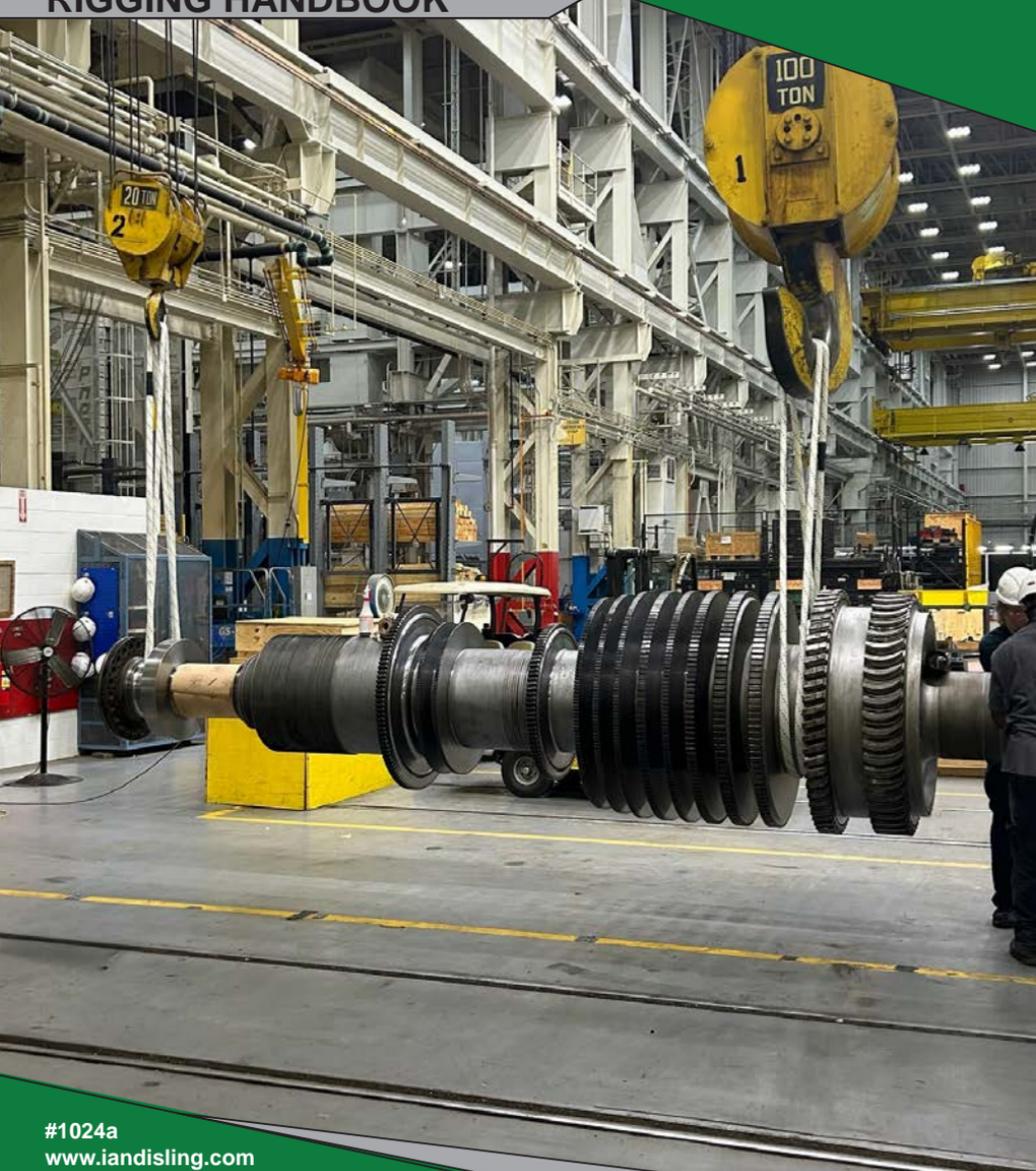




# RIGGING HANDBOOK



#1024a

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	Twin-Path® Slings with Covermax® Cover and K-Spec® Core Yarn	Polyester Roundsliding	Nylon Web Sling	Helix™ High Performance Roundsliding with K-Spec	Wire Rope Sling	Tri-Flex® Sling (3 part)	Multi-Part Wire Rope (Gator-Laid® and Gator-Flex® Slings)	Chain Sling
<b>Key Features</b>	Lightest and strongest slings available, repairable, Check-Fast® Inspection System, low stretch, longest lasting sling	Low cost flexible lifting sling, available with Check-Fast® Inspection System and Covermax® Cover	Low cost general purpose lifting sling	Extreme strength, small diameter, low stretch, high-performance HMPE cover, time-tested K-Spec Core yarn	Low cost general purpose lifting sling	Flexible, more ergonomic, cost effective alternative to wire rope sling	Flexible, more ergonomic, cost effective alternative to wire rope sling, low D/d ratio	Heavy duty, repairable sling
<b>Approx. Weight to WLL ratio</b>	1lb/ 50,000lb	1lb/ 15,000lb	1lb/ 15,000lb	1lb/ 45,000 lb	1lb/ 10,000lb	1lb/ 7,500lb	1lb/ 9,000lb	1lb/ 5,000lb
<b>Length Tolerance</b>	+/- 1"	Call	Call	+/- 1"	+/- diameter of rope	+/- finished diameter of rope	+/- finished diameter of rope	+/- length of one link
<b>Elongation at WLL</b>	<1%	3%	6-10%	<1%	1%	1%	1%	<1%
<b>Max Temp</b>	180°F/ 82°C (Spark eater® Sling 300°F/150°C)	194°F/ 90°C	194°F/ 90°C	180° F / 82° C	400°F/ 204°C	400°F/ 204°C	400°F/ 204°C	400°F/ 204°C
<b>Flexibility</b>	Very Flexible	Very Flexible	Very Flexible	Extremely Flexible	Low	Flexible	Flexible	Flexible
<b>UV Resistance</b>	High	Low to High	Low	High	N/A	N/A	N/A	N/A
<b>Abrasion Resistance</b>	High	Low to High	Low	High	Very High	Very High	Very High	Very High
<b>Proof Tested?</b>	Yes	No	No	Yes	No	No	No	Yes
<b>Repairable?</b>	Yes	No	No	No	No	No	No	Yes
<b>Design Factor</b>	5:1	5:1	5:1	5:1	5:1	5:1	5:1	4:1
<b>D/d Ratio in eye</b>	N/A	N/A	N/A	1:1	5:1	2:1	1:1	N/A
<b>D/d Ratio in body</b>	Any comparably rated fitting	1:1	N/A	1:1	25:1	5:1	5:1	6:1
<b>Resistance to Acids</b>	Very Good	Good	Poor	VERY Good	Good	Good	Good	Good
<b>Resistant to Salt Water?</b>	Yes	Yes	No	Yes	No	No	No	No

## Cautions & Warnings

All ratings shown in this literature are based upon the items being new or “in as new” condition. Catalog ratings are considered to be the greatest load that should be applied to the item; therefore, any shock loading must be considered when selecting the item for use in a system.

The products shown in this literature are subject to wear, misuse, overloading, corrosion, deformation, intentional alteration and other usage factors that may necessitate a reduction in the product’s Rated Capacity or a reduction in its Design Factor. Therefore, it is recommended that all products be regularly inspected to determine their condition as a basis for deciding if the product may continue to be used at the catalog-assigned working load limit (WLL), a reduced WLL, a reduced design factor, or removed from service.

 <b>WARNING</b>	
	<ul style="list-style-type: none"><li>• Death or Injury can occur from improper use or care.</li><li>• For use only by a competent and/or qualified person as defined by OSHA.</li><li>• Stay clear of the load at all times.</li><li>• Do not exceed rated capacity.</li><li>• Sling can fail if damaged, misused or overloaded.</li><li>• Inspect before each use. Damaged slings shall not be used.</li><li>• Users shall protect sling from being cut by load edges, corners, protrusions and abrasive surfaces.</li><li>• Do not expose to damaging chemicals and temperatures.</li></ul>
<p>For additional important safety, inspection, removal and repair information, follow manufacturer guidelines, ASME B30.9, WSTDA RS 1HP and Cortage Institute CI 1905 standards</p>	

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## Twin-Path® Roundsling with Covermax® Cover, K-Spec® Core Yarn and Check-Fast® Inspection System

Twin-Path® synthetic roundslings have Check-Fast® Inspection System overload indicators, Covermax® Covers for superior abrasion resistance, and inner red covers as an aid to inspection. Twin-Path® slings are used worldwide in place of steel rigging for heavy lifts. They are approximately 10% of the weight of a steel sling and are repairable. The Twin-Path® sling design, which has two individual paths of fiber working as one sling, gives the rigger confidence. These slings have less than 1% elongation at rated capacity. If productivity, safety, and precision are important, then Twin-Path® high-performance roundslings are your best choice. Independent testing shows that K-Spec® core yarn is the longest lasting load-bearing core yarn in any sling.



**NOTE:** Capacities shown include both paths and are for one complete sling. Sling ratings based on commercial fittings of equal or greater capacity. Conforms to ANSI/ASME B30.9 Chapter 7, NAVFAC P-307, the Cordage Institute CI1905 Roundsling Standard, WSTDA RS-1-HP standard. This chart is based on a 5:1 Design Factor (DF); but any other DF can be fabricated. Higher capacity slings are available - \*\*Tri-Path design. **CAPACITIES ARE IN POUNDS (LB)**

Twin-Path® Sling Stock No.	Vertical	Choker	Vertical Basket	Basket Hitches		Approximate Weight (lb. per ft.) (Bearing - Bearing)	Nominal Body Width (Inches)*	Minimum Recommended Hardware Diameter (Inches)	Minimum Bending Radius (Inches)
			90° 	60° 	45° 				
TPXCF 1000	10,000	8,000	20,000	17,320	14,140	0.41	1.5 - 3"	0.63	0.32
TPXCF 1500	15,000	12,000	30,000	25,980	21,210	0.45	1.5 - 3"	0.75	0.38
TPXCF 2000	20,000	16,000	40,000	34,640	28,280	0.52	1.5 - 3"	0.86	0.43
TPXCF 2500	25,000	20,000	50,000	43,300	35,350	0.66	2.0 - 4"	1.00	0.50
TPXCF 3000	30,000	24,000	60,000	51,960	42,420	0.73	2.0 - 4"	1.10	0.55
TPXCF 4000	40,000	32,000	80,000	69,280	56,560	0.86	2.0 - 4"	1.40	0.70
TPXCF 5000	50,000	40,000	100,000	86,600	70,700	1.07	2.5 - 5"	1.50	0.75
TPXCF 6000	60,000	48,000	120,000	103,920	84,840	1.20	2.5 - 5"	1.50	0.75
TPXCF 7000	70,000	56,000	140,000	121,240	98,980	1.33	2.5 - 5"	1.84	0.92
TPXCF 8500	85,000	68,000	170,000	147,220	120,190	1.60	3.0 - 6"	1.84	0.92
TPXCF 10000	100,000	80,000	200,000	173,200	141,400	1.80	3.0 - 6"	2.00	1.00
TPXCF 12500	125,000	100,000	250,000	216,500	176,750	2.30	4.0 - 8"	2.50	1.25
TPXCF 15000	150,000	120,000	300,000	259,800	212,100	2.62	4.0 - 8"	2.50	1.25
TPXCF 17500	175,000	140,000	350,000	303,100	247,450	2.95	4.0 - 8"	2.80	1.40
TPXCF 20000	200,000	160,000	400,000	346,400	282,800	3.45	5.0 - 10"	3.00	1.50
TPXCF 25000	250,000	200,000	500,000	433,000	353,500	4.10	5.0 - 10"	3.30	1.65
TPXCF 27500	275,000	220,000	550,000	476,300	388,850	4.58	6.0 - 12"	3.62	1.81
TPXCF 30000	300,000	240,000	600,000	519,600	424,200	4.91	6.0 - 12"	9.50	4.75
TPXCF 40000	400,000	320,000	800,000	692,800	565,600	6.70	7.0 - 14"	9.50	4.75
TPXCF 50000	500,000	400,000	1,000,000	866,000	707,000	8.48	8.0 - 16"	11.40	5.70
TPXCF 60000	600,000	480,000	1,200,000	1,039,000	848,000	10.28	9.0 - 18"	11.40	5.70
TPXCF 70000**	700,000	560,000	1,400,000	1,212,400	989,800	12.44	14.5 - 29"	14.30	7.15
TPXCF 80000**	800,000	640,000	1,600,000	1,385,600	1,131,200	13.94	14.5 - 29"	14.30	7.15

**⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.iandisling.com](http://www.iandisling.com) for more information.

## Check-Fast® Inspection System



The Check-Fast® Inspection System is designed to improve job site safety. The Check-Fast® External Warning Indicator (EWI) provides a criteria for pass/fail inspection when the internal load-bearing core yarn may be damaged. The Check-Fast® Inspection System can also indicate ultraviolet (UV) light degradation, fiber-on-fiber abrasion, fatigue, and severe overload. If the sling is overloaded beyond its rated capacity, the EWI is designed to retract before the sling fails. The sling inspector now has an objective “GO/NO-GO” inspection device rather than relying on subjective and labor-intensive inspection techniques to guess if the load-bearing core yarns are in good condition.

## Fiber Optic Inspection for Twin-Path® Slings

Fiber Optic Inspection is an optional add-on for Twin-Path® slings. If crushing or heat damage has occurred to the sling, the fiber optic cable will no longer have the ability to transmit light from one end to the other. This indicates to the inspector that the sling should be removed from service and returned for factory inspection. The fiber optic cable will transmit light using natural, overhead, or flashlight sources.



## Helix® Roundsling with 100% HMPE Braided Cover, K-Spec® Core Yarn and Rifled® Cover Technology



Helix high performance fiber roundslings are narrow width heavy lift slings designed to fit in lifting hardware with limited space. Helix lifting slings utilizes K-Spec core fiber, the strongest and most trusted roundsling core yarn on the market. Refined over 30 years, K-spec is extremely durable, strong, light weight, and has less than 1% elongation at rated capacity. Helix slings offer high strength capacities while maintaining a narrow profile. This makes Helix the ideal solution when lifting with narrow hardware or limited space.

**Note:** Sling ratings based on commercial fittings of equal or greater capacity. Conforms to ANSI/ ASME B30.9 Chapter 7, NAVFAC P-307 Section 14.7.4.3, the Cordage Institute C11905 Roundsling Standard and the WSTDA RS-1-HP standard. This chart is based on a 5:1 Design Factor (DF) but any other DF can be fabricated. Higher capacity slings are available. **CAPACITIES ARE IN POUNDS (lb.)**

CODE	VERTICAL (lbs)	CHOKER (lbs)	BASKET (lbs)	Diameter
HELIX500	5,000	4,000	10,000	0.6
HELIX1000	10,000	8,000	20,000	0.7
HELIX1500	15,000	12,000	30,000	0.8
HELIX2000	20,000	16,000	40,000	0.9
HELIX2500	25,000	20,000	50,000	1.0
HELIX3000	30,000	24,000	60,000	1.2
HELIX4000	40,000	32,000	80,000	1.4
HELIX5000	50,000	40,000	100,000	1.5
HELIX6000	60,000	48,000	120,000	1.8
HELIX7000	70,000	56,000	140,000	2.0
HELIX8500	85,000	68,000	170,000	2.1
HELIX10000	100,000	80,000	200,000	2.2
HELIX12500	125,000	100,000	250,000	2.4
HELIX15000	150,000	120,000	300,000	2.5
HELIX17500	175,000	140,000	350,000	2.9
HELIX20000	200,000	160,000	400,000	3.0

**Warning:** Sling can fail if damaged, misused, or overloaded causing severe injury or death!

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.iandisling.com](http://www.iandisling.com) for more information.

# HELIX

## K-Spec® Core Yarn

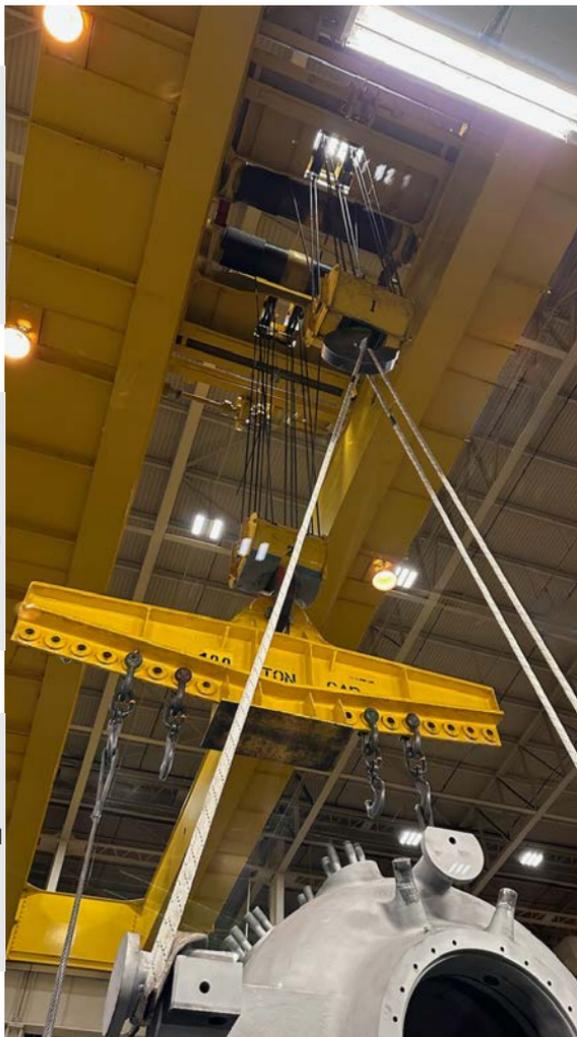
Helix™ utilizes K-Spec core fiber, the strongest and most trusted roundsling core yarn on the market. Refined over 30 years, K-spec is extremely durable, strong, light weight, and has less than 1% elongation at rated capacity.

## Narrow Width Profile

Helix™ slings offer high strength capacities while maintaining a narrow profile. This makes Helix the ideal solution when lifting with narrow hardware or limited space.

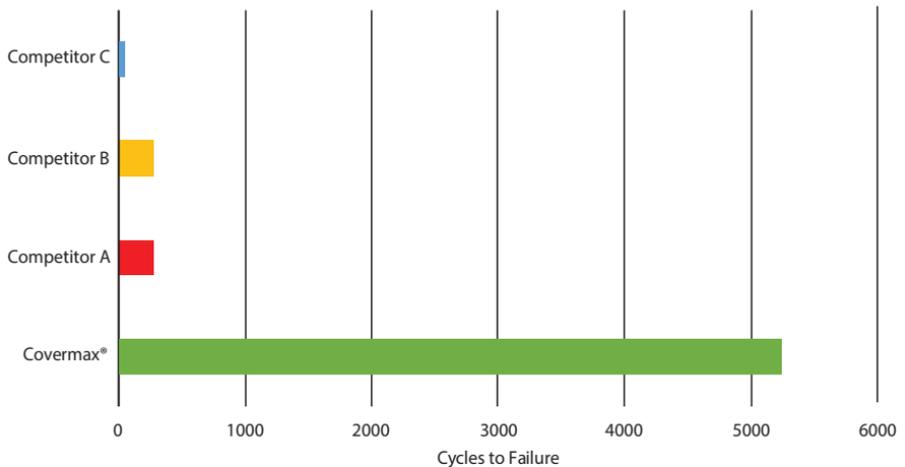
## Rifled Cover HMPE Braided Jacket

Helix™ is equipped with an abrasion and chemical resistant HMPE braided jacket that protects the load bearing core yarn. This jacket is braided in the USA.



## Covermax® Covers

Twin-Path® slings are made with a Covermax® Cover. This is a heavy-duty, double-layer industrial nylon material. The outside cover is green and the inside cover is red. If you see any red showing through the green cover, stop using the sling and return for factory inspection. Covermax® Covers have been tested to provide the best ultraviolet (UV) light protection and the best abrasion protection of any commercially-available synthetic lifting sling. Below is a summary chart of the cover tests.



