
89	3-1/2	5.75	13.16	146	334	198	437
102	4	7.31	19.00	186	483	448	987



Grosby®

Wire Rope Thimbles Standard Wire Rope Thimbles



G-411
Standard

G-411 meets the performance requirements of Federal Specification FF-T-276b, Type II, except for those provisions required of the contractor.

- The standard choice for light duty applications and loading conditions.
- Hot Dip galvanized Steel.

Rope Dia. (in.)	Weight Per 100 (lbs.)
1/8	3.50
3/16	3.50
1/4	3.50
5/16	4.00
3/8	6.70
1/2	12.50
5/8	34.50
3/4	47.10
7/8	84.60
1	97.50
1-1/8 - 1-1/4	175.00

Extra Heavy Wire Rope Thimbles



G-414 and SS-414

G-414 meets the performance requirements of Federal Specification FF-T-276b, Type III, except for those provisions required of the contractor.

- Greater protection against wear and deformation of the wire rope eye.
- Longer service life.
- Available in Hot Dip galvanized or Stainless Steel.
- Stainless steel recommended for more corrosive environments where greater protection is required.

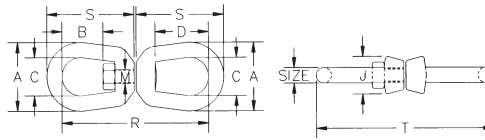
Rope Dia. (in.)	Weight Per 100 (lbs.)
*1/4	6.50
*5/16	11.80
*3/8	21.60
7/16	34.70
*1/2	51.00
9/16	51.00
*5/8	75.70
*3/4	158.10
7/8	177.80
1	313.90
1-1/8 - 1-1/4	400.00
1-1/4 - 1-3/8	811.00
1-3/8 - 1-1/2	1294.80
1-5/8	1700.00
1-3/4	1775.00
1-7/8 - 2	2775.00
2-1/4	3950.00

* SS-414 sizes available in stainless steel type 304.

Forged Swivels

Regular Swivels

Meets the performance requirements of Federal Specifications RR-C-271D, Type VII, Class 2, except for those provisions required of the contractor.



G-402

- Hot Dip Galvanized
- Quenched and Tempered.

Size (in.)	G-402 Stock No. Galv.	Working Load Limit* (lbs.)	Weight Each (lbs.)	Dimensions (in.)								
				A	B	C	D	J	M	R	S	T
1/4	1016019	850	.21	1.25	.69	.75	1.06	.69	.31	2.94	1.69	3.44
5/16	1016037	1250	.39	1.63	.81	1.00	1.25	.81	.38	3.56	2.06	4.19
3/8	1016055	2250	.71	2.00	.94	1.25	1.50	1.00	.50	4.31	2.50	5.06
1/2	1016073	3600	1.32	2.50	1.31	1.50	2.00	1.31	.63	5.44	3.19	6.44
5/8	1016091	5200	2.49	3.00	1.56	1.75	2.38	1.50	.75	6.56	3.88	7.81
3/4	1016117	7200	4.02	3.50	1.75	2.00	2.63	1.88	.88	7.19	4.31	8.69
7/8	1016135	10000	6.25	4.00	2.06	2.25	3.06	2.13	1.00	8.38	5.00	10.13
1	1016153	12500	8.95	4.50	2.31	2.50	3.50	2.38	1.13	9.63	5.75	11.63
1-1/4	1016199	18000	16.37	5.63	2.69	3.13	3.69	3.00	1.38	11.13	6.75	13.36
1-1/2	1016215	45200	45.79	7.00	4.19	4.00	4.19	4.00	2.25	17.13	10.00	20.13

* Ultimate Load is 5 times the Working Load Limit.



Anchor Shackle

- Working Load Limit permanently shown on every shackle.
- Forged Alloy Steel – Quenched and Tempered, with alloy pins.
- Shackles can be furnished proof tested with certificates to designated standards, such as ABS, DNV, Lloyds, or other certification. Charges for proof testing and certification available when requested at time of order.

Chain Shackles

Screw Pin



G-210 S-210

Round Pin



G-215 S-215

Screw pin chain shackles meet the performance requirements of Federal Specification RR-C-271D, Type IVB, Grade A, Class 2, except for those provisions required of the contractor.

Round pin chain shackles meet the performance requirements of Federal Specification RR-C-271D, Type IVB, Grade A, Class 1, except for those provisions required of the contractor.