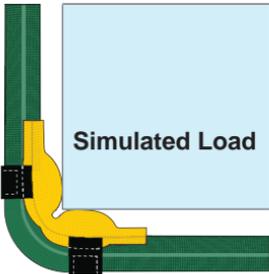
## Repairability / Early Warning Signs

1. Covermax® Covers are double layer with green on the outside and red on the inside for abrasion identification. Torn Covermax® Covers can be repaired.
2. Fiber optic cable can be replaced if damaged.
3. The Check-Fast® Inspection System can be reset or replaced to keep your Twin-Path® sling in service.



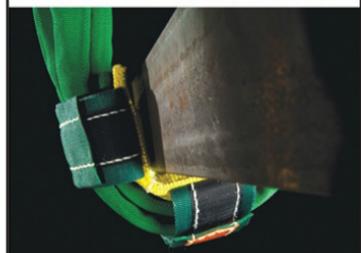
## CornerMax® Pads: Engineered Cut Protection

CornerMax® Pads are one of the engineered cut protection options developed by Slingmax® Rigging Solutions. The CornerMax® Pad is designed to be used on loads that have a 90 degree straight edge. The pad creates a “tunnel” of cut protection known as the “No-Touch Zone”. The edge of the load does not come in contact with the pad or sling, thus protecting the sling. Note that the sides of the load must completely support the pads in order to create and maintain the “tunnel”. CornerMax® Pads have a rated working load limit of 25,000 pounds per inch (4464 kg per cm) of sling width.



**MAXIMUM LOADING:** Do NOT exceed 25,000 lb per inch of sling width.

CornerMax® Part No.	Sling Width (inches)	CornerMax® Approx. Width (inches)	CornerMax® Approx. Weight (lb)
CRNMX02	1 & 2	4	1.00
CRNMX03	3	5	1.25
CRNMX04	4	6	1.50
CRNMX05	5	8	2.00
CRNMX06	6	8	2.00
CRNMX08	8	10	2.50
CRNMX10	10	12	3.00
CRNMX12	12	16	5.50
CRNMX14	14	18	6.50



## CornerMax® Sleeve: Engineered Cut Protection

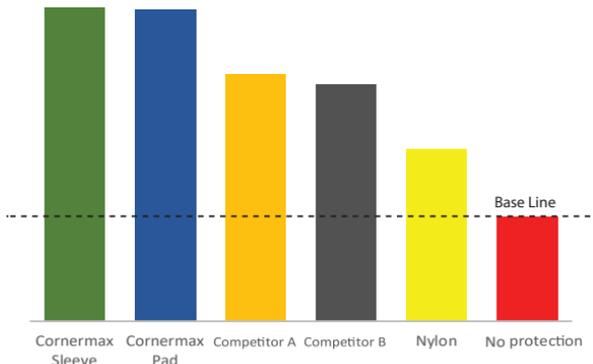
The CornerMax® Sleeve is the ideal solution to protect synthetic slings from cutting when it is not practical to use a CornerMax® Pad. This can be due to the geometry of the load edge not allowing space for a pad or repetitive uses, such as unloading steel coils. The extreme cut resistance of the sleeve is attributed to its proprietary weave design and is unmatched in the rigging industry with a cut protection rating of 25,000 pounds per inch (4,464 kg per cm) of sling width. The CornerMax® Sleeve is made with high-tech fiber and is laboratory tested for cut resistance. In some applications, the CornerMax® Sleeve may be attached to the sling to prevent sliding of the pad between lifts. The true benefits of the revolutionary material far outweigh the costs and now allow for the use of synthetic slings in applications previously dominated by heavy chain, mesh, and wire rope slings.



CornerMax® Sleeve Part No.	External Sleeve Width (inches)	Fastened over both legs of Twin-path® Sling
CRNMXS03	5 in.	Up to TPXCF/TPXC 3,000
CRNMXS04	6 in.	Up to TPXCF/TPXC 5,000
CRNMXS08	8 in.	Up to TPXCF/TPXC 10,000
CRNMXS10	10 in.	Up to TPXCF/TPXC 20,000



This chart shows the results of testing CornerMax® Sleeve and Pad compared to competing edge protection. In our tests the CornerMax® Sleeve and Pad exceeded all other types of cut protection. We back this up with a rating of 25,000 lbs per inch of sling width. The CornerMax® Sleeve and Pad allow synthetic roundslings to meet their working load limit with no damage to the sling or the protection.



## Spider Sleeve

**DO NOT USE FOR CUT PROTECTION! FOR ABRASION PROTECTION ONLY!**



Spider Sleeve reduces cover friction, enabling the sling's outer cover to glide over itself or a piece of hardware. Available in configurations such as sliding, fixed, or removable sleeve. The 100% HMPE fiber construction ensures exceptional strength and durability while maintaining an extremely low coefficient of friction. Spider Sleeve prevents jacket damage when slings are tightly choked, facilitates easy release after choking, and avoids bursting when rigging on tight or narrow hardware. Designed to eliminate the 'bite' of the cover, the Spider Sleeve allows slings to glide into position in situations where the outer jacket comes in contact with itself or rough hardware.

### **Versatile Configurations**

Available in sliding, fixed, or removable configurations, providing flexibility to suit diverse rigging needs.

### **Friction Reduction**

Spider Sleeve minimizes cover friction, allowing the sling's outer cover to glide effortlessly over itself or rough hardware.

### **High-Performance Material**

Crafted from 100% HMPE fiber, tightly woven to ensure exceptional strength and durability while maintaining an extremely low coefficient of friction.



## Synthetic Armor™ Pads: Abrasion Protection

**DO NOT USE FOR CUT PROTECTION! FOR ABRASION PROTECTION ONLY!**

Synthetic Armor™ Pads protect slings from abrasion damage that can be caused by contact with rough surfaces such as concrete beams and structures. They are also used to protect finished or painted loads from marring. These pads can be made to fit any length or width sling. They can also be made in long lengths that the customer can cut into suitable sizes on the job. Double or triple thickness provides resistance for more severe conditions. A variety of materials are used to protect slings and loads depending on the degree of abrasion expected in the application.



## Shackle Pin Pads

**DO NOT USE FOR CUT PROTECTION! FOR ABRASION PROTECTION ONLY!**

The pin area of a shackle can damage synthetic slings when under load. Placing synthetic slings on the pin should be avoided. Shackles may have a sharp edge where the pin goes through the shackle ears. If the sling is rigged on this area, it can become severely damaged. If you must rig on the pin, protect your sling with a Shackle Pin Pad. The Shackle Pin Pad is sized for the model of shackle and protects the sling along the entire pin.

- Three connection points secure pad to shackle using industrial velcro.
- Install and remove in seconds.

### WARNING

Can cause damage or failure of sling if misused or damaged. Inspect before each use. Inspect for cuts, tears, or damage that may prevent protection of the sling. Be sure wear protection is the correct size and type to protect the sling. DEATH or INJURY can occur from improper use or maintenance.



## Twin-Path® Adjustable Bridle

The Twin-Path® Adjustable Bridle (TPXA with K-Spec® core yarn, or TPA with polyester core yarn) is a two-leg bridle made using a Twin-Path® sling with an adjustable bridle ring. When tension is applied to the Twin-Path® Adjustable Bridle, it self-adjusts until the lifting point is over the center of gravity. This allows the two legs to be adjusted for a level lift without the need for custom slings or hardware.



TPA Part No.	Bridle Capacity (lb)	Sling Eye Nominal Width*	Adjustable Ring Dimensions			Shackle Requirements		Sling Weight (lb)	
			Ring Stock Diameter	Main Hook Area (Width)	Ring Area (Length)	Nominal Shackle Size	WLL (tons)	Approx. 3 Foot Base	Approx. Adder per Foot
TPA6	6,000	2-1/2"	1-3/16"	3-1/8"	2-5/8"	5/8"	3-1/4	7.33	1.35
TPXA12	12,000	3"	1-1/8"	4-1/8"	4"	7/8"	6-1/2	12.2	1.20
TPXA20	20,000	3"	1-1/8"	4-1/8"	4"	1-1/4"	12	12.65	1.35
TPXA30	30,000	4"	1-5/8"	5-1/4"	5-1/2"	1-1/2"	17	28.19	1.53
TPXA40	40,000	4"	1-5/8"	5-1/4"	5-1/2"	1-3/4"	25	28.73	1.71
TPXA60	60,000	4"	2"	7"	7-1/2"	2"	35	50.93	2.31
TPXA90	90,000	5"	2-1/4"	8"	8-1/2"	2-1/4"	55	77.76	3.42

**Notes:** Capacities shown are for entire assembly with the double leg at a 45° horizontal angle. Body width is 1" wider. Metric capacities are available.

**⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures.
- For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions.
- See [www.iandisling.com](http://www.iandisling.com) for more information.

## Twin-Path® Adjustable Bridle (Continued)

The Twin-Path® Adjustable Bridle has a double leg for the heavy side of the load and a single leg on the lighter side. See the Adjustable Bridle Product Manual for more information.



If the lifting points are equal distance from the center of gravity, the Twin-Path® Adjustable Bridle can be hooked up with the double or single leg on either lifting point



If the lifting points are an equal distance on either side of the center of gravity but one is higher, the double leg should be attached to the higher lifting point

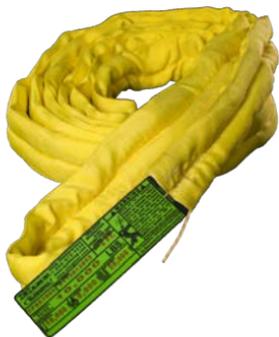


If one of the lifting points is closer to the center of gravity, attach the double leg to this lifting point. It will have the highest weight concentration. If the Twin-Path® Adjustable Bridle is attached so that the single leg is nearest the center of gravity, the lift cannot be made.



The Twin-Path® Adjustable Bridle should be used in applications where the double leg horizontal angle is greater than 45 degrees. Always connect above the center of gravity. If connections are made below the center of gravity, the load may turn when moved.

## Sparkeater® Roundsling



The Sparkeater® Roundsling is the sling to use when the job site is in a hot environment (up to 300°F or 150°C). These slings are made with high-temperature core yarns and a high temperature outer cover. Sparkeater® Roundslings, as with all Twin-Path® Roundslings, come with an inner red cover that provides an early warning for damage, as well as the patented Check-Fast® Inspection System.

Note: Capacities shown include both paths and are for one complete sling. Sling ratings based on commercial fittings of equal or greater capacity. Conforms to ANSI/ ASME B30.9 Chapter 7, NAVFAC P-307 Section 14.7.4.3, the Cordage Institute CI1905 Roundslings Standard and the WSTDA RS-1-HP standard. This chart is based on a 5:1 Design Factor (DF) but any other DF can be fabricated. Higher capacity slings are available. CAPACITIES ARE IN POUNDS (lb)

Twin-Path® Sparkeater® Sling Stock No.	Vertical	Choker	Vertical Basket	Basket Hitches		Approximate Weight (Lb. per Ft.) (Bearing - Bearing)	Nominal Body Width (Inches)*	Minimum Recommended Hardware Diameter (Inches)	Minimum Bending Radius (Inches)
			90° 	60° 	45° 				
TPSE 1000	10,000	8,000	20,000	17,320	14,140	0.41	1.5 - 3"	0.63	0.32
TPSE 1500	15,000	12,000	30,000	25,980	21,210	0.45	1.5 - 3"	0.75	0.38
TPSE 2000	20,000	16,000	40,000	34,640	28,280	0.52	1.5 - 3"	0.86	0.43
TPSE 2500	25,000	20,000	50,000	43,300	35,350	0.66	1.5 - 3"	1.00	0.50
TPSE 3000	30,000	24,000	60,000	51,960	42,420	0.73	2.0 - 4"	1.10	0.55
TPSE 4000	40,000	32,000	80,000	69,280	56,560	0.86	2.0 - 4"	1.40	0.70
TPSE 5000	50,000	40,000	100,000	86,600	70,700	1.07	2.0 - 4"	1.50	0.75
TPSE 6000	60,000	48,000	120,000	103,920	84,840	1.20	2.0 - 4"	1.50	0.75
TPSE 7000	70,000	56,000	140,000	121,240	98,980	1.33	3.5 - 7"	1.84	0.92
TPSE 8500	85,000	68,000	170,000	147,220	120,190	1.60	3.5 - 7"	1.84	0.92
TPSE 10000	100,000	80,000	200,000	173,200	141,400	1.80	3.5 - 7"	2.00	1.00

**⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.ianDSLING.com](http://www.ianDSLING.com) for more information.

## Single-Path High Performance Roundslings with K-Spec® Core Yarn

Slingmax® Single-Path Slings are the only single-path, high-performance fiber roundslings available with the Check-Fast® Inspection System and Covermax® Cover. The Covermax® Cover is the most durable cover available for a synthetic sling.



Also available in polyester with a polyester cover and core yarn.

**Note:** Sling ratings based on commercial fittings of equal or greater capacity. Conforms to ANSI/ ASME B30.9 Chapter 7, NAVFAC P-307 Section 14.7.4.3, the Cordage Institute C11905 Roundslings Standard and the WSTDA RS-1-HP standard. This chart is based on a 5:1 Design Factor (DF) but any other DF can be fabricated. Higher capacity slings are available. **CAPACITIES ARE IN POUNDS (lb.)**

Single-Path K-Spec® Sling Stock No.	Vertical	Choker	Vertical Basket	Basket Hitches		Approximate Weight (lb. per Ft.) (Bearing-Bearing)	Nominal Body Width (Inches)	Minimum Recommended Hardware Diameter (Inches)	Minimum Bending Radius (Inches)
			90° 	60° 	45° 				
SPXCF 500	5,000	4,000	10,000	8,660	7,070	0.36	2.5"	0.76	0.38
SPXCF 1000	10,000	8,000	20,000	17,320	14,140	0.41	2.5"	0.88	0.44
SPXCF 1500	15,000	12,000	30,000	25,980	21,210	0.46	2.5"	1.00	0.50
SPXCF 2000	20,000	16,000	40,000	34,640	28,280	0.54	2.5"	1.26	0.63
SPXCF 2500	25,000	20,000	50,000	43,300	35,350	0.60	3"	1.38	0.69
SPXCF 3000	30,000	24,000	60,000	51,960	42,420	0.66	3"	1.50	0.75
SPXCF 4000	40,000	32,000	80,000	69,280	56,560	0.79	3"	1.76	0.88
SPXCF 5000	50,000	40,000	100,000	86,600	70,700	1.02	4"	1.76	0.88
SPXCF 6000	60,000	48,000	120,000	103,920	84,840	1.15	4"	2.00	1.00
SPXCF 7000	70,000	56,000	140,000	121,240	98,980	1.31	4"	2.25	1.13
SPXCF 8500	85,000	68,000	170,000	147,220	120,190	1.55	5"	2.50	1.25
SPXCF 10000	100,000	80,000	200,000	173,200	141,400	1.78	5"	2.75	1.38
SPXCF 12500	125,000	100,000	250,000	216,500	176,750	2.12	5"	3.00	1.50
SPXCF 15000	150,000	120,000	300,000	259,800	212,100	2.54	6"	3.00	1.50
SPXCF 17500	175,000	140,000	350,000	303,100	247,450	3.09	6"	3.50	1.75
SPXCF 20000	200,000	160,000	400,000	346,400	282,800	3.58	6"	3.50	1.75

**⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.iandisling.com](http://www.iandisling.com) for more information.



## ONYX High Performance Roundsling with O-Spec Core Yarn

The ONYX roundsling, manufactured on the Slingmax Roundsling machine using the Slingmax Quality System, features O-Spec Core Yarn, produced with high-performance HMPE fiber. This specialized core, twisted and batch-tested in our Greensboro, NC facility, allows ONYX slings to be less than half the weight of polyester roundslings with equal capacity, while achieving unmatched length tolerances compared to competitors. Each ONYX sling is verified to meet ASME B30.9 standards and tested to capacity on our 1.2 million-pound pull-test machine.

**Note:** Sling ratings based on commercial fittings of equal or greater capacity. Conforms to ANSI/ ASME B30.9 Chapter 7, NAVFAC P-307 Section 14.7.4.3, the Cordage Institute CI1905 Roundsling Standard and the WSTDA RS-1-HP standard. This chart is based on a 5:1 Design Factor (DF) but any other DF can be fabricated. Higher capacity slings are available. **CAPACITIES ARE IN POUNDS (lb.)**

CODE	VERTICAL (lbs)	CHOKER (lbs)	BASKET (lbs)	WEIGHT PER FT (lbs)
ONYX500	5,000	4,000	10,000	0.36
ONYX1000	10,000	8,000	20,000	0.43
ONYX1500	15,000	12,000	30,000	0.51
ONYX2000	20,000	16,000	40,000	0.64
ONYX2500	25,000	20,000	50,000	0.72
ONYX3000	30,000	24,000	60,000	0.80
ONYX4000	40,000	32,000	80,000	0.97
ONYX5000	50,000	40,000	100,000	1.27
ONYX6000	60,000	48,000	120,000	1.40
ONYX7000	70,000	56,000	140,000	1.63
ONYX8500	85,000	68,000	170,000	1.88
ONYX10000	100,000	80,000	200,000	2.15

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- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.iandisling.com](http://www.iandisling.com) for more information.

## Polyester Roundslings with Check-Fast® Inspection System

This is the only single-path, polyester roundslings with an overload indicator. The SPCF single-path roundslings are constructed with our patented Covermax Cover, which is the most durable and abrasion resistant roundslings cover available. SPF single-path roundslings are constructed with a polyester cover.

Single-Path Polyester Roundslings Stock No.	Vertical	Choker	Vertical Basket	Basket Hitches		Approximate Weight (Lb. per Ft.) (Bearing - Bearing)	Nominal Body Width (Inches)
			90° 	60° 	45° 		
SPCF/SPF 300	3,000	2,400	6,000	5,196	4,242	0.30	2.5"
SPCF/SPF 450	4,500	3,600	9,000	7,794	6,363	0.45	2.5"
SPCF/SPF 600	6,000	4,800	12,000	10,392	8,484	0.48	2.5"
SPCF/SPF 900	9,000	7,200	18,000	15,588	12,726	0.70	2.5"
SPCF/SPF 1200	12,000	9,600	24,000	20,784	16,968	0.90	3"
SPCF/SPF 1400	14,000	11,200	28,000	24,248	19,796	0.95	3"
SPCF/SPF 1700	17,000	13,600	34,000	29,444	24,038	1.20	3"
SPCF/SPF 2200	22,000	17,600	44,000	38,104	31,108	1.40	3"
SPCF/SPF 2600	26,000	20,800	52,000	45,032	36,764	1.70	4"
SPCF/SPF 3200	32,000	25,600	64,000	55,424	45,248	1.90	4"
SPCF/SPF 5000	50,000	40,000	100,000	86,600	70,700	2.70	5"
SPCF/SPF 6000	60,000	48,000	120,000	103,920	84,840	3.00	5"

Twin-Path® Covermax® Polyester Roundslings Stock No.	Vertical	Choker	Vertical Basket	Basket Hitches		Approximate Weight (Lb. per Ft.) (Bearing - Bearing)	Nominal Body Width (Inches)
			90° 	60° 	45° 		
TPCF/TPF 450	4,500	3,600	9,000	7,794	6,363	0.45	2.5"
TPCF/TPF 600	6,000	4,800	12,000	10,392	8,484	0.48	3"
TPCF/TPF 750	7,500	6,000	15,000	12,990	10,605	0.65	3"
TPCF/TPF 900	9,000	7,200	18,000	15,588	12,726	0.70	3"
TPCF/TPF 1200	12,000	9,600	24,000	20,784	16,968	0.90	4"
TPCF/TPF 1400	14,000	11,200	28,000	24,248	19,796	0.95	4"
TPCF/TPF 1700	17,000	13,600	34,000	29,444	24,038	1.20	4"
TPCF/TPF 2200	22,000	17,600	44,000	38,104	31,108	1.40	5"
TPCF/TPF 2600	26,000	20,800	52,000	45,032	36,764	1.70	5"
TPCF/TPF 3200	32,000	25,600	64,000	55,424	45,248	1.90	5"
TPCF/TPF 5000	50,000	40,000	100,000	86,600	70,700	2.70	6"
TPCF/TPF 6000	60,000	48,000	120,000	103,920	84,840	3.00	6"

Note: Capacities shown are for one complete sling. Sling ratings based on commercial fittings of equal or greater capacity. Conforms to ANSI/ ASME B30.9 Chapter 7, NAVFAC P-307 Section 14.7.4.3, the Cordage Institute C11905 Roundslings Standard and the WSTD RS-1-HP Roundslings Standard. This chart is based on a 5:1 Design Factor (DF) but any other DF can be fabricated. Higher capacity slings are available. CAPACITIES ARE IN POUNDS (LB.)

**⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.iandisling.com](http://www.iandisling.com) for more information.

## Single-Path Roundslings



SP300	Purple
SP450	Black
SP600	Green
SP900	Yellow
SP1200	Gray
SP1400	Red
SP1700	Brown
SP2200	Blue
SP2600	Orange
SP3200	Orange
SP5000	Orange
SP6000	Orange

Single-Path Polyester Roundsling Stock No.	Vertical	Choker	Vertical Basket	Basket Hitches		Approximate Weight (Lb. per Ft.) (Bearing - Bearing)	Nominal Body Width (Inches)
			90° 	60° 	45° 		
SP300	3,000	2,400	6,000	5,196	4,242	0.30	2.5"
SP450	4,500	3,600	9,000	7,794	6,363	0.45	2.5"
SP600	6,000	4,800	12,000	10,392	8,484	0.48	2.5"
SP900	9,000	7,200	18,000	15,588	12,726	0.70	2.5"
SP1200	12,000	9,600	24,000	20,784	16,968	0.90	3"
SP1400	14,000	11,200	28,000	24,248	19,796	0.95	3"
SP1700	17,000	13,600	34,000	29,444	24,038	1.20	3"
SP2200	22,000	17,600	44,000	38,104	31,108	1.40	3"
SP2600	26,000	20,800	52,000	45,032	36,764	1.70	4"
SP3200	32,000	25,600	64,000	55,424	45,248	1.90	4"
SP5000	50,000	40,000	100,000	86,600	70,700	2.70	5"
SP6000	60,000	48,000	120,000	103,920	84,840	3.00	5"

**Lifting Fibers:** Endless loops of polyester load-bearing yarn

**Cover:** Polyester Cover

**Tag:** Poly-vinyl or leather tags are available

**Capacities:** 3,000 lb. to 60,000 lb. vertical rated capacities

**Design Factor:** 5:1

**Configuration:** Roundsling or eye - and - eye

**Applications:** Vertical, Basket, Choker

**Inspection:** Available with Check-Fast® Inspection System

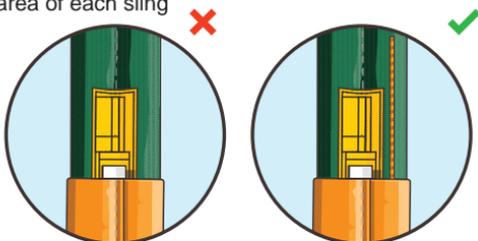
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## Twin-Path Sling Before Each Use

**⚠ DEATH or INJURY** can occur from improper use or care.

- Sling users shall be trained.** Do not use this sling unless you are properly trained.
- Read and follow all instructions and warnings in this manual.
- Check tag to confirm that sling is adequately rated for the load. See pages 5-19 for charts.
- Inspect sling for damage including:
  - Missing or unreadable Identification Tag
  - Ensure Check-Fast® External Warning Indicator or Tell-Tail indicators extend past the tag area of each sling



- If fiber optics are installed, ensure light transmits from end to end
- Holes, tears, cuts, abrasive wear or snags
- Ensure inner red cover is not visible
- Acid or caustic burns
- Exposed core yarn
- Broken or damaged core yarn
- Weld splatter or heat damage
- Fittings that are pitted, corroded, cracked, bent, twisted, gouged or broken
- Any other condition, including visible damage, that causes doubt as to the continued use of the sling

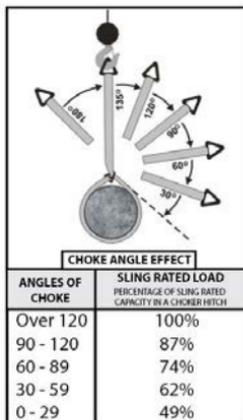
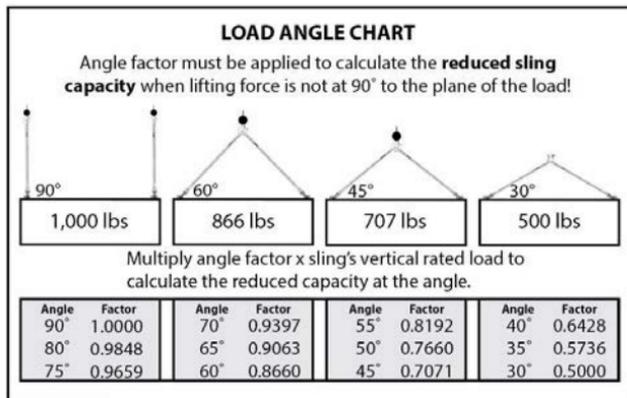
**⚠ IF ANY OF THESE ARE DETECTED - SLING SHALL BE REMOVED FROM SERVICE IMMEDIATELY**

### Inspection Frequencies

- All slings and rigging shall be inspected before each use.
- Documented periodic inspections shall be completed at least annually or more frequently depending on service.
  - Refer to ASME B30.9 and / or contact manufacturer for recommendations for guidance on service intervals.

## Twin-Path Sling USE

1. Determine the weight and center of gravity of the load. For special lifts consult manufacturer for additional support and/or suggested products.
2. Check the sling tag to confirm that the sling is rated adequately for the load in the manner or hitches that it will be used. Refer to load angle, choke angle and other relevant charts.



⚠ Use caution with lifts at angles less than 45° and do not make lifts with slings at less than 30°. When possible, use longer slings to minimize angular tension by increasing the angle. Severe angles can greatly reduce sling strength.

3. Check chemical resistance. Twin-Path® slings are generally resistant to common chemicals. Resistances in this chart are based on common concentrations at room temperature. Elevated concentrations and temperatures may affect chemical resistance. Contact Slingmax for more information when using in environments with elevated concentrations of chemicals and/or temperatures.

Chemical	Resistance
<b>Hydrocarbons</b>	Excellent
Hydraulic Fluid	Excellent
Crude Oil	Excellent
Gasoline	Excellent
Kerosene	Excellent
Diesel Fuel	Excellent
Mineral Oil	Excellent
<b>Acids</b>	Excellent
Sulfuric Acid	Excellent
High Concentration Sulfuric Acid	Fair
Hydrochloric Acid	Excellent
Phosphoric Acid	Excellent
Boric Acid	Excellent

Chemical	Resistance
<b>Alkalis</b>	Excellent
Chlorine bleach	Poor
Sodium Hydroxide	Fair
High Concentration Sodium Hydroxide	Poor
<b>Other</b>	Excellent
Salt Water	Fair
Ammonia	Fair
<b>Most Solvents</b>	Excellent
Ethanol	Excellent
Methanol	Excellent
Toluene	Excellent
d-limonene	Poor

⚠ Some chemicals on this chart (including those rated as "Excellent") can damage the sling cover. Contact Slingmax® for more information.

## USE (Continued)

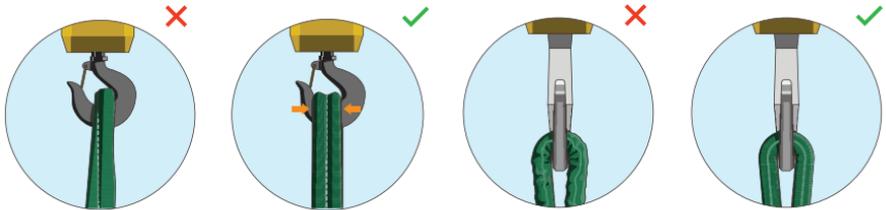
4. Be sure warning indication devices are operable.

⚠ Do not drag sling over any surface.

⚠ Do not expose to damaging chemicals and/or temperatures over 180°F/82°C. Refer to manufacturer for additional information.

5. Select compatible fittings.

6. Center the sling and the load on the hardware being used. Avoid bunching the sling. Do not fold sling, rather, push together.

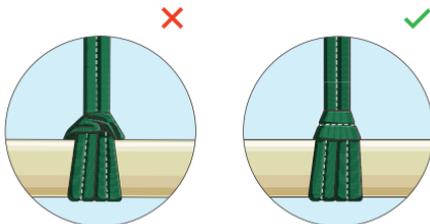


⚠ To avoid injury, it may be necessary to use multiple persons or an overhead lifting device to lift the slings and rigging.

7. Protect sling from abrasive surfaces, pinch hazards, and edges. Use abrasion protection for abrasive surfaces and cut protection for edges on the hardware or load.

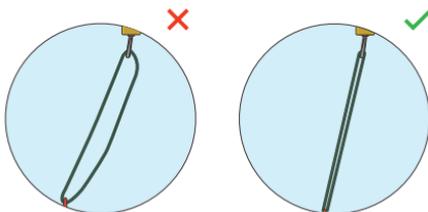
8. Ensure sling paths are smooth in the hitch without any twisting or bunching.

⚠ Sling shall not be twisted, tied into knots, or joined by knotting.



## USE (Continued)

9. Equalize the slack by hand. Do not equalize the sling by using the crane or hoist to create tension.



- ⚠ Keep hands clear when the sling is being tightened.

10. Carefully lift the load.

- ⚠ Balance, maintain control and avoid sudden movement or jerking of the load.

- ⚠ Be alert for snagging of the load.

- ⚠ STAND CLEAR OF LOAD AT ALL TIMES.

- ⚠ DO NOT RIDE ON SLING OR LOAD.

- ⚠ STOP THE LIFT IMMEDIATELY if the load does not lift evenly, the external warning indication devices react, or any other observed failure of the rigging is detected.

### CARE

Store slings to prevent contact with possible mechanical damage, corrosion, dust, grit and extreme temperatures.

To clean: use mild soap and water and allow to air dry before storing.

Do not machine wash or dry, to avoid damaging the sling.

### REPAIR

Field repair is not permitted. Return sling to a Slingmax® Dealer for repairs. Visit [www.slingmax.com](http://www.slingmax.com) for list of authorized Slingmax® Dealers.

- ⚠ Attempting to repair sling can result in sling failure, load drop, and death or serious injury.

### DISPOSAL

Before disposing of Twin-Path® slings, the slings shall be cut in half to prevent inadvertent use.

Waste must be disposed of in accordance with national and local environmental regulations.

## Gator-Laid® Wire Rope Slings

For heavy lifting, Gator-Laid® Wire Rope Slings are the most efficient and flexible wire rope slings that meet all industrial and regulatory standards. These slings have metal sleeves for the splice connection and parallel-laid wire in the eyes. It is a heavy-lift sling that can be made in short working lengths. Gator-Laid® products were developed in conjunction with the offshore oil industry to provide the world's best heavy lift wire rope slings.



### GATOR-LAID® SLINGS TECHNICAL CHART

Finished Diameter	Component Parts	Standard Eye Size	Vertical Rated Capacity (tons)	Choker Rated Capacity (tons)	Basket Rated Capacity (tons)	Weight per Foot (lb.)
1-3/4"	7/16"	22"	14.6	10.9	29.2	3.15
2"	1/2"	24"	19.1	14.3	38.2	4.14
2-1/4"	9/16"	26"	24.1	18.0	48.2	5.31
2-1/2"	5/8"	28"	29.6	22.2	59.2	6.48
3"	3/4"	30"	42.3	31.7	84.6	9.36
3-1/2"	7/8"	35"	57.3	42.9	114.6	12.78
4"	1"	40"	74.4	55.8	148.4	16.65
4-1/2"	1-1/8"	45"	93.6	60.2	187.2	21.06
5"	1-1/4"	50"	115.0	86.2	230.0	26.01
5-1/2"	1-3/8"	55"	138.2	103.6	276.4	31.50
6"	1-1/2"	60"	164.1	123.0	328.2	37.44
7"	1-3/4"	70"	220.3	165.2	440.6	51.03
8"	2"	80"	285.1	213.8	570.2	66.51
9"	2-1/4"	90"	355.6	266.7	711.2	84.24
10"	2-1/2"	100"	434.8	326.1	869.6	104.00

NOTE: Rated Capacity is based on a 5:1 Design Factor.

**⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.iandisling.com](http://www.iandisling.com) for more information.

## Gator-Flex® Grommet

Gator-Flex® Grommets are endless for heavy lifts that require short connections. These slings can be made shorter than standard multi-part slings, but maintain all of the advantages of multi-part slings. They are the most flexible grommets in the industry.



### GATOR-FLEX® GROMMETS TECHNICAL CHART

Finished Diameter	Component Parts	Vertical Rated Capacity (tons)	Choker Rated Capacity (tons)	Basket Rated Capacity (tons)	Weight per Foot (lb.)
1"	1/4"	10	7	20	2
1-1/4"	5/16"	15	11	30	3
1-1/2"	3/8"	22	15	44	5
1-3/4"	7/16"	29	21	58	6
2"	1/2"	38	27	76	8
2-1/4"	9/16"	48	34	96	11
2-1/2"	5/8"	59	42	118	13
3"	3/4"	85	59	170	19
3-1/2"	7/8"	115	81	230	25
4"	1"	148	104	296	33
4-1/2"	1-1/8"	187	131	374	42
5"	1-1/4"	230	161	460	52
5-1/2"	1-3/8"	276	194	552	63
6"	1-1/2"	328	230	656	75
7"	1-3/4"	441	308	882	102
8"	2"	570	399	1140	133
9"	2-1/4"	711	498	1422	168
10"	2-1/2"	870	609	1740	209
11"	2-3/4"	1040	728	2080	250
12"	3"	1224	857	2448	300

NOTE: Rated Capacity is based on a 5:1 Design Factor.

**⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.iansling.com](http://www.iansling.com) for more information.

## Tri-Flex® Wire Rope Slings

Tri-Flex® Wire Rope Slings provide the best combination of strength and flexibility. Because of the Tri-Flex® sling construction, there is a large savings in material and machine costs in larger sizes. This, combined with ease of use, makes Tri-Flex® Wire Rope Slings the slings for smart buyers.



### TRI-FLEX® SLINGS TECHNICAL CHART

Finished Diameter	Component Parts	Vertical Rated Capacity (tons)	Choker Rated Capacity (tons)	Basket Rated Capacity (tons)	Weight per Foot (lb.)
1/2"	1/4"	1.7	1.3	3.4	.44
5/8"	5/16"	2.6	1.9	5.2	.68
3/4"	3/8"	3.6	2.7	7.2	.99
7/8"	7/16"	4.9	3.7	9.8	1.33
1"	1/2"	6.4	4.8	12.8	1.75
1-1/8"	9/16"	8.0	6.0	16.0	2.24
1-1/4"	5/8"	9.9	7.4	19.8	2.73
1-1/2"	3/4"	14.0	10.5	28.0	3.9
1-3/4"	7/8"	19.0	14.3	38.0	5.4
2"	1"	24.8	18.6	49.6	7.0
2-1/4"	1-1/8"	31.2	23.4	62.4	8.9
2-1/2"	1-1/4"	38.4	28.8	76.8	10.9
2-3/4"	1-3/8"	46.0	34.5	92.0	13.3
3"	1-1/2"	55.0	41.2	110.0	15.8
3-1/4"	1-5/8"	63.4	47.6	126.8	18.5
3-1/2"	1-3/4"	73.0	54.8	146.0	21.5
4"	2"	95.0	71.2	190.0	28.0
4-1/2"	2-1/4"	118.0	88.5	236.0	35.6
5"	2-1/2"	145.0	109.0	290.0	44.0

NOTE: Rated Capacity is based on a 5:1 Design Factor.

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- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.iandisling.com](http://www.iandisling.com) for more information.

## Tri-Flex® Wire Rope Slings with Cable Laid

This wire rope sling is an extremely flexible product with great applications for general rigging purposes. It makes a fantastic choker sling, especially when setting or removing utility poles.



### TRI-FLEX® SLINGS WITH CABLE LAID

Finished Diameter	Component Parts	Vertical Rated Capacity (tons)	Choker Rated Capacity (tons)	Basket Rated Capacity (tons)
1/2"	1/4"	1.3	.9	2.6
3/4"	3/8"	2.7	2.0	5.4
1"	1/2"	4.6	3.4	9.2
1-1/4"	5/8"	7	5.2	14.0
1-1/2"	3/4"	10	7.5	20.0

NOTE: Rated Capacity is based on a 5:1 Design Factor.

**⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures.
- For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions.
- See [www.iandisling.com](http://www.iandisling.com) for more information.

## Equalizer Block

The Equalizer Block is used to maintain tension on all legs of the sling during a lift. Rather than adjusting slings and hooks prior to beginning a lift, the Equalizer Block automatically adjusts itself when the load is put on the device from the sling. This product was designed specifically for Twin-Path® slings and is the only rolling block for synthetic roundslings.



Part No.	Capacity (5:1 DF)	Maximum Sling Width (Inches)	Suggested Sling for 90° Basket	Block Weight (lb.)
SEB10	10 US ton	3	TPXCF1000	44
SEB25	25 US ton	4	TPXCF2500	79
SEB50	50 US ton	6	TPXCF5000	220
SEB75	75 US ton	8	TPXCF7500	270
SEB125M	125 Metric ton	8	TPXCF15000	640

## Pad Eye Tester

Light weight and portable tool for testing pad eyes and lifting lugs and eye bolts. Can be used upright (as pictured), inverted, or in a horizontal plane. Equipped with an adjustable clevis height and large dial capacity read out. Aluminum housing on 10 ton, 20 ton, and 30 ton models.



### Applications:

Proof testing pad eyes, lifting lugs, eye bolts. Can be used upright as pictured, inverted or in a horizontal plane.

### Features:

- Lightweight and portable
- Aluminum housing on 10, 20, 30 ton models
- Assist handles on 2 sides
- Stainless steel data plate
- Adjustable clevis height
- Large dial type capacity read out
- Powder coated finish
- 10' hose and quick couplers
- Hand pump
- Durable carrying case

### Optional Equipment:

- Polyurethane hose in 10', 12', 20', & 50' lengths
- Wire-braid rubber hose in 10', 20', 30', & 50' lengths
- Powered Pump
- Extra Clevis and pin

Part No.	Capacity (US Tons)	Clevis Dimensions (Inches)					Pin Diameter (D)	Weight (lb.)
		A	B	C	E	F		
PET-010-PC	10	4-5/8	1-13/16	2-7/8	2	3	1"	30
PET-020-PC	20	6-3/16	2	3-3/16	2-1/4	4	2"	65
PET-030-PC	30	8-1/2	3-1/2	5	3	5-3/8	2"	110

## Slingmax® Products - FAQ

### A. Twin-Path® Extra Covermax® Slings

#### 1. Can a Twin-Path® sling be used in a fitting or trunnion that is less than the sling's width?

Yes, Twin-Path® slings can fit spaces half of their catalog width with no reduction in capacity. There are two dimensions, called Nominal Body Width, in the Twin-Path® section of the catalog. The larger dimension is the flat tube measurement before installing the core yarn. The smaller dimension is the approximate reduction in width you can expect to achieve when placing the sling in a smaller fitting. The paths of the Twin-Path® sling should be squeezed together to reduce the dimension - DO NOT fold one path over the other to create a reduced dimension.

#### 2. What is the Check-Fast® Inspection System?

The Check-Fast® Inspection System with External Warning Indicator (EWI) provides a criteria for pass/fail inspection when the internal load-bearing core yarn may be damaged. The Check-Fast® Inspection System can also indicate ultraviolet (UV) light degradation, fiber-on-fiber abrasion, fatigue, and severe overload. If the sling is overloaded beyond its rated capacity, the EWI is designed to retract before the sling fails. The sling inspector now has an objective "GO/NO-GO" inspection device rather than relying on subjective and labor-intensive inspection techniques to guess if the load-bearing core yarns are in good condition. If the EWI is not visible, remove the sling from service and send to the manufacturer for repair evaluation. This system is available for high performance K-Spec® Core Yarn roundslings or polyester roundslings fabricated by authorized Slingmax® dealers.

#### 3. What is the difference between the Check-Fast® EWI and Tell-Tails?

Tell-tails are extensions of the core yarn bundles and are designed to function as overload indicators. The "tails" are designed to retract and eventually disappear if the sling is overloaded. Tell-tails should extend past the tag area of each sling. If both Tell-Tails are not visible, remove the sling from service and send to the manufacturer for repair evaluation. This inspection system also combines use of a fiber optic cable. The condition of the internal load-bearing core yarn can be inspected by checking the continuity of the fiber optic cable. If crushing, cutting, heat or chemical damage has occurred, the damage to the fiber optic cable will destroy its ability to transmit light from one end to the other, giving the inspector a reason to remove the sling from service and send it in for repair evaluation. (The Fiber Optic Inspection system is also an option with the Check-Fast® Inspection System).

#### 4. What pin diameter or hardware diameter is OK with a Twin-Path® sling?

Slings used with fittings shall be compatible with the fittings used. The lifting capacity shall be rated at the lower of the sling or fitting. Fitting openings shall be of the proper shape and size to assure that the sling will seat properly. In other words, the diameters of most commercially-available hardware are sufficient for use with a Twin-Path® sling of equal capacity.

#### 5. What happens if oil or gasoline gets on my Twin-Path® sling?

Hydrocarbons and oils do not affect the performance of any Twin-Path® sling. Please refer to Page 21 for the 'Environmental Considerations' of K-Spec® core yarn for additional information. Twin-Path® slings with Covermax® Covers may be cleaned using a commercially-available mild detergent and ambient temperature water, then allowed to air dry.

#### 6. Do Twin-Path® slings stretch? I've seen loads bounce with synthetic slings.

At rated capacity, nylon slings will stretch up to 15%. Roundslings made with Polyester core yarn will stretch 3%. Braided polyester slings will stretch 9%. Twin-Path® slings with K-Spec® core yarn stretch less than 1% at rated capacity, about the same as wire rope slings.

#### 7. What are the length tolerances on Twin-Path® slings?

Our advertised length tolerances are listed in Technical Bulletin #4 (please see [www.slingmax.com](http://www.slingmax.com)); however, much tighter and more precise tolerances are readily achieved. Remember that pull-to-pull measurements of Twin-Path® slings should be measured under a light load, even if it is only at 10% of Vertical Rated Capacity (VRC). While the K-Spec® core yarns will not stretch nor shrink, the Covermax® Cover is a bulked nylon which will show some expansion and contraction over time.

#### 8. If a synthetic roundsling has one interior core yarn that has been damaged or cut, can it still be used if the sling's capacity is de-rated?

NO! Roundslings that suffer damage to the load-bearing core yarn must be removed from service. These slings shall be destroyed to prevent inadvertent use.

## Slingmax® Products - FAQ

9. If the cover on a Twin-Path® sling is damaged, can it be repaired?

Yes. The Covermax® Cover is actually comprised of two covers - a green outer cover and a red inner cover. As long as there is no damage to the core yarns, the cover may be safely repaired. With the Twin-Path® design, our manufacturers can repair the cover without the risk of sewing over the internal core yarns during repair.

10. Are all Twin-Path® slings proof tested before reaching the customer?

Yes. As part of our manufacturing process, each Twin-Path® sling is proof tested to twice its vertical rated capacity. In addition, every repaired Twin-Path® sling is also proof-tested before it is returned to the customer.

11. Can I overlap Twin-Path® slings in a shackle or other hardware?

Yes. The paths should be laid directly on top of each other to prevent possible tearing of the Covermax® Cover.

### B. Sling Protection

1. What is the difference between “abrasion protection” and “cut protection”?

Abrasion protection is needed when the sling is wrapped around a load that is rough, dirty or gritty. Slingmax® abrasion protection products include Synthetic Armor™ (Synarm) Pads and shackle pin pads. Cut protection is needed when there is an edge or corner that the sling may come in contact with. Slingmax® cut protection devices include the CornerMax® Pad and CornerMax® Sleeves; both are engineered devices designed to provide cut protection up to 25,000 lbs. per inch of sling width.

2. Can I use a Synthetic Armor™ Pad for cut protection?

No. Synthetic Armor™ Pads are intended for abrasion protection. If cut protection is required, we recommend use of CornerMax® products.

3. How do I know if a load edge is “sharp” enough to require a CornerMax® Pad?

The word “sharp” is considered subjective and is no longer used in our catalog or website. CornerMax® Pads should be utilized to protect the sling from all edges and corners.

### C. Wire Rope Slings

1. Why use a multi-part wire rope sling instead of a single-strand wire rope sling?

A single-strand sling is less flexible than a multi-part wire rope sling. Also, a multi-part wire rope sling provides a better D/d ratio.

2. Are the D/d ratios for Slingmax® multi-part wire rope slings based on component diameter?

No. The D/d ratios are based on the finished diameter. Finished and component diameters for each wire rope sling may be found on the respective catalog page for each respective item.

3. What are the reductions for Slingmax® wire rope slings if you are not able to use the correct D/d?

Recommended ratings for sling body D/d below 5:1 are as follows:

5:1	100%
4:1	92%
3:1	84%
2:1	73%
1:1	65%
Less than 1	50%

## Hand-Splice Slings



Hand-Splice slings come in two styles: (1) The standard Four Tuck, burnt-end splice, or (2) the hidden Tuck, safety splice with concealed ends. For the same benefits in a better choker, you should consider Tri-Flex® Slings.

### 6 x 19 and 6 x 36, Improved Plow, Fiber Core

Rope Size (inches)	Eye Size (inches)		Recommended Minimum Length	Rated Capacity in Tons (2000 lbs.)*		
	W	L		Vertical	Choker Hitch	Vertical Basket
1/4"	3	6	1' 10"	.49	.37	.99
5/16"	3	6	2' 0"	.76	.57	1.5
3/8"	3	6	2' 2"	1.1	.80	2.1
7/16"	4	8	2' 8"	1.4	1.1	2.9
1/2"	4	8	2' 10"	1.8	1.4	3.7
9/16"	5	10	3' 4"	2.3	1.7	4.6
5/8"	5	10	3' 6"	2.8	2.1	5.6
3/4"	6	12	4' 2"	3.9	2.9	7.8
7/8"	7	14	5' 2"	5.1	3.9	10.0
1"	8	16	5' 10"	6.7	5.0	13.0

### 6 x 19 and 6 x 36, Improved Plow, IWRC

Rope Size (inches)	Eye Size (inches)		Recommended Minimum Length	Rated Capacity in Tons (2000 lbs.)*		
	W	L		Vertical	Choker Hitch	Vertical Basket
1/4"	3	6	1' 10"	.53	.40	1.0
5/16"	3	6	2' 0"	.81	.61	1.6
3/8"	3	6	2' 2"	1.1	.86	2.3
7/16"	4	8	2' 8"	1.5	1.2	3.1
1/2"	4	8	2' 10"	2.0	1.5	3.9
9/16"	5	10	3' 4"	2.5	1.8	4.9
5/8"	5	10	3' 6"	3.0	2.2	6.0
3/4"	6	12	4' 2"	4.2	3.1	8.4
7/8"	7	14	5' 2"	5.5	4.1	11.0
1"	8	16	5' 10"	7.2	5.4	14.0

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## Mechanical Splice Flemish Eye Slings

Mechanical Splice Flemish Eye Slings are general purpose slings. They are adaptable for basket and straight-pull hitches. These slings are more widely used than any other type of sling for general material handling. In sizes of 1" diameter and up, Tri-Flex® slings should be used as they are economical, light, and flexible.



### 6 x 19 Type, EIP, IWRC

Rope Size (inches)	Eye Size (inches)		Recommended Minimum Length	Rated Capacity in Tons (2000 lbs.)*					
	W	L		Vertical	Choker Hitch	Basket Hitch			
						Vertical Basket	60°	45°	30°
1/4"	3	6	1' 6"	.65	.48	1.3	1.1	.91	.65
5/16"	3	6	1' 10"	1.0	.74	2.0	1.7	1.4	1.0
3/8"	3	6	1' 10"	1.4	1.1	2.9	2.5	2.0	1.4
7/16"	4	8	2' 4"	1.9	1.4	3.9	3.4	2.7	1.9
1/2"	4	8	2' 6"	2.5	1.9	5.1	4.4	3.6	2.5
9/16"	4	8	2' 8"	3.2	2.4	6.4	5.5	4.5	3.2
5/8"	5	10	3' 2"	3.9	2.9	7.8	6.8	5.5	3.9
3/4"	6	12	3' 8"	5.6	4.1	11.0	9.7	7.9	5.6
7/8"	7	14	4' 4"	7.6	5.6	15.0	13.0	11.0	7.6
1"	8	16	4' 10"	9.8	7.2	20.0	17.0	14.0	9.8
1 1/8"	9	18	5' 6"	12.0	9.1	24.0	21.0	17.0	12.0

### 6 x 19 Type, EIP, IWRC

Rope Size (inches)	Eye Size (inches)		Recommended Minimum Length	Rated Capacity in Tons (2000 lbs.)*					
	W	L		Vertical	Choker Hitch	Basket Hitch			
						Vertical Basket	60°	45°	30°
1/4"	3	6	1' 6"	.65	.48	1.3	1.1	.91	.65
5/16"	3	6	1' 10"	1.0	.74	2.0	1.7	1.4	1.0
3/8"	3	6	1' 10"	1.4	1.1	2.9	2.5	2.0	1.4
7/16"	4	8	2' 4"	1.9	1.4	3.9	3.4	2.7	1.9
1/2"	4	8	2' 6"	2.5	1.9	5.1	4.4	3.6	2.5
9/16"	4	8	2' 8"	3.2	2.4	6.4	5.5	4.5	3.2
5/8"	5	10	3' 2"	3.9	2.9	7.8	6.8	5.5	3.9
3/4"	6	12	3' 8"	5.6	4.1	11.0	9.7	7.9	5.6
7/8"	7	14	4' 4"	7.6	5.6	15.0	13.0	11.0	7.6
1"	8	16	4' 10"	9.8	7.2	20.0	17.0	14.0	9.8
1 1/8"	9	18	5' 6"	12.0	9.1	24.0	21.0	17.0	12.0
1 1/4"	10	20	6' 2"	15.0	11.0	30.0	26.0	21.0	15.0
1 3/8"	11	22	6' 10"	18.0	13.0	36.0	31.0	25.0	18.0
1 1/2"	12	24	7' 4"	21.0	16.0	42.0	37.0	30.0	21.0
1 3/4"	14	26	8' 6"	28.0	21.0	57.0	49.0	40.0	28.0
2"	16	28	9' 10"	37.0	28.0	73.0	63.0	52.0	37.0

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## Cable Laid Slings

Flexibility is the outstanding characteristic of Cable Laid Slings. The extra flexibility is obtained through use of special multi-wire galvanized wire ropes. They have flemish eyes with pressed-on sleeves. For the same benefits at a significant cost savings, you should consider Tri-Flex® slings. See Table of Contents.



Rope Diameter (inches)	Construction	Eye Size (inches)		Recommended Minimum Length	Rated Capacity in Tons (2000 lbs)					
		W	L		Straight Pull	Choker Hitch	Basket Hitch			
							Vertical	60°	45°	30°
1/4"	7 x 7 x 7	2	4	1' 4"	.50	.38	1.0	.87	.71	.50
3/8"	7 x 7 x 7	3	6	1' 10"	1.1	.81	2.0	1.7	1.4	1.0
1/2"	7 x 7 x 7	4	8	2' 6"	1.8	1.4	3.7	3.2	2.6	1.8
5/8"	7 x 7 x 7	5	10	3' 2"	2.8	2.1	5.5	4.7	3.8	2.7
3/4"	7 x 7 x 7	6	12	3' 8"	3.8	2.9	7.6	6.6	5.3	3.8
5/8"	7 x 7 x 19	5	10	3' 2"	2.9	2.2	5.8	5.0	4.1	2.9
3/4"	7 x 7 x 19	6	12	3' 8"	4.1	3.0	8.1	7.0	5.7	4.0
7/8"	7 x 7 x 19	7	14	4' 4"	5.4	4.0	11.0	9.5	7.8	5.5
1"	7 x 7 x 19	8	16	4' 10"	6.9	5.1	14.0	12.0	9.9	7.0
1 1/8"	7 x 7 x 19	9	18	5' 6"	8.2	6.2	16.0	14.0	22.0	8.0
1 1/4"	7 x 7 x 19	10	20	6' 2"	9.9	7.4	20.0	17.0	14.0	10.0
3/4"	7 x 6 x 19 IWRC	6	12	3' 8"	3.8	2.8	7.6	6.6	5.3	3.8
7/8"	7 x 6 x 19 IWRC	7	14	4' 4"	5.0	3.8	10.0	8.6	7.0	5.0
1"	7 x 6 x 19 IWRC	8	16	4' 10"	6.4	4.8	13.0	11.0	9.1	6.5
1 1/8"	7 x 6 x 19 IWRC	9	18	5' 6"	7.7	5.8	15.0	13.0	10.0	7.5
1 1/4"	7 x 6 x 19 IWRC	10	20	6' 2"	9.2	6.9	18.0	15.0	12.0	9.0
1 3/8"	7 x 6 x 19 IWRC	11	22	6' 10"	11.0	8.2	22.0	19.0	15.0	11.0
1 1/2"	7 x 6 x 19 IWRC	12	24	7' 4"	13.0	9.6	26.0	22.0	18.0	13.0

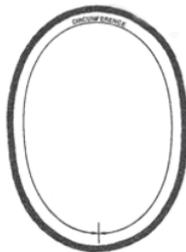
**⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.iandisling.com](http://www.iandisling.com) for more information.

## Grommet Slings

Grommet Slings can be fabricated in very short circumferences and are made from one continuous length of strand or wire rope. This requires only one tuck-in point as compared with six tuck-in points needed to manufacture an endless sling.

Grommets made from strand are called Rope Grommets and are used for high resistance to abrasion. Grommets made from wire rope are called Cable Grommets and are used where extra flexibility is needed. Many fittings are adaptable for use with Grommet Slings.



### Length Tolerance

Grommets are made to a length tolerance of plus or minus 6 sling body diameters, or plus or minus 1% of circumferential sling length, whichever is greater.

Rope Diameter*	Minimum Sling Circumference	Vertical Rated Capacity (tons)	Choker Rated Capacity (tons)	Basket Rated Capacity (tons)
1/4"	2 ft	1.1	0.7	2.1
5/16"	3 ft	1.6	1.2	3.3
3/8"	3 ft	2.4	1.6	4.7
7/16"	4 ft	3.2	2.2	6.4
1/2"	4 ft	4.1	2.9	8.3
9/16"	5 ft	5.2	3.7	10.0
5/8"	5 ft	6.4	4.5	13.0
3/4"	6 ft	9.2	6.4	18.0
7/8"	7 ft	12.0	8.7	25.0
1"	8 ft	16.0	11.0	32.0
1-1/8"	9 ft	20.0	14.0	41.0
1-1/4"	10 ft	25.0	17.0	50.0
1-3/8"	11 ft	30.0	21.0	60.0
1-1/2"	12ft	36.0	25.0	71.0

Rated loads are based a diameter of curvature of 5 times the individual rope diameter at points of contact with load.

\*Larger sizes available

#### **⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.iandisling.com](http://www.iandisling.com) for more information.

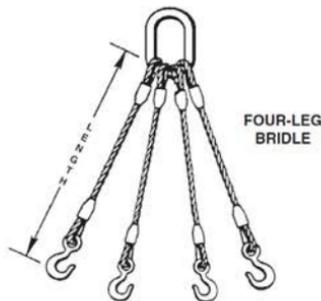
## Wire-Rope Bridles

### Wire-Rope Bridles - Two-Leg Three-Leg Four-Leg



Rope Size (in.)	Recommended Minimum Length	Rated Capacity in tons (2000 lbs.) <sup>1</sup>		
		60°	45°	30°
1/4	1' 6"	1.1	0.9	0.6
5/16	1' 8"	1.7	1.4	1
3/8	1' 10"	2.4	1.9	1.4
7/16	2' 4"	3.2	2.6	1.9
1/2	2' 6"	4.3	3.5	2.5
9/16	2' 10"	5.5	4.5	3.2
5/8	3' 4"	6.7	5.5	3.9
3/4	3' 8"	9.7	7.9	5.6
7/8	4' 4"	12.9	10.6	7.5
1	5'	16.9	13.8	9.8
1-1/8	5' 10"	20.7	16.9	12
1-1/4	6' 6"	25.9	21.2	15
1-3/8	7'	31.1	25.4	18
1-1/2	7' 6"	36.3	29.6	21
1-3/4	9' 2"	48.5	39.5	28

Component Rope Size (in.)	Recommended Minimum Length	Rated Capacity in tons (2000 lbs.) <sup>1</sup>		
		60°	45°	30°
1/4	1' 6"	1.6	1.3	0.9
5/16	1' 8"	2.5	2.1	1.5
3/8	1' 10"	3.6	2.9	2.1
7/16	2' 4"	4.9	4.0	2.8
1/2	2' 6"	6.4	5.3	3.7
9/16	2' 10"	8.3	6.7	4.8
5/8	3' 4"	10.1	8.2	5.8
3/4	3' 8"	14.5	11.8	8.4
7/8	4' 4"	19.4	15.9	11.2
1	5'	25.4	20.7	14.7
1-1/8	5' 10"	31.1	25.4	18
1-1/4	6' 6"	38.9	31.8	22.5
1-3/8	7'	46.7	38.1	27
1-1/2	7' 6"	54.5	44.5	31.5
1-3/4	9' 2"	72.7	59.3	42



Rope Size (in.)	Recommended Minimum Length	Rated Capacity in tons (2000 lbs.) <sup>1</sup>		
		60°	45°	30°
1/4	1' 6"	2.2	1.8	1.3
5/16	1' 8"	3.4	2.8	2
3/8	1' 10"	4.8	3.9	2.8
7/16	2' 4"	6.5	5.3	3.8
1/2	2' 6"	8.6	7.0	5
9/16	2' 10"	11.0	9.0	6.4
5/8	3' 4"	13.5	11.0	7.8
3/4	3' 8"	19.4	15.8	11.2
7/8	4' 4"	25.9	21.2	15
1	5'	33.9	27.7	19.6
1-1/8	5' 10"	41.5	33.9	24
1-1/4	6' 6"	51.9	42.4	30
1-3/8	7'	62.3	50.9	36
1-1/2	7' 6"	72.7	59.3	42

**⚠ Warning:** Sling can fail if damaged, misused, or overloaded causing severe injury or death!

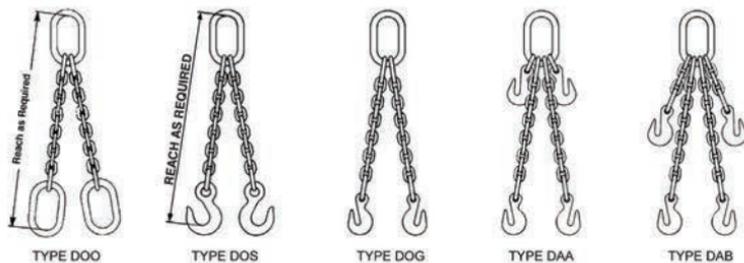
- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.iandisling.com](http://www.iandisling.com) for more information.

## Alloy Chain Slings (types)

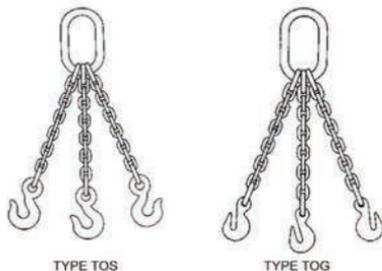
### SINGLE TYPES: S and C



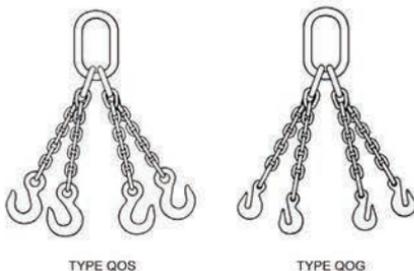
### DOUBLE TYPE: D



### TRIPLE TYPE: T



### QUADRUPLE TYPE: Q



**NOTE:** This page does not cover the complete line of chain slings. Chain slings can be provided with welded connections or Quik-Alloy Style. Call us for all of your chain sling requirements.

## Alloy Chain Slings

RATED CAPACITY (WORKING LOAD LIMIT) FOR ALLOY STEEL CHAIN SLINGS\*

RATED CAPACITY (WORKING LOAD LIMIT), POUNDS

System 8 Chain Size Inches	Single Branch Sling 90 degree Loading	Double Sling			Triple and Quadruple Sling		
		60° 60 Degree	45° 45 Degree	30° 30 Degree	60° 60 Degree	45° 45 Degree	30° 30 Degree
9/32	3,500	6,100	4,900	3,500	9,100	7,400	5,200
3/8	7,100	12,300	10,000	7,100	18,400	15,100	10,600
1/2	12,000	20,800	17,000	12,000	31,200	25,500	18,000
5/8	18,100	31,300	25,600	18,100	47,000	38,400	27,100
3/4	28,300	49,000	40,000	28,300	73,500	60,000	42,400
7/8	34,200	59,200	48,400	34,200	88,900	72,500	51,300
1	47,700	82,800	67,400	47,700	123,900	101,200	71,500
1-1/4	72,300	125,200	102,200	72,300	187,800	153,400	108,400

System 10 Chain Size Inches	Single Branch Sling 90 degree Loading	Double Sling			Triple and Quadruple Sling		
		60° 60 Degree	45° 45 Degree	30° 30 Degree	60° 60 Degree	45° 45 Degree	30° 30 Degree
9/32	4,300	7,400	6,100	4,300	11,200	9,100	6,400
3/8	8,800	15,200	12,400	8,800	22,800	18,600	13,200
1/2	15,000	26,000	21,200	15,000	39,000	31,800	22,500
5/8	22,600	39,100	32,000	22,600	58,700	47,900	33,900
3/4	35,300	61,100	49,900	35,300	91,700	74,900	53,000
7/8	42,700	74,000	60,400	42,700	110,900	90,600	64,000

Rating of multileg slings adjusted for angle of loading between the inclined leg and the horizontal plane of the load.

\*Other grades of proof tested steel chain include Proof Coil, BBB Coil and Hi-Test Chain. These grades are not recommended for overhead lifting and therefore are not covered by this code.

## Basic Types of Chain Slings

Slings are designated throughout the industry by the symbols.

### First Symbol (Basic Type)

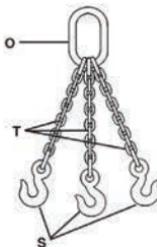
- S** Single Chain Sling with master link and hook, or hook each end.
- C** Single Choker Chain Sling with master link each end. No hooks.
- D** Double Chain Sling with standard master link and hooks.
- T** Triple Chain Sling with standard master link and hooks.
- Q** Quadruple Chain Sling with standard master link and hooks.

### Second Symbol (Type of master link or end link)

- O** Standard Oblong Master Link – Recommended for all types.

### Third Symbol (Type of Hooks)

- S** Sling Hook
- G** Grab Hook
- F** Foundry Hook
- L** Latch Lock Hook



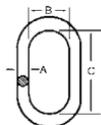
**⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

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## Cam-Alloy Oblong Links and Sub-Assembly

### Cam-Alloy Oblong Master Links

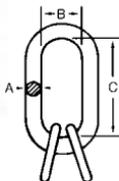
- For Use with Grade 80/100 Chain Slings, Wire Rope and Synthetic Assemblies
- 5 to 1 Design Factor
- Meet or Exceed All Requirements of ASME B30.26
- 100% Proof Tested in Accordance with ASTM A952
- Hallmarked with "USA", Date Code, Link No. and Material Diameter
- Made in the USA
- DO NOT EXCEED THE WORKING LOAD LIMIT



Link No.	Cat. No.	Material Diameter (A)	Inside Width (B)	Inside Length (C)	Working Load Limit 5 to 1	Used with Single Type S & C	Used with Double Type D	Used with Triple or Quad Type T or Q
CO-0	5685615	13/32 in	1.50 in	3.00 in	4200 lb	7/32 in	7/32 in	-
CO-1	5683215	5/8 in	2.50 in	5.00 in	8600 lb	9/32 in	9/32 in	7/32 in
CO-2	5683315	13/16 in	3.00 in	6.00 in	17600 lb	3/8 in	3/8 in	9/32 in
CO-3	5683415	1-1/8 in	4.00 in	8.00 in	30000 lb	1/2 in or 5/8 in	1/2 in	3/8 in
CO-4	5683515	1-1/4 in	4.00 in	8.00 in	45200 lb	3/4 in	5/8 in	1/2 in
CO-5	5683615	1-5/8 in	5.25 in	10.50 in	70600 lb	7/8 in	3/4 in	5/8 in
CO-6	5683715	1-7/8 in	6.00 in	12.00 in	105900 lb	1 in	7/8 in	3/4 in
CO-7	5687015	2 in	7.00 in	14.00 in	102600 lb	1-1/4 in or 1-1/2 in	1 in	-
CO-8	5687215	2-1/4 in	8.00 in	16.00 in	144600 lb	-	1-1/4 in or 1-1/2 in	7/8 in or 1 in

### Cam-Alloy Oblong, Master Link Sub-Assemblies

- For Construction of Triple, Quad and Double Basket Slings
- 5 to 1 Design Factor
- Meet or Exceed All Requirements of ASME B30.26
- 100% Proof Tested in Accordance with ASTM A952
- Master Link Hallmarked with "USA", Date Code, Link No. and Material Diameter
- Made in the USA
- DO NOT EXCEED THE WORKING LOAD LIMIT



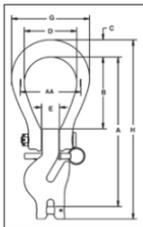
Chain Size	Catalog No.	UPC No. 020418	Working Load Limit 5 to 1	Weight Each	Oblong Master Link Material Dia. (A)	Oblong Master Link Inside Width (B)
9/32 in	5682215	182501	12900 lb	4.40 lb	13/16 in	3 in
3/8 in	5682315	182846	26400 lb	9.50 lb	1-1/8 in	4 in
1/2 in	5682415	182518	45000 lb	16.00 lb	1-1/4 in	4 in
5/8 in	5682515	182525	67800 lb	31.75 lb	1-5/8 in	5-1/4 in
3/4 in	5682615	182532	105900 lb	50.00 lb	1-7/8 in	6 in
7/8 in	5682715	167409	128100 lb	85.00 lb	2-1/4 in	8 in

Chain Size	Catalog No.	Oblong Master Link Inside Length (C)	Master Coupling Link Material Dia. (D)	Master Coupling Link Inside Width (E)	Master Coupling Link Inside Length (F)
9/32 in	5682215	6 in	17/32 in	1-1/2 in	2-3/4 in
3/8 in	5682315	8 in	25/32 in	1-9/16 in	2-7/8 in
1/2 in	5682415	8 in	1 in	3 in	5 in
5/8 in	5682515	10-1/2 in	1-1/4 in	4 in	6 in
3/4 in	5682615	12 in	1-1/2 in	4 in	6 in
7/8 in	5682715	16 in	1-3/4 in	4 in	6 in

## The Eliminator



**A-1361**  
Single Hook

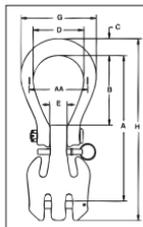


The Crosby ELIMINATOR® combines selected features and functionality of a master link, connecting link, grab hook and adjuster legs to provide you with one fitting that is suitable for applications that require an adjustable length chain sling.

- Forged Alloy Steel - Quenched and Tempered.
- Innovative two piece design allows for maximum flexibility.
- Individually Proof Tested with certification.
- The Crosby ELIMINATOR®, with properly installed and locked latch pin, can be used for personnel lifting applications and meets the intent of OSHA Rule 1926.1431(g)(1)(i) (A) and 1926.1501(g)(4)(iv)(B).
- Suitable for use with Grade 100 and Grade 80 chain.
- Engineered to accommodate optional locking pins that can be inserted to "lock" the shortened chain legs into place.
- Fatigue rated at 1-1/2 times the Working Load Limit at 20,000 cycles.
- Use the A-1361 and A-1362 in combination to make 3 leg chain slings.
- "Look for the Platinum Color - Crosby Grade 100 Alloy Products."
- All sizes are RFID EQUIPPED.



**A-1362**  
Double Hook



**Crosby 8/10™**



**Fatigue Rated**



### A-1361 Crosby ELIMINATOR® Single Hook

Chain Size (in) (mm)	Frame Size	Working Load Limit (lb)*	A-1361 Stock No.	L-1361 Stock No.	Weight Each (lb)	Dimensions (in)								S-4104N Replacement Latch Pin Stock No.
						A	B	C	D	E	G	H	AA	
1/4	7	2	4300	1049797	3.9	8.20	3.88	90	3.00	.94	4.40	9.78	3.50	1092983
5/16	8	2	5700	1049804	3.9	8.18	3.88	90	3.00	.94	4.40	9.78	3.50	1092983
3/8	10	3	8800	1049813	4.04	10.05	4.81	1.16	3.50	1.13	5.20	12.06	4.00	1092992
1/2	13	4	15000	1049822	13.5	12.88	6.00	1.63	4.13	1.31	6.39	15.57	5.00	1093001
5/8	16	5	22600	1049831	24.1	15.26	6.88	1.96	4.75	1.63	7.41	18.58	6.00	1093010

\* Proof tested at 2.5 times the Working Load Limit. Minimum Ultimate Load is 4 times the Working Load Limit.

### A-1362 Crosby ELIMINATOR® Double Hook

Chain Size (in) (mm)	Frame Size	Working Load Limit (lb)*	A-1362 Stock No.	L-1362 Stock No.	Weight Each (lb)	Dimensions (in)								S-4104N Replacement Latch Pin Stock No.
						A	B	C	D	E	G	H	AA	
1/4	7	2	8600	1049859	4.7	8.20	3.88	90	3.00	.94	4.40	10.10	3.50	1092983
5/16	8	2	11400	1049868	4.7	8.18	3.88	90	3.00	.94	4.40	10.10	3.50	1092983
3/8	10	3	17600	1049877	8.1	10.05	4.81	1.16	3.50	1.13	5.20	12.56	4.00	1092992
1/2	13	4	30000	1049886	17.3	12.88	6.00	1.63	4.13	1.31	6.39	16.25	5.00	1093001
5/8	16	5	45200	1049895	31.5	15.26	6.88	1.96	4.75	1.63	7.41	19.33	6.00	1093010

\* Proof tested at 2 times the Working Load Limit. Minimum Ultimate Load is 4 times the Working Load Limit.

### Using Crosby ELIMINATOR® in 3 and 4 Leg Slings

Spectrum 10 Chain Size (in) (mm)	Master Link A-342 Stock No.	Master Link A-1342 Stock No.	Crosby ELIMINATOR® Single A-1361 Stock No.	Crosby ELIMINATOR® Double A-1362 Stock No.	
					1/4 (9/32)
5/16	8	1014319	1011421	1049804	1049868
3/8	10	1014331	1011430	1049813	1049877
1/2	13	1014348	1011449	1049822	1049886
5/8	16	1014365	1011458	1049831	1049895

Use one of either A-342 or A-1342 master link.  
Use one of each when making three leg sling.

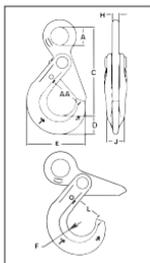
Spectrum 10 Chain Size (in) (mm)	Master Link A-342 Stock No.	Master Link A-1342 Stock No.	Crosby ELIMINATOR® Single A-1361 Stock No.	Crosby ELIMINATOR® Double A-1362 Stock No.	
					1/4 (9/32)
5/16	8	1014319	1011421	—	1049868
3/8	10	1014331	1011430	—	1049877
1/2	13	1014348	1011449	—	1049886
5/8	16	1014365	1011458	—	1049895

Use one of either A-342 or A-1342 master link.  
Use two A-1362 fittings when making quad leg sling.

## Chain Hooks



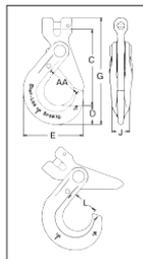
**S-1316**  
Eye Hook



- Forged Alloy Steel - Quenched and Tempered.
- 25% stronger than Grade 80.
- Individually Proof Tested to 2-1/2 times the Working Load Limit with certification
- Recessed trigger design is flush with the hook bod , protecting the trigger from potential damage.
  - Easy to operate with enlarged thumb access.
- Positive Lock Latch is Self-Locking when hook is loaded.
- Eye style is designed with "Engineered Flat" to connect to S-1325 chain coupler.
- Suitable for use with Grade 100 and Grade 80 chain.
- The SHUR-LOC® hook, if properly installed and locked, can be used for personnel lifting applications and meets the intent of OSHA Rule 1926.1431(g)(1)(i)(A) and 1926.1501(g)(4)(iv)(B).
- Fatigue rated at 1-1/2 times the Working Load Limit at 20,000 cycles.
- "Look for the Platinum Color - Crosby Grade 100 Alloy Products."
- Forged Alloy Steel - Quenched and Tempered.



**S-1317**  
Clevis Hook



### SHUR-LOC® Hook Series with Positive Locking Latch

#### S-1316 Eye Hook

Chain Size		Working Load Limit (lb)*	S-1316 Stock No.	Weight Each (lb)	Dimensions (in)								
(in)	(mm)				A	C	D	E	F	H	J	L	AA
1/4	5/16	3200	1022896	.85	.78	3.95	.79	2.60	.67	.31	.63	1.14	1.50
3/8	10	5700	1022914	1.80	1.08	5.31	1.10	3.50	.87	.39	.81	1.48	2.00
1/2	13	8900	1022923	3.40	1.30	6.57	1.17	4.39	1.10	.51	.94	1.83	2.50
1/2	13	15000	1022932	6.00	1.65	8.23	1.67	5.45	1.26	.67	1.16	2.22	3.00
5/8	16	22600	1022941	15.1	2.20	10.06	2.04	6.56	1.50	.87	1.50	2.65	3.50
3/4	18-20	35300	1022942	19.0	2.60	10.77	2.22	7.76	2.01	.87	2.03	3.52	5.00
7/8	22	42700	1022943	28.0	2.87	12.49	2.45	8.75	2.27	.98	2.20	3.83	6.00
1	26	59700	1022944	49.5	3.15	14.60	3.21	9.87	2.46	1.26	2.68	4.09	6.50

\* Minimum Ultimate Load is 4 times the Working Load Limit.

#### S-1317 Clevis Hook

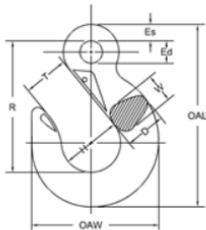
Chain Size		Working Load Limit (lb)*	S-1317 Stock No.	Weight Each (lb)	Dimensions (in)						
(in)	(mm)				C	D	E	G	J	L	AA
-	6	3200	1028991	.77	3.44	.79	2.60	4.75	.63	1.16	1.50
1/4	7	4300	1029000	1.80	4.48	1.10	3.51	6.25	.81	1.48	2.00
5/16	8	5700	1029009	1.80	4.47	1.10	3.51	6.25	.81	1.48	2.00
3/8	10	8900	1029018	3.66	5.53	1.17	4.39	7.54	.94	1.83	2.50
1/2	13	15000	1029027	6.80	6.81	1.67	5.49	9.52	1.16	2.22	3.00
5/8	16	22600	1029036	11.9	8.22	2.04	6.55	11.61	1.50	2.65	3.50
3/4	18-20	35300	1029071	15.0	9.42	2.22	7.76	13.21	2.03	3.52	5.00
7/8	22	42700	1029080	28.0	11.14	2.45	8.75	15.45	2.20	3.83	6.00
1	26	59700	1029089	49.5	12.56	3.21	9.87	18.44	2.68	4.09	6.50

\* Minimum Ultimate Load is 4 times the Working Load Limit.

## Cam-Alloy Hooks

### Cam-Alloy Sling Hooks

- For Use with Grade 80/100 Chain Slings
- 4 to 1 Design Factor
- Meet or Exceed All Requirements of ASME B30.9 and B30.10
- 100% Proof Tested in Accordance with ASTM A952
- Additionally Hallmarked with "USA" and Date Code
- Made in the USA
- DO NOT EXCEED THE WORKING LOAD LIMIT

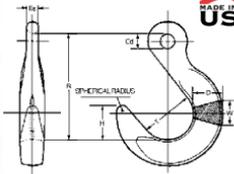


Chain Size	Catalog No.	UPC No. 020418	Hook No.	Grade	Working Load Limit	Weight Each	Shelf Pack
9/32 in	5646415	222320	C-80	100	4300 lb	1.30 lb	25
3/8 in	5646615	221583	C-81	100	8800 lb	2.10 lb	10
1/2 in	5646815	222856	C-82	100	15000 lb	5.42 lb	-
5/8 in	5647015	225109	C-83	100	22600 lb	10.00 lb	-
3/4 in	5647215	225093	C-84	100	35300 lb	15.10 lb	-
7/8 in	5645415	152962	C-85	100	42700 lb	21.00 lb	-
1 in	5641615	078859	C-86	80	47700 lb	21.98 lb	-

Chain Size	Catalog No.	D Dim.	Ed Dim.	Es Dim.	H Dim.	OAL	OAW	R Dim.	T Dim.	W Dim.
9/32 in	5646415	1.14 in	0.75 in	0.44 in	1.50 in	5.56 in	3.59 in	4.50 in	1.25 in	0.75 in
3/8 in	5646615	1.46 in	0.813 in	0.594 in	2.13 in	6.59 in	4.50 in	4.75 in	1.82 in	1.05 in
1/2 in	5646815	2 in	1.13 in	0.804 in	2.25 in	8.37 in	5.65 in	5.70 in	1.88 in	1.42 in
5/8 in	5647015	2.42 in	1.31 in	0.875 in	2.62 in	10.47 in	6.67 in	7.47 in	2.34 in	1.54 in
3/4 in	5647215	2.91 in	1.50 in	1.00 in	3.00 in	11.59 in	7.77 in	8.00 in	2.53 in	1.83 in
7/8 in	5645415	2.88 in	2.00 in	1.12 in	3.75 in	13.38 in	8.75 in	9.75 in	3.18 in	1.88 in
1 in	5641615	3.50 in	1.94 in	1.38 in	4.25 in	14.56 in	9.59 in	10.18 in	3.25 in	2.38 in

### Cam-Alloy Foundry Hooks

- For Use with Grade 80/100 Chain Slings
- 4 to 1 Design Factor
- Meet or Exceed All Requirements of ASME B30.9 and B30.10
- 100% Proof Tested in Accordance with ASTM A952
- Additionally Hallmarked with "USA" and Date Code
- Made in the USA
- DO NOT EXCEED THE WORKING LOAD LIMIT

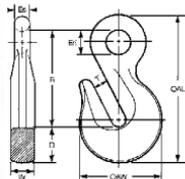


Chain Size	Catalog No.	UPC No. 020418	Hook No.	Grade	Working Load Limit	Weight Each	D Dim.	Ed Dim.	Es Dim.	H Dim.	R Dim.	T Dim.	W Dim.	Spherical Radius
9/32 in	5664415	182457	C-498	100	4300 lb	2.20 lb	1.3 in	0.62 in	0.47 in	1.56 in	4.75 in	2.50 in	1.00 in	0.25 in
3/8 in	5664615	182464	C-499	100	8800 lb	3.90 lb	1.56 in	0.75 in	0.62 in	1.87 in	5.75 in	3.00 in	1.25 in	0.31 in
1/2 in	5664815	182471	C-500	100	15000 lb	6.70 lb	1.81 in	1.00 in	0.75 in	2.25 in	6.87 in	3.50 in	1.50 in	0.37 in
5/8 in	5665015	182488	C-501	100	22600 lb	10.50 lb	2.33 in	1.25 in	0.87 in	2.62 in	8.06 in	4.00 in	1.75 in	0.44 in
3/4 in	5665215	182495	C-502	100	35300 lb	15.60 lb	2.81 in	1.50 in	1.00 in	3.00 in	9.25 in	4.50 in	2.00 in	0.50 in
7/8 in	5665415	152948	C-503	100	42700 lb	24.00 lb	3.08 in	1.84 in	1.12 in	3.37 in	10.37 in	5.00 in	2.25 in	0.56 in
1 in	5661615	078965	C-504	80	47700 lb	34.10 lb	3.25 in	2.09 in	1.25 in	3.75 in	11.56 in	5.50 in	2.50 in	0.62 in
1-1/4 in	5662015	078972	C-505	80	72300 lb	52.50 lb	3.88 in	2.47 in	1.37 in	4.25 in	12.87 in	6.00 in	3.00 in	0.75 in

## Cam-Alloy Hooks (Continued)

### Cam-Alloy Grab Hooks

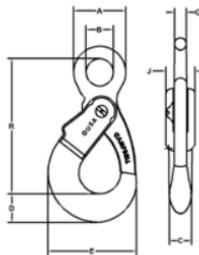
- For Use with Grade 80/100 Chain Slings
- 4 to 1 Design Factor
- Meet or Exceed All Requirements of ASME B30.9 and B30.10
- 100% Proof Tested in Accordance with ASTM A952
- Additionally Hallmarked with "USA" and Date Code
- Made in the USA
- Note: Use of Chain in a Grab Hook May Reduce the Design Factor of the Chain by up to 20%
- DO NOT EXCEED THE WORKING LOAD LIMIT



Chain Size	Catalog No.	UPC No. 020418	Hook No.	Grade	Working Load Limit	Weight Each	Shelf Pack	D Dim.	Ed Dim.	Es Dim.	OAL	QAW	R Dim.	T Dim.	W Dim.
9/32 in	5624415	182303	C-72	100	4300 lb	0.60 lb	50	0.81 in	0.56 in	0.37 in	3.69 in	1.87 in	2.50 in	0.37 in	0.59 in
3/8 in	5624615	182310	C-73	100	8800 lb	0.90 lb	30	1.16 in	0.75 in	0.44 in	4.00 in	2.56 in	2.41 in	0.50 in	0.66 in
1/2 in	5624815	182327	C-75	100	15000 lb	2.80 lb	20	1.44 in	1.12 in	0.56 in	5.40 in	3.50 in	3.40 in	0.66 in	0.88 in
5/8 in	5625015	182334	C-76	100	22600 lb	3.70 lb	-	1.75 in	1.22 in	0.69 in	6.66 in	4.25 in	4.22 in	0.78 in	1.12 in
3/4 in	5625215	182341	C-77	100	35300 lb	7.50 lb	-	2.12 in	1.44 in	1.00 in	8.28 in	5.18 in	5.15 in	0.94 in	1.38 in
7/8 in	5625415	152979	C-78	100	42700 lb	11.20 lb	-	2.44 in	1.75 in	1.00 in	10.44 in	5.68 in	7.00 in	1.06 in	1.62 in
1 in	5621615	078651	C-79	80	47700 lb	18.50 lb	-	3.00 in	1.87 in	1.12 in	12.14 in	6.75 in	7.98 in	1.19 in	1.81 in

### Self-locking Eye Hooks

- Meet or Exceed All Requirements of ASME B30.9 and B30.10
- Fatigue and 100% Proof Tested in Accordance with ASTM A952
- Additionally Hallmarked with "USA" and Date Code
- Meets the Intent of OSHA Regulation 1926.550(g)(4)(iv)(b)
- Latch Closes Automatically Under Load
- Eye Style is Designed to Accommodate Heavy Duty Wire Rope Thimbles
- Stamped with Recommended Wire Rope Size
- Working Load Limit Rating of 5 to 1 to Meet Design Requirements of Wire Rope Slings
- Made in the USA
- DO NOT EXCEED THE WORKING LOAD LIMIT

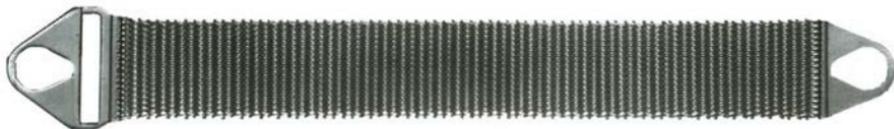


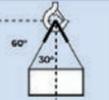
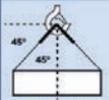
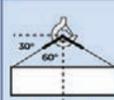
Chain Size	Catalog No.	UPC No. 020418	Working Load Limit 4 to 1	For Wire Rope Size	Working Load Limit 5 to 1	Weight Each	Shelf Pack
9/32 in	5648495	193262	4300 lb	7/16 in	3800 lb	2.25 lb	-
3/8 in	5648695	193279	8800 lb	1/2 in	7000 lb	4.00 lb	-
1/2 in	5648895	193286	15000 lb	5/8 in	12000 lb	8.65 lb	1
5/8 in	5649095	193293	22600 lb	7/8 in	18000 lb	13.80 lb	1

Chain Size	Catalog No.	A Dim.	B Dim.	C Dim.	D Dim.	E Dim.	F Dim.	G Dim.	H Dim.	J Dim.	R Dim.
9/32 in	5648495	1.875 in	1.00 in	0.938 in	1.02 in	3.594 in	1.625 in	0.438 in	0.875 in	1.25 in	5.468 in
3/8 in	5648695	2.375 in	1.375 in	1.125 in	1.250 in	4.312 in	1.875 in	0.578 in	1.063 in	1.50 in	6.50 in
1/2 in	5648895	3.188 in	1.688 in	1.312 in	1.796 in	5.404 in	2.250 in	0.688 in	1.281 in	1.75 in	8.75 in
5/8 in	5649095	3.50 in	2.00 in	1.50 in	2.169 in	6.50 in	2.375 in	0.75 in	1.50 in	2.00 in	10.00 in



## Wire Mesh Slings



	NOMINAL WIDTH OF SLING (Inches)	 CHOKER	 VERTICAL BASKET	EFFECT OF ANGLE ON RATED CAPACITIES IN BASKET HITCH		
				 30° Vert. 60° Horiz.	 45° Vert. 45° Horiz.	 60° Vert. 30° Horiz.
<b>G-35 HEAVY DUTY</b> <small>(weight in lbs.)</small>	2	1,600	3,200	2,700	2,000	1,800
	3	3,000	6,000	5,100	3,800	2,800
	4	4,400	8,800	7,480	5,600	4,400
	6	6,600	13,200	11,225	8,400	6,600
	8	8,800	17,600	15,000	11,250	8,800
	10	11,000	22,000	18,700	14,000	11,000
	12	13,200	26,400	22,440	16,800	13,200
	14	15,400	30,800	26,180	19,600	15,400
	16	17,600	35,200	29,920	22,400	17,600
	18	19,800	39,600	33,660	25,200	19,800
20	22,000	44,000	37,400	28,000	22,000	
<b>G-59 LIGHT DUTY</b> <small>(weight in lbs.)</small>	2	900	1,800	1,600	1,300	900
	3	1,400	2,800	2,400	2,000	1,400
	4	2,000	4,000	3,500	2,800	2,000
	6	3,000	6,000	5,200	4,200	3,000
	8	4,000	8,000	6,900	5,700	4,000
	10	5,000	10,000	8,600	7,100	5,000
	12	6,000	12,000	10,400	8,500	6,000
	14		14,000	12,100	9,900	7,000
	16		16,000	13,900	11,300	8,000
	18		18,000	15,600	12,700	9,000
20		20,000	17,300	14,100	10,000	

## Engineering Specifications

Grade 30

**System 3\***  
Proof Coil

GRADE 3 PROOF - SYSTEM 3 CHAIN						
Trade Size Inches	Size Material Inches	Working Load Limit Pounds	Nominal Inside Length in Inches	Nominal Inside Width in Inches	Links Per Foot	Weight Per 100 Feet Pounds
3/16	.22	800	.95	.34	12.5	37
1/4	.28	1,300	1.20	.45	10.0	60
5/16	.32	1,900	1.27	.47	9.4	80
3/8	.39	2,650	1.36	.57	8.8	138
1/2	.51	4,500	1.70	.75	7.1	238
5/8	.66	6,900	2.10	.87	5.7	390
3/4	.78	10,600	2.70	1.02	4.4	536

Grade 40

**System 4\***  
High Test

GRADE 4 HIGH TEST - SYSTEM 4 CHAIN						
Trade Size Inches	Size Material Inches	Working Load Limit Pounds	Nominal Inside Length in Inches	Nominal Inside Width in Inches	Links Per Foot	Weight Per 100 Feet Pounds
1/4	.28	2,600	1.20	.45	10	63
5/16	.34	3,900	1.27	.47	9.4	102
3/8	.39	5,400	1.15	.58	10.4	155
7/16	.47	7,200	1.29	.67	9.3	216
1/2	.51	9,200	1.70	.75	7.1	238
5/8	.66	11,500	1.94	.93	6.2	356
3/4	.78	16,200	2.21	1.10	5.4	581

Grade 70

**System 7\***  
Transport

GRADE 7 TRANSPORT - SYSTEM 7 CHAIN						
Trade Size Inches	Size Material Inches	Working Load Limit Pounds	Nominal Inside Length in Inches	Nominal Inside Width in Inches	Links Per Foot	Weight Per 100 Feet Pounds
1/4	.31	3,150	.94	.46	12.8	94
5/16	.34	4,700	1.01	.48	11.9	111
3/8	.39	6,600	1.36	.57	8.8	142
7/16	.47	8,750	1.29	.67	9.3	212
1/2	.51	11,300	1.70	.75	7.1	238

Grade 70 & 80

**System 8 & 10 Alloy**

CAM ALLOY CHAIN							
System	Trade Size Inches	Size Material Inches	Working Load Limit Pounds	Nominal Inside Length in Inches	Nominal Inside Width in Inches	Links Per Foot	Weight Per 100 Feet Pounds
8	7/32	.22	2,100	.69	.30	17.5	43
10	9/32	.29	4,300	.86	.41	13.8	74
10	3/8	.40	8,800	1.22	.55	10.0	148
10	1/2	.52	15,000	1.57	.75	7.8	250
10	5/8	.64	22,600	1.93	.87	6.5	379
10	3/4	.80	35,300	2.42	1.04	4.9	610
10	7/8	.88	42,700	2.70	1.28	4.4	775
8	1	1.00	47,700	2.80	1.40	4.3	965
8	1 1/4	1.25	72,300	3.50	1.75	3.5	1525

DO NOT USE FOR LIFTING OR HOISTING

## Synthetic Web Slings

Synthetic web slings are composed of primarily nylon as well as polyester web. As an inexpensive rigging solution, synthetic web slings are soft and flexible. I&I Sling, Inc. constructs all of its synthetic web slings with domestically produced 9800lb heavy duty webbing. They are fully compliant with the latest ASME B30.9 standard and have a 5:1 Design Factor.

Material type can be specified at placement of order. As an additional option, synthetic web slings can be fabricated with a protective edge or have Covermax® material added in the body and/or eyes for enhanced abrasion resistance. I&I Sling, Inc. can also supply custom web slings, such as wide body type, cylinder and glass slings. They are available in 6 different types:

### Synthetic Web Eye & Eye and Twisted Eye (EE)

#### SINGLE PLY

WIDTHS	Part #	WORKING LOAD LIMIT (LB)		
		VERTICAL	CHOKER	BASKET
1"	EE1-901	1,600	1,200	3,200
2"	EE1-902	3,200	2,400	6,400
3"	EE1-903	4,800	3,600	9,600
4"	EE1-904	6,400	4,800	12,800
5"	EE1-905	7,800	6,200	15,600
6"	EE1-906	9,300	7,400	18,600
8"	EE1-908	11,800	9,400	23,600
10"	EE1-910	14,700	11,750	29,400
12"	EE1-912	17,600	14,050	35,200

#### DOUBLE PLY

WIDTHS	Part #	WORKING LOAD LIMIT (LB)		
		VERTICAL	CHOKER	BASKET
1"	EE2-901	3,200	2,400	6,400
2"	EE2-902	6,400	4,800	12,800
3"	EE2-903	8,600	6,500	17,200
4"	EE2-904	11,500	8,600	23,000
5"	EE2-905	13,700	10,950	27,400
6"	EE2-906	16,500	13,200	33,000
8"	EE2-908	22,700	18,150	45,400
10"	EE2-910	28,400	22,720	56,800
12"	EE2-912	34,100	27,250	68,200

**⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures.
- For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions.
- See [www.iandisling.com](http://www.iandisling.com) for more information.

## Synthetic Web Endless (EN)

### SINGLE PLY

WIDTHS	Part #	WORKING LOAD LIMIT (LB)		
		VERTICAL	CHOKER	BASKET
1"	EN1-901	3,200	2,500	6,400
2"	EN1-902	6,400	5,000	12,800
3"	EN1-903	9,400	7,500	18,800
4"	EN1-904	12,400	9,900	24,800
5"	EN1-905	15,600	12,450	31,200
6"	EN1-906	18,600	14,850	37,600
8"	EN1-908	21,200	16,950	42,400
10"	EN1-910	26,500	21,200	53,000
12"	EN1-912	31,800	25,400	63,600

### DOUBLE PLY

WIDTHS	Part #	WORKING LOAD LIMIT (LB)		
		VERTICAL	CHOKER	BASKET
1"	EN2-901	6,100	4,900	12,200
2"	EN2-902	12,200	9,800	24,400
3"	EN2-903	17,600	14,050	35,200
4"	EN2-904	22,000	17,600	44,000
5"	EN2-905	27,400	21,900	54,800
6"	EN2-906	33,000	26,400	66,000
8"	EN2-908	42,300	33,800	84,600
10"	EN2-910	52,900	42,300	105,800
12"	EN2-912	63,500	50,800	127,000



**⚠ Warning: Sling can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces. Do not expose to damaging chemicals or temperatures. • For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions. • See [www.iandisling.com](http://www.iandisling.com) for more information.

### Reverse Eye (RE)

WIDTHS	Part #	WORKING LOAD LIMIT (LB)		
		VERTICAL	CHOKER	BASKET
2"	RE1-902	4,500	3,600	9,000
4"	RE1-904	7,700	6,200	15,400
6"	RE1-906	11,000	8,800	22,000

WIDTHS	Part #	WORKING LOAD LIMIT (LBS)		
		VERTICAL	CHOKER	BASKET
2"	RE2-902	6,500	5,200	13,000
4"	RE2-904	13,000	10,400	26,000
6"	RE2-906	20,000	16,000	40,000

### TRIANGLE & CHOKER (TC) / TRIANGLE & TRIANGLE

(TT)

### SINGLE PLY

WIDTHS	Part #		WORKING LOAD LIMIT (LB)		
			VERTICAL	CHOKER (TC) ONLY	BASKET
2"	TT1-902	TC1-902	3,200	2,400	6,400
3"	TT1-903	TC1-903	4,800	3,600	9,600
4"	TT1-904	TC1-904	6,400	4,800	12,800
5"	TT1-905	TC1-905	7,800	6,200	15,600
6"	TT1-906	TC1-906	9,300	7,400	18,600
8"	TT1-908	TC1-908	11,800	9,400	23,600
10"	TT1-910	TC1-910	14,700	11,750	29,400
12"	TT1-912	TC1-912	17,600	14,050	35,200

### DOUBLE PLY

WIDTHS	Part #		WORKING LOAD LIMIT (LB)		
			VERTICAL	CHOKER (TC) ONLY	BASKET
2"	TT2-902	TC2-902	6,400	4,800	12,800
3"	TT2-903	TC2-903	8,600	6,500	17,200
4"	TT2-904	TC2-904	11,500	8,600	23,000
5"	TT2-905	TC2-905	13,700	10,950	27,400
6"	TT2-906	TC2-906	16,500	13,200	33,000
8"	TT2-908	TC2-908	22,700	18,150	45,400
10"	TT2-910	TC2-910	28,400	22,720	56,800
12"	TT2-912	TC2-912	34,100	27,250	68,200

TC Type



TT Type



**Warning:** Sling can fail if damaged, misused, or overloaded causing severe injury or death!

- For use only by a competent and / or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect sling from being cut by load edges, corners, protrusions, and abrasive surfaces.
- Do not expose to damaging chemicals or temperatures.
- For important safety, removal, and repair information follow OSHA, ASME B30.9 and associated Use and Care instructions.
- See [www.iandisling.com](http://www.iandisling.com) for more information.

## Recommended standard specification for synthetic web

The purpose of this section is to provide guidelines of webbing sling preparation, inspection, and use.

### Mechanical Considerations

1. Web slings in contact with edges, corners, protrusions or abrasive surfaces SHALL ALWAYS be protected with materials of sufficient strength and construction to prevent sling damage.
2. Web slings should be protected from abrasive surfaces.
3. Determine the weight of the load. Web slings shall not be loaded in excess of the rated capacity. Consideration shall be given to the sling angle, which affects rated capacity.
4. Select web slings having suitable characteristics for the type of load, hitch, and environment.
5. Web slings that are used in a choker hitch shall be of sufficient length to ensure that the choke point should always be on the sling body – not on the sling eye, fitting, base of the eye or fitting, load bearing splice or tag.
6. Web slings used in a basket hitch shall have the load balanced to prevent slippage and maintain control of the load.
7. The openings in fittings shall be the proper shape and size to ensure that the fittings will seat properly on the web sling, crane hook or other attachments.
8. Web slings should not be dragged on the floor or over an abrasive surface.
9. Web slings shall not be twisted, shortened, lengthened, tied into knots or joined by knotting. Web slings shall be shortened, lengthened or adjusted only by methods approved by the manufacturer.
10. Web slings should not be pulled from under loads when the load is resting on the web sling. Loads resting on web slings could damage the sling.
11. Web slings shall not be used for pulling against stuck, snagged or restrained objects if loading conditions are unknown.
12. If a sling is used for non-lifting applications under known loading circumstances and within the rated sling capacity, it may be returned to lifting service.
13. Marking Slings for Dedicated Applications – Slings that are used for pulling against stuck, snagged or restrained objects in loading conditions that are unknown shall not be used for ANY lifting application. These Dedicated Application slings shall be marked "Not For Lifting".
14. Do not drop web slings equipped with metal fittings.
15. Web slings that appear to be damaged shall not be used unless inspected and accepted as usable per Section 4.4 Sling Inspection of Web Sling & Tie Down Association's Recommended Standard Specification for Synthetic Web Slings.
16. Web slings shall be hitched in a manner providing control of the load.
17. Personnel shall not stand under, on or next to suspended loads or rigging that is under tension.
18. All portions of the human body shall be kept from being placed between the web sling and the load and from between the web sling and handling or lifting device.
19. Personnel shall not ride web slings or loads suspended by web slings. Web slings shall not be used as bridles on suspended personnel platforms.
20. Shock loading shall be avoided.
21. Excessive twisting of the legs (branches) shall be avoided.
22. Load applied to a hook shall be centered in the bowl of the hook to prevent point loading.
23. During use, personnel shall be alert for possible snagging.
24. The web sling legs (branches) shall contain or support the load from the sides above the center of gravity when using a basket hitch.
25. Tags and labels should be kept away from the load, hook and point of choke.
26. Web slings should not be constricted or bunched between the ears of a clevis, shackle or in a hook. When a web sling is used with a shackle, it is recommended that it be used (rigged) in the bow of the shackle. When this is not possible, protect the sling eyes or connection points from damage.
27. Place blocks under load prior to setting down the load to allow removal of the web sling, if applicable.
28. For multiple-leg slings used with nonsymmetrical loads, an analysis by a qualified person should be performed to prevent overloading of any leg.
29. Do not wash web slings as a loss of strength is possible due to mechanical/chemical damage.

## Environmental Considerations

Environmental factors such as an exposure to sunlight, dirt or gritty-type matter and cyclical changes in temperature and humidity can result in an accelerated deterioration of web slings. The rate of this deterioration will vary with the level of exposure to these conditions and with the thickness of the sling material. For example, single ply slings will generally degrade more rapidly with this exposure than multiple ply slings. All web sling slings that are exposed to these conditions should be highly scrutinized during their inspection.

1. Web slings, when not in use, should be stored in a cool, dry and dark place to prevent loss of strength from exposure to sources of ultraviolet light. Web slings shall not be stored in chemically active areas and/or in areas where mechanical and/or environmental damage could occur.
2. Chemically active environments can affect the strength of web slings in varying degrees ranging from little to total degradation. The web sling manufacturer, or a qualified person, should be consulted before web slings are used in a chemically active environment. In addition, water absorption can decrease the strength of nylon web slings by as much as 10-15%. Sling strength returns when the sling dries completely.
3. Each chemical application shall be evaluated, taking into consideration the following:
  - A. Type of acid or alkalis
  - B. Exposure conditions, i.e., liquid, vapor, mist
  - C. Concentration
  - D. Temperature
  - E. Duration of exposure
4. **ACIDS**
  - Nylon is subject to degradation in acids, ranging from little to total degradation.
  - Polyester is resistant to many acids, but is subject to degradation, ranging from little to moderate in some acids.
5. **ALKALIS**
  - Polyester is subject to degradation in alkalis, ranging from little to total degradation.
  - Nylon is resistant to many alkalis, but is subject to degradation, ranging from little to moderate in some alkalis.
6. Nylon and polyester slings shall not be used in contact with objects or used at temperatures in excess of 194°F (90°C) or at temperatures below minus 40°F (minus 40°C).
7. Web slings incorporating aluminum fittings shall not be used where fumes, vapors, sprays, mists or liquids of alkalis and/or acids are present, unless material compatibility is verified.

8. Environments in which synthetic web slings are continuously exposed to sources of ultraviolet light can affect the strength of synthetic web slings in varying degrees, ranging from slight to total degradation.

**WARNING:** Slings used in environments where they are subject to continuous exposure to sunlight or ultraviolet light shall be proof tested to twice the rated capacity semi-annually or more frequently depending on severity of exposure.

Web slings that are used outdoors regularly should generally be permanently removed from service within a period of 2 to 4 years.

**CAUTION:** Degradation can take place without visible indications.

- A. Factors which affect the degree of strength loss are:
  1. Length of time of continuous exposure.
  2. Web sling construction and design.
  3. Other environmental factors such as weather conditions and geographic location.
- B. Suggested procedures to minimize the effects of sunlight or ultraviolet light:
  1. When not in use, store web slings in a cool, dry and dark location free of mechanical and environmental damage.
- C. Some visual indications of environmental degradation are:
  1. Fading of webbing color.
  2. Uneven or disoriented surface yarn of the webbing.
  3. Shortening of the sling length.
  4. Reduction in elasticity and strength of the sling material due to an exposure to sunlight, often evident by an accelerated abrasive damage to the surface yarn of the sling.
  5. Breakage or damage to yarn fibers, often evident by fuzzy appearance of the web.
  6. Stiffening of the web, which can become particularly evident when web slings are exposed to outdoor conditions without being used or cyclically tensioned.

## Slings Inspection

**A three stage procedure is recommended to help ensure that slings are inspected with appropriate frequency.**

1. Initial Inspection - Prior to use, all new, altered, modified or repaired web slings shall be inspected by a designated person to verify compliance with the applicable provisions of Web Slings & Tie Down Association's Recommended Standard Specification for Synthetic Web Slings.

2. Frequent Inspection – In normal service conditions, a visual inspection for damage shall be performed by the user or other designated person each day or shift before the sling is used. In severe service conditions, a visual inspection for damage shall be performed by the user or other designated person before each use. Manufacturer's recommendations must be followed if a higher rate of inspection frequency, such as before each use, is prescribed. Written records are not required for frequent inspections.

3. Periodic Inspection – A complete inspection for damage shall be performed by a designated person. This inspection should be done by someone other than the individual(s) who most commonly perform the frequent inspection.

A. Periodic Inspection Frequency – Periodic inspection intervals shall not exceed one year. The frequency of periodic inspections should be based on:

1. Frequency of sling use.
2. Severity of service conditions.
3. Nature of lifts being made.
4. Experience gained on the service life of slings used in similar circumstances.

B. Time Interval Guidelines – The guidelines for time intervals are as follows:

1. Normal Service - Yearly
2. Severe Service – Monthly to quarterly
3. Special Service – As recommended by a qualified person

C. Written Records – A written record that the most recent inspection was performed shall be maintained documenting that the event occurred. It is not required that the condition of individual slings be recorded during the periodic inspection. If documentation of the individual slings is maintained, it should be based upon a unique sling serial number, color coding, electronic tracking (RFID) or other means. If individual tracking is not maintained, the inspection process should provide some means of identifying which slings have been inspected at the periodic level of inspection.

4. Removal Criteria - A web sling shall be removed from service if any of the following forms of damage are visible:

A. If web sling identification tag is missing or not readable.

B. Holes, tears, cuts, snags or embedded materials.

C. Broken or worn stitches in the load bearing splice.

D. Knots in any part of the sling webbing.

E. Acid or alkali burns.

F. Melting, charring, or weld spatter of any part of the web sling.

G. Excessive abrasive wear or crushed webbing.

H. Signs of ultraviolet light (UV) degradation.

I. Distortion, excessive pitting, corrosion or other damage to fitting(s).

J. If provided, exposed red core yarn. However, if damage is present and red yarns are not exposed DO NOT USE the sling.

K. Any conditions which cause doubt as to the strength of the web sling.

## Repairs

1. There shall be no repairs of sling webbing or stitching

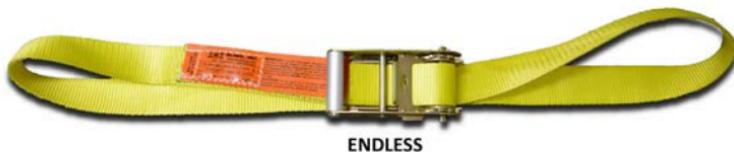
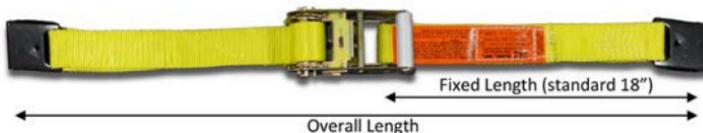
## Synthetic Tiedown Assemblies

Custom ratchet assemblies can be manufactured to meet your tie down needs.

Tiedown assemblies should never be used for overhead lifting

TYPE	WIDTH	WLL*
RA1-601	1"	835 lb
RA1-602	2"	3,300 lb
RA1-603	3"	5,400 lb
RA1-604	4"	5,400 lb

\*WLL varies depending on end fitting - Design Factor 3:1



Available Fittings:



FLAT HOOK



NARROW  
HOOK



SNAP HOOK



TWISTED  
SNAP HOOK



GRAB HOOK

**⚠ Warning: Can fail if damaged, misused, or overloaded causing severe injury or death!**

- For use only by a competent and/or qualified person as defined by OSHA.
- Do not exceed rated capacity. Protect from being cut by load edges, corners, protrusions and abrasive surfaces.
- Do not expose to damaging chemicals or temperatures.
- For important safety, inspection, removal and repair information follow OSHA, WSTDA and associated Use and Care instructions. • See [www.iandisling.com](http://www.iandisling.com) for more information.

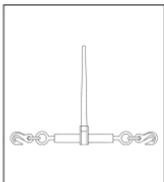
## Load Binders

### Lebus® LOAD BINDER

#### WARNINGS & APPLICATION INSTRUCTIONS

#### WARNING

- Failure to use this load binder properly may result in serious injury or even death to you or others.
- Do not operate load binder while standing on the load.
- Move handle with caution. It may whip – Keep body clear.
- Keep yourself out of the path of the moving handle and any loose chain laying on the handle.
- You must be familiar with state and federal regulations regarding size and number of chain systems required for securing loads on trucks.
- Always consider the safety of nearby workers as well as yourself when using load binder.
- While under tension, load binder must not bear against an object, as this will cause side load.
- Do not throw these instructions away. Keep them close at hand and share them with any others who use this load binder.
- Do not use handle extender – see instructions.
- Do not attempt to close or open the binder with more than one person.



Ratchet Type



Lever Snubbing Type



Lever Type



Lever Walking Type

#### Mechanical Advantage

Lever Type Binder = 25 : 1  
Ratchet Type Binder = 50 : 1

**Example:** 100 pounds of effort applied to the binder results in the following force on the binder.

**Lever Type:**  
100 lb x 25 = 2500 lb of force

**Ratchet Type:**  
100 lb x 50 = 5000 lb of force

### Instructions – Lever Type Load Binders

- Hook load binder to chain so you can operate it while standing on the ground. Position load binder so its handle can be pulled downward to tighten chain (see photo). **Be aware of ice, snow, rain, oil, etc. that can affect your footing. Make certain your footing is secure.**
- The Crosby Group LLC specifically recommends AGAINST the use of a handle extender (cheater pipe). If sufficient leverage cannot be obtained using the lever type load binder by itself, a ratchet type binder should be used.
- If the above recommendation is disregarded and a cheater pipe is used, it must closely fit the handle and must slide down the handle until the handle projections are contacted. The pipe should be secured to the handle, for example, by a pin, so that the pipe cannot fly off the handle if you lose control and let go. The increased leverage, by using a cheater pipe, can cause deformation and failure of the chain and load binder.
- During and after tightening chain, check load binder handle position. **Be sure** it is in the locked position and that its bottom side touches the chain link.
- Chain tension may decrease due to load shifting during transport. To be sure the load binder remains in proper position: Secure handle to chain by wrapping the loose end of chain around the handle and the tight chain, or tie handle to chain with soft wire.
- When releasing load binder, remember there is a great deal of energy in the stretched chain. This will cause the load binder handle to move very quickly with great force when it is unlatched. **Move handle with caution. It may whip – Keep body clear.**
- **Never use a cheater pipe or handle extender to release handle.** Use a steel bar and pry under the handle and stay out of the path of handle as it moves upward.
- If you release the handle by hand, use an open hand under the handle and push upward. **Do not close your hand around the handle. Always keep yourself out of the path of the moving handle.**



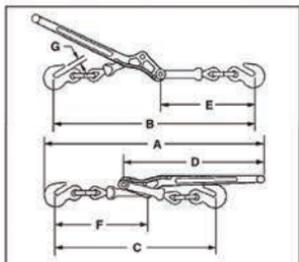
### Instructions - Ratchet Load Binders

- Position ratchet binder so it can be operated from the ground.
- **Make sure your footing is secure.**

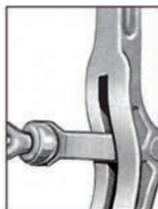
### Maintenance of All Load Binders

- Routinely check load binders for wear, bending, cracks, nicks, or gouges. **If visual wear bending or cracks are present - Do not use load binder.**
- Routinely lubricate pivot and swivel points of Lever Binders, and pawl part and screw threads of Ratchet Binders to extend product life and reduce friction wear.

## Standard Lever Type Load Binder



Meets or exceeds US DOT FMCSA Part 393 Subpart I



**A. NOTE:** Extra heavy construction at leverage point to prevent spreading. Heel of binder toggles away from load, permitting easy release.



**B.** Ball and socket swivel joints at hook assemblies permit a straight line pull.



**SEE APPLICATION AND WARNING INFORMATION**

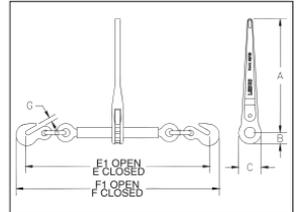
- Forged Steel — Quenched and Tempered.
- Binder toggles away from the load.

Model	Stock No.	Std. Pkg.	Min-Max Chain Size (in.)	Working Load Limit (lbs.)	Proof Load (lbs.)	Ultimate Load (lbs.)	Weight Each (lbs.)	Handle Length (in.)	Take Up (in.)	Dimensions (in.)						
										A	B	C	D	E	F	G
7-1	1048128	4	5/16 - 3/8	5,400	10,800	19,000	7.02	16.00	4.50	24.13	22.13	17.88	16.00	10.38	10.38	.50
A-1	1048146	4	3/8 - 1/2	9,200	18,400	33,000	12.47	18.50	4.50	28.75	25.75	21.25	18.69	12.31	12.38	.63
C-1	1048164	4	1/2 - 5/8	13,000	26,000	46,000	19.68	21.00	4.75	31.25	29.75	25.00	21.00	14.63	13.75	.72

## Ratchet Load Binder



**L-140**  
Ratchet Type  
Load Binder



- Upgraded for use with Grades 70, 80 and 100 Chain.
- Utilizes standard Crosby A-323 Alloy Eye Grab Hooks.
- New design "one piece" forged handle.
- Continuous take-up feature provides finite adjustment to tie down load.
- One piece assembly, no bolts or nuts to loosen.
- Ratchet spring is rust proofed.
- All load bearing or holding parts forged.
- Easy operating positive ratchet.
- Binders shown with Proof Loads have been individually proof tested to values shown, prior to shipment.
- Meets or exceeds requirements of US DOT FMCSA Part 393 Subpart I.

### L-140 Standard Ratchet Type Load Binders (Meets or exceeds requirements of US DOT FMCSA Part 393 Subpart I.)

Model	Stock No.	Min-Max Chain Size (in)	Working Load Limit (lb)*	Proof Load (lb)	Weight Each (lb)	Handle Length (in)	Barrel Length (in)	Take Up (in)	Dimensions (in)							
									A	B	C	E	E1	F	F1	G
R-7 **	1048404	5/16-3/8	8800	17600	12.11	14	10	8.0	14.00	1.38	2.75	22.94	30.94	25.13	33.13	.50
R-A **	1048422	3/8-1/2	15000	30000	14.70	14	10	8.0	14.00	1.38	2.75	25.25	33.25	27.63	35.63	.63
R-C ***	1048440	1/2-5/8	16000	32000	14.55	14	10	8.0	14.00	1.38	2.75	26.38	34.38	29.44	37.44	.72

\* Ultimate Load is 3 times the Working Load Limit. \*\* Matches the Working Load Limit of Grade 100 chain for both sizes. \*\*\* Matches the Working Load Limit of Grade 100 chain for 1/2" size.



## Synthetic Rope: Ultrax

Ultrax rope is made with HMPE fibers, offering 0.6% elongation at working load and 2.7 - 3.0% at ultimate break. Ultrax has a specific gravity of 0.97 g/cc, and is lightweight enough for helicopter placement. This rope features low elongation, zero water absorption, abrasion resistance with Maxijacket HP coating, and flexibility in freezing conditions. It delivers high tensile strength and long wear life for demanding applications



Diameter Inches	Diameter mm	Weight Lbs/100ft	Weight Kg/100m	Average Spliced Break Strength* Lbs	Average Spliced Break Strength* Kg	Minimum Spliced Break Strength* Lbs	Minimum Spliced Break Strength* Kg	Maximum** Work Load 5:1 Lbs	Maximum** Work Load 5:1 Kg
1/16	2	0.1	0.2	800	360	720	324	160	72
1/8	3	0.3	0.5	2,200	995	1,980	896	440	199
5/32	4	0.5	0.8	3,400	1,540	3,060	1,386	680	308
3/16	5	1.0	1.5	6,000	2,720	5,400	2,448	1,200	544
1/4	6	1.7	2.5	10,000	4,540	9,000	4,086	2,000	908
5/16	8	2.4	3.6	14,800	6,715	13,320	6,044	2,960	1,343
3/8	10	3.6	5.3	20,000	9,080	18,000	8,172	4,000	1,816
7/16	11	4.6	6.8	26,500	12,030	23,850	10,827	5,300	2,406
1/2	13	6.4	9.6	37,400	16,975	33,660	15,278	7,480	3,395
9/16	14	8.0	11.9	45,000	20,430	40,500	18,387	9,000	4,086
5/8	16	9.5	14.1	53,000	24,060	47,700	21,654	10,600	4,812
3/4	19	14.0	20.8	75,000	34,050	67,500	30,645	15,000	6,810
7/8	22	17.9	26.7	98,000	44,490	88,200	40,041	19,600	8,898
1	25	24.2	36.0	120,000	54,480	108,000	49,032	24,000	10,896
1-1/8	29	28.8	42.9	148,000	67,190	133,200	60,471	29,600	13,438
1-1/4	32	33.9	50.5	172,000	78,085	154,800	70,277	34,400	15,617
1-5/16	33	41.8	62.2	184,000	83,535	165,600	75,182	36,800	16,707
1-1/2	38	55.4	82.5	254,000	115,315	228,600	103,784	50,800	23,063



## Synthetic Rope: Maxibraid Plus

Maxibraid Plus is a double-braided rope with an inner load-bearing core made of High Modulus Polyethylene (HMPE) and a polyester outer sleeve slightly thicker than Ultrex Plus, providing enhanced abrasion resistance in high-wear applications. It offers extraordinary strength, low elongation, and sleeve toughness for outstanding control, with expertly engineered strength and elasticity specifications. The rope delivers superior wear life, with 100% of the load-bearing capacity carried by the core alone. The HMPE core is coated with Yale's Maxijacket coating for added toughness before being over-braided. For sizes 3/4" and larger, Yale has developed a special splice with a tucked core and a conventional double-braid cover. This splice prevents movement of the eye in service, shortens the internal tail, and improves flexibility while reducing damage near the eye.



Diameter Inches	Diameter mm	Weight Lbs/100ft	Weight Kg/100m	Average Spliced Break Strength* Lbs	Average Spliced Break Strength* Kg	Minimum Spliced Break Strength* Lbs	Minimum Spliced Break Strength* Kg	Maximum** Work Load 5:1 Lbs	Maximum** Work Load 5:1 Kg
1/4	6	2.1	3.1	5,400	2,450	4,860	2,205	1,080	490
5/16	8	3.2	4.7	10,270	4,660	9,243	4,194	2,054	932
3/8	10	4.3	6.4	13,180	5,980	11,862	5,382	2,636	1,196
7/16	11	5.5	8.2	16,150	7,330	14,535	6,597	3,230	1,466
1/2	13	7.3	10.9	21,000	9,530	18,900	8,577	4,200	1,906
9/16	14	9.1	13.6	28,000	12,710	25,200	11,439	5,600	2,524
5/8	16	11.0	16.4	34,000	15,435	30,600	13,892	6,800	3,087
3/4	19	14.2	21.1	44,000	19,975	39,600	17,978	8,800	3,995
7/8	22	21.3	31.7	63,000	28,600	56,700	25,740	12,600	5,720
1	25	25.8	38.3	75,000	34,050	67,500	30,645	15,000	6,810
1-1/8	29	32.2	47.9	100,000	45,400	90,000	40,860	20,000	9,080
1-1/4	32	37.9	56.5	123,000	55,840	110,700	50,250	24,600	11,168



## Synthetic Rope: Double Esterlon

Double Esterlon is a double-braided rope constructed of premium over-finish polyester fiber in both the sleeve and core, identified by two green strands braided into the cover. It is available with an optional Max-i-jacket urethane coating to enhance wear resistance. The yarn is treated with a marine-grade finish prior to twisting, creating a balanced double braid with a high-performance finish to reduce yarn-on-yarn abrasion. This rope offers low stretch, excellent wear life, and is easily spliced. Double Esterlon has high dielectric strength and yields the highest strength for a double-braid polyester when spliced correctly.



Diameter Inches	Diameter mm	Weight Lbs/100ft	Weight Kg/100m	Average Spliced Break Strength* Lbs	Average Spliced Break Strength* Kg	Minimum Spliced Break Strength* Lbs	Minimum Spliced Break Strength* Kg	Maximum** Work Load 5:1 Lbs	Maximum** Work Load 5:1 Kg
1/4	6	2.4	3.6	2,940	1,330	2,646	1,197	588	266
5/16	8	3.2	4.8	3,750	1,700	3,375	1,530	750	340
3/8	10	4.2	6.3	5,740	2,605	5,166	2,345	1,148	521
7/16	11	5.7	8.5	7,690	3,490	6,921	3,141	1,538	698
1/2	13	7.8	11.6	11,000	4,990	9,900	4,491	2,200	998
9/16	14	9.8	14.6	13,290	6,030	11,961	5,658	2,658	1,206
5/8	16	13.9	20.8	17,540	7,960	15,786	5,427	3,508	1,592
3/4	19	16.5	24.6	20,800	9,440	18,720	7,164	4,160	1,888
7/8	22	23.8	35.4	33,000	14,980	29,700	8,496	6,600	2,996
1	25	33.7	50.2	46,200	20,970	41,580	13,482	9,240	4,194
1-1/16	27	39.1	58.2	47,500	21,565	42,750	18,873	9,500	4,313
1-1/8	29	44.7	66.5	54,100	24,560	48,690	19,409	10,820	4,912
1-1/4	32	50.9	75.5	63,700	28,915	57,330	22,104	12,740	5,783
1-5/16	33	57.4	85.5	70,360	31,940	63,324	26,024	14,072	6,388
1-1/2	38	70.1	104.4	88,890	40,355	80,001	28,746	17,778	8,071
1-5/8	41	83.2	123.9	93,710	42,540	84,339	36,320	18,742	8,508
1-3/4	44	103.0	153.3	111,930	50,815	100,737	45,734	22,386	10,163
2	51	123.5	183.9	133,450	60,585	120,105	54,527	26,690	12,117



## Synthetic Rope: Yalex

Yalex rope, made from premium over-finish polyester, has 3% elongation at working load and 15.8 - 16.3% at ultimate break. With a specific gravity of 1.38 g/cc, it offers durability and ease of use. Features include easy splicing, a Maxijacket urethane coating to reduce snagging, and an option to color code for application or load rating. The yarn is treated with a marine-grade finish before twisting, and the 2-ply construction helps retain shape, making used rope easy to splice.



Diameter Inches	Diameter mm	Weight Lbs/100ft	Weight Kg/100m	Average Spliced Break Strength* Lbs	Average Spliced Break Strength* Kg	Minimum Spliced Break Strength* Lbs	Minimum Spliced Break Strength* Kg	Maximum** Work Load 5:1 Lbs	Maximum** Work Load 5:1 Kg
1/4	6	1.7	2.5	3,300	1,495	2,970	1,346	660	299
5/16	8	2.4	3.1	5,350	2,425	4,815	2,813	1,070	485
3/8	10	3.6	4.1	6,600	2,995	5,940	2,696	1,320	599
7/16	11	4.6	6.4	11,990	5,440	10,791	4,896	2,398	1,088
1/2	13	6.4	8.4	15,370	6,975	13,833	6,278	3,074	1,395
9/16	14	8.0	10.3	18,860	8,560	16,974	7,704	3,772	1,712
5/8	16	9.5	11.6	20,900	9,485	18,810	8,537	4,180	1,897
3/4	19	14.0	15.5	27,000	12,255	24,300	11,030	5,400	2,451
7/8	22	17.9	23.0	42,100	19,110	37,890	17,199	8,420	3,822
1	25	24.2	32.3	48,950	22,220	44,055	19,998	9,790	4,444
1-1/8	29	28.8	34.6	61,600	27,965	55,440	25,169	12,320	5,593
1-1/4	32	33.9	38.9	72,050	32,710	64,845	29,439	14,410	6,542
1-5/16	33	41.8	46.1	82,220	37,325	73,998	33,593	16,444	7,465
1-1/2	38	55.4	59.4	102,850	46,690	92,565	42,021	20,570	9,338
1-5/8	41	62.0	82.2	123,750	56,180	111,375	50,562	24,750	11,236
1-3/4	44	75.4	93.1	132,000	59,925	118,800	53,933	26,400	11,985
2	51	91.3	115.8	146,520	66,520	131,868	59,868	29,304	13,304



## PE-12

PE-12 rope, made from high-performance polyester fibers, offers 3% elongation at working load and 13.0 - 13.5% at ultimate break. With a specific gravity of 1.38 g/cc, it is built for durability. The single-end-per-carrier construction, combined with high twist and braid angles, improves wear resistance. Additionally, the rope is easy to splice, simplifying field repairs.



Diameter Inches	Diameter mm	Weight Lbs/100ft	Weight Kg/100m	Average Spliced Break Strength* Lbs	Average Spliced Break Strength* Kg	Minimum Spliced Break Strength* Lbs	Minimum Spliced Break Strength* Kg	Maximum** Work Load 5:1 Lbs	Maximum** Work Load 5:1 Kg
5/16	8	2.8	4.2	4,050	1,835	3,645	1,652	810	367
3/8	10	3.9	5.8	6,200	2,810	5,580	2,529	1,240	562
7/16	11	6.5	9.7	10,000	4,540	9,000	4,086	2,000	908
1/2	13	8.4	12.5	13,940	6,325	12,546	5,693	2,788	1,265
9/16	14	10.2	15.2	16,590	7,530	14,931	6,777	3,318	1,506
5/8	16	11.5	17.1	19,640	8,915	17,676	8,024	3,928	1,783
3/4	19	15.7	23.4	23,250	10,555	20,925	9,500	4,650	2,111
7/8	22	22.9	34.1	38,300	17,385	34,470	15,647	7,660	3,477
1	25	27.2	40.5	42,900	19,475	38,610	17,528	8,580	3,895



## Optimus

Yalex rope, made from premium over-finish polyester, has 3% elongation at working load and 15.8 - 16.3% at ultimate break. With a specific gravity of 1.38 g/cc, it offers durability and ease of use. Features include easy splicing, a Maxijacket urethane coating to reduce snagging, and an option to color code for application or load rating. The yarn is treated with a marine-grade finish before twisting, and the 2-ply construction helps retain shape, making used rope easy to splice.



Diameter Inches	Diameter mm	Weight Lbs/100ft	Weight Kg/100m	Average Spliced Break Strength* Lbs	Average Spliced Break Strength* Kg	Minimum Spliced Break Strength* Lbs	Minimum Spliced Break Strength* Kg	Maximum** Work Load 5:1 Lbs	Maximum** Work Load 5:1 Kg
3/8	10	4.0	6.0	6,000	2,720	5,400	2,448	1,200	544
1/2	13	9.2	13.7	13,500	6,125	12,150	5,513	2,700	1,225
5/8	16	11.7	17.4	19,000	8,625	17,100	7,763	3,800	1,725
3/4	19	16	23.8	25,000	11,350	22,500	10,215	5,000	2,270
7/8	22	25	37.2	36,000	16,340	32,400	14,706	7,200	3,268



## Pilot Line

Pilot Line rope, made from polyester, offers 3% elongation at working load and 13.0 - 13.5% at ultimate break. With a specific gravity of 1.38 g/cc, it provides best-in-class value and serves as an industry standard for pilot line systems and stringing applications. The Maxijacket coating enhances abrasion resistance.



Diameter Inches	Diameter mm	Weight Lbs/100ft	Weight Kg/100m	Average Spliced Break Strength* Lbs	Average Spliced Break Strength* Kg	Minimum Spliced Break Strength* Lbs	Minimum Spliced Break Strength* Kg	Maximum** Work Load 5:1 Lbs	Maximum** Work Load 5:1 Kg
5/16	8	2.3	3.4	3,600	1,630	3,240	1,467	720	326

## River max

River Max is a double braid rope designed for maximum abrasion protection and high strength, featuring a High Modulus Polyethylene (HMPE) fiber construction. Ideal for high-contact abrasion applications, it performs well on winches, around bollards, and through chocks, making it a great solution for lightweight handling on deck. The load-bearing core, made of 12-strand Ultrax, provides 100% of the rope's strength, while an additional HMPE over-braid offers enhanced protection with the most abrasion-resistant fiber available.



Finished Diameter Inches	Core Diameter Inches	Weight Lbs/100ft	Weight Kg/100m	Average Spliced Break Strength* Lbs	Average Spliced Break Strength* Kg	Minimum Spliced Break Strength* Lbs	Minimum Spliced Break Strength* Kg	Maximum** Work Load 5:1 Lbs	Maximum** Work Load 5:1 Kg
5/8	1/2	9.7	14.4	39,250	17,815	35,325	16,034	7,850	3,563
3/4	9/16	11.9	17.7	47,000	21,335	42,300	19,202	9,400	4,267
7/8	5/8	17.0	25.3	55,500	25,195	49,950	22,676	11,100	5,039
1	3/4	21.6	32.2	75,000	34,050	67,500	30,645	15,000	6,810
1-1/8	7/8	26.6	39.6	98,000	44,490	88,200	40,041	19,600	8,898
1-5/16	1	35.5	52.9	120,000	54,480	108,000	49,032	24,000	10,896
1-3/8	1-1/8	45	67	148,000	67,190	133,200	60,471	29,600	13,438
1-1/2	1 1/4	55.4	82.5	172,000	78,085	154,800	70,277	34,400	15,617



## Unitrex

Unitrex XS Max Wear is a high-tech parallel-core rope made of High Modulus Polyethylene (HMPE), wrapped in neoprene tape and over-braided with a durable high-tenacity polyester jacket. This synthetic cable is stiffer than typical ropes and has stretch characteristics similar to wire, but it's much lighter and easier to handle. With its toughness, it carries a higher working load rating, 25% of its breaking strength.

Unitrex XS Max Wear has excellent strength retention in service, backed by field studies. Its rubber layer protects the HMPE core, and the urethane-saturated outer jacket makes it the toughest HMPE rope available. All of Yale's parallel-core ropes are torque-free, with bonded cores preventing internal contamination.

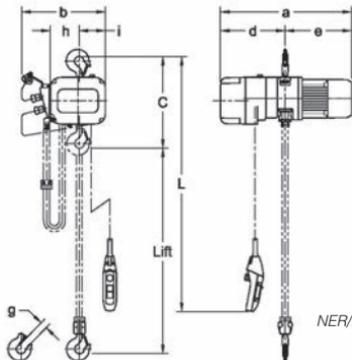


Diameter Inches	Diameter mm	Weight Lbs/100ft	Weight Kg/100m	Average Spliced Break Strength* Lbs	Average Spliced Break Strength* Kg	Minimum Spliced Break Strength* Lbs	Minimum Spliced Break Strength* Kg	Maximum** Work Load 4:1 Lbs	Maximum** Work Load 4:1 Kg
0.44	11	6.7	10.0	20,000	9,080	18,000	8,172	5,000	2,270
0.53	13	9.2	13.7	26,000	11,800	23,400	10,620	6,500	2,950
0.58	15	11.4	17.0	34,000	15,435	30,600	13,892	8,500	3,859
0.63	16	13.5	20.1	42,500	19,295	38,250	17,366	10,625	4,824
0.71	18	16.9	25.2	50,500	22,925	45,450	20,633	12,625	5,731
0.84	21	24.2	36.0	73,500	33,365	66,150	30,029	18,375	8,341
1.00	25	32.4	48.2	100,000	45,400	90,000	40,860	25,000	11,350
1.15	29	42.4	63.1	125,000	56,750	112,500	51,075	31,250	14,188
1.25	32	52.5	78.2	158,000	71,730	142,200	64,557	39,500	17,933
1.40	36	64.9	96.6	195,000	88,530	175,500	79,677	48,750	22,133
1.75	44	92.6	137.9	264,000	119,855	237,600	107,870	66,000	29,964
1.94	49	98.8	147.1	310,000	140,740	279,000	126,666	77,500	35,185
1.99	51	113.3	168.7	360,000	163,440	324,000	147,096	90,000	40,860
2.20	56	144.0	214.4	430,000	195,220	387,000	175,698	107,500	48,805

# Harrington Electric Chain Hoist



NER/ER010L  
(Shown with optional  
canvas chain container)



NER/ER010L

## SINGLE SPEED — SPECIFICATIONS

Cap. (Tons)	Product Code	Standard Lift (ft)	Push Button Cord L (ft)	Lifting Speed (ft/min)	Lifting Motor 3 Phase 60 Hz			Load Chain Diameter (mm) x Chain Fall Lines	Net Weight (lbs)		Weight for Additional One Foot of Lift (lbs)		
					Output (Hp)	Rated Current (amps)			NER	ER			
						@208 - 230V	@460V						
1/8	(N)ER001H	10	8.2	55	0.75	3.4	1.7	4.3 x 1	60	62	0.28		
1/4	(N)ER003S			36	0.75	3.4	1.7	4.3 x 1	60	62	0.28		
1/4	(N)ER003H			53	1.2	4.8	2.5	6.0 x 1	79	82	0.54		
1/2	(N)ER005L			15	0.75	3.4	1.7	6.0 x 1	71	79	0.54		
1/2	(N)ER005S			29	1.2	4.8	2.5	6.0 x 1	79	82	0.54		
1	(N)ER010L			14	1.2	4.8	2.5	7.7 x 1	104	110	0.89		
1	(N)ER010S			28	2.4	8.6	4.2	7.7 x 1	119	119	0.89		
1 1/2	(N)ER015S			18	2.4	8.6	4.2	10.2 x 1	159	170	1.6		
2	(N)ER020C			7	1.2	4.8	2.5	7.7 x 2	130	134	1.8		
2	(N)ER020L			14	2.4	8.6	4.2	10.2 x 1	161	174	1.6		
2	(N)ER020S			28	4.7	16.4	7.9	10.2 x 1	201	198	1.6		
2 1/2	(N)ER025S			22	4.7	16.4	7.9	11.2 x 1	227	225	1.9		
3	(N)ER030L*			16	4.7	18.3	9.2	12.5 x 1	256	256	2.3		
3	(N)ER030C			9.2	9.2	17	4.7	16.4	7.9	10.2 x 2	234	234	3.2
5	(N)ER050L					11	4.7	16.4	7.9	11.2 x 2	289	284	3.8

\*The (N)ER030L listed is the previous hoist model. Refer to Harrington catalog C-EPH for features and benefits.

# Harrington Lever Hoist



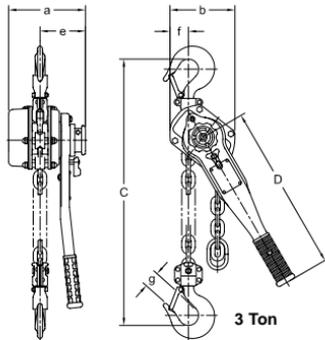
## LB LEVER HOIST — SPECIFICATIONS & DIMENSIONS

Cap. (Tons)	Product Code	Headroom C (in)	Std. Lift (ft)	Pull to Lift Load* (lbs)	a (in)	b (in)	D* (in)	e (in)	f (in)	g (in)	Load Chain Diameter (mm) x Chain Fall Lines	Net Weight (lbs)	Shipping Weight Approx. (lbs)	Weight for Additional One Foot of Lift (lbs)
3/4	LB008	11.0	5	54 (36)	5.7	4.7	9.6 (14.4)	3.8	1.6	0.9	5.6 x 1	13	13	0.5
1	LB010	11.8		72 (46)								1.1	1.1	
1 1/2	LB015	13.2		64 (45)	6.3	5.0	10.4 (14.4)	4.0	1.5	1.3	7.1 x 1	18	18	0.7
2	LB020	14.8		59 (42)	6.8	5.9						1.8	1.4	8.8 x 1
2 3/4	LB028			81 (57)			6.3	4.4	1.5	10.0 x 1	33			
3	LB030	15.6		69	7.5	8.5					16.3 (16.9)	2.3	2.0	10.0 x 2
6	LB060	21.3		72			12.0	4.1	2.9	10.0 x 3				
9	LB090	26.8		78										

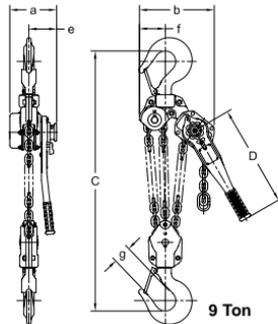
\*Figures in parentheses are for hoists with the optional load limit warning handle.



Double chain fall line  
6 Ton



3 Ton



9 Ton

## Harrington Hand Chain Hoist



Harrington CF hand chain hoists give you a practical alternative thanks to an economical design using fewer parts for trouble-free service. Outstanding durability is due to a die-cast aluminum body and high-strength, heat-treated main pinion shaft and load gear. Pre-lubricated ball bearings, precision machined gears, and Weston-style load brake make lifting smooth and easy while allowing long service and low maintenance.

### Many Benefits From More Features:

- Experience exceptional strength with a thick die-cast aluminum body.
- Handle tough demands with high-strength, heat-treated main pinion shaft and load gear.
- Get positive braking action with Weston-style load brake incorporating two moisture-resistant brake pads with four braking surfaces.
- Minimize manual effort thanks to smooth running, pre-lubricated ball bearings, and precision machined drive train components.
- Simplify maintenance with fewer parts and an easy-to-work-on design.

### Capabilities To Count On:

- 10-foot lift is standard, 15- and 20-foot lifts are also stocked; nonstandard lifts and hand chain drops available as well.
- Grade 100 heat-treated manganese alloy load chain resists abrasion and wear while minimizing chain weight.
- Forged and heat-treated alloy steel hooks are designed to open slowly and not fracture under excessive loads.
- Test certificate verifies that every hoist has been factory load tested to 125% of rated capacity, in accordance with ASME B30.16 requirements.

### Options:

- Chain container
- Corrosion-resistant chain
- Inspection hook



### CF HAND CHAIN HOIST — SPECIFICATIONS

Cap. (Tons)	Product Code	Headroom C (in)	Std. Lift (ft)	Pull to Lift Load (lbs)	Overhaul Ratio	Load Chain Diameter (mm) x Chain Fall Lines	Net Weight (lbs)	Shipping Weight Approx. (lbs)	Weight for Additional One Foot of Lift (lbs)
1/2	CF005	12.8	10	60	19	5.0 x 1	24	26	1.0
1	CF010	14.6		72	31	6.3 x 1	29	31	1.2
1 1/2	CF015	17.3		84	41	7.1 x 1	40	42	1.4
2	CF020	20.1		80	63	6.3 x 2	47	49	1.6
3	CF030	23.2		92	81	7.1 x 2	62	66	2.1
5	CF050	24.4			134	7.1 x 3	82	86	2.9

Please Note: Special lengths of load and hand chain available upon request. Weights are approximate.

# Harrington Push and Geared Trolleys



Harrington push and geared trolleys help you maneuver