Nominal Size (in.)	Working Load Limit* t	Weight Each (lbs.)	
		G-210 S-210	G-215 S-215
1/4	1/2	.11	.10
5/16	3/4	.17	.18
3/8	1	.28	.25
7/16	1-1/2	.43	.40
1/2	2	.59	.50
5/8	3-1/4	1.25	1.21
3/4	4-3/4	2.63	2.00
7/8	6-1/2	3.16	3.28
1	8-1/2	4.75	4.75
1-1/8	9-1/2	6.75	6.30
1-1/4	12	9.06	9.00
1-3/8	13-1/2	11.63	12.00
1-1/2	17	15.95	16.15
1-3/4	25	26.75	29.96
2	35	42.31	43.25
2-1/2	†55	71.75	-

† Furnished in Screw Pin Only.

* NOTE: Maximum Proof Load is 2.0 times the Working Load Limit. Minimum Ultimate Load is 6 times the Working Load Limit.

Bolt-Type Shackles

Bolt Type Anchor Shackle Bolt Type Chain Shackle



G-2130 S-2130



G-2150 S-2150

Bolt Type Anchor Shackles with thin head bolt - nut with cotter pin. Meets the performance requirements of Federal Specification RR-C-271D, Type IVA, Grade A, Class 3, except for those provisions required of the contractor.

Bolt Type Chain Shackles with Thin hex head bolt – nut with cotter pin. Meets the performance requirements of Federal Specification RR-C271D, Type IVB, Grade A, Class 3, except for those provisions required of the contractors.

- Working Load Limit permanently shown on every shackle.
- Capacities 1/3 thru 150 metric tons.
- Forged - Quenched and Tempered, with alloy pins.
- Shackles 55 metric tons and smaller can be furnished proof tested with certificates to designated standards, such as ABS, DNV, Lloyds, or other certification.
- Certification must be requested at time of order.
- Shackles 85 metric tons and larger can be provided as follows.
 - Non Destructive Tested
 - Serialized Pin and Bow
 - Material Certification (Chemical)
 - Certification must be requested at time of order

Nominal Shackle Size (in.)	Working Load Limit* t	2130 Weight Each (lbs.)	2150 Weight Each (lbs.)
3/16	1/3‡	.06	-
1/4	1/2	.11	.13
5/16	3/4	.22	.23
3/8	1	.33	.33
7/16	1-1/2	.49	.49
1/2	2	.79	.75
5/8	3-1/4	1.68	1.47
3/4	4-3/4	2.72	2.52
7/8	6-1/2	3.95	3.85
1	8-1/2	5.66	5.55
1-1/8	9-1/2	8.27	7.60
1-1/4	12	11.71	10.81
1-3/8	13-1/2	15.83	13.75
1-1/2	17	20.80	18.50
1-3/4	25	33.91	31.40
2	35	52.25	46.75
2-1/2	55	98.25	85.00
3	†85	154.00	124.25
3-1/2	†120‡	265.00	-
4	†150‡	338.00	-

† Individually Proof Tested with certification and furnished with Round Head Bolts with welded handles
‡ Furnished in Anchor style only.

* NOTE: Maximum Proof Load is 2.0 times the Working Load Limit. Minimum Ultimate Load is 6 times the Working Load Limit.

Alloy Bolt-Type Anchor Shackles



G-2140 and S-2140

NOTICE: All 2140 shackles 120 tons and larger are magnetic particle inspected. Certification available on special request.

G-2140 meets the performance requirements of Federal Specification RR-C-271D, Type IVA, Grade B, Class 3, except for those provisions required of the contractor.

- Shackles are Quenched and Tempered and can meet DNV impact requirements of 42 joules at -20°C.
- Working Load Limit is permanently shown on every shackle.
- Alloy bows, Alloy bolts.
- Quenched and Tempered.
- All sizes are individually proof tested to 2.0 times the Working Load Limit.
- Shackles 200 metric tons and larger are provided as follows:
 - Non Destructive Tested
 - Serialized Pin and Bow
 - Material Certification (Chemical)
 - Certification must be requested at time of order.
- Forged Alloy Steel 30 thru 175 metric tons. Cast Alloy Steel 200 thru 400 metric tons.
- Pins are galvanized and painted red.

Nominal Shackle Size (in.)	Working Load Limit* t	Weight Each (lbs.)
1-1/2	30	20.8
1-3/4	40	33.9
2	55	52.0
2-1/2	85	96.0
3	120	178.0
3-1/2	†150	265.0
4	†175	338.0
4-3/4**	†200	450.0
5**	†250	600.0
6**	†300	775.0
7**	†400	1102.0

** Cast Alloy Steel.

† Furnished with Round Head Bolts with welded handle.

* NOTE: Maximum Proof Load is 2.0 times the Working Load Limit. Minimum Ultimate Load is 4 times the Working Load Limit on 200 thru 400 Metric Tons. For sizes 30 thru 175 Metric Tons, Minimum Ultimate Load is 5.4 times the Working Load Limit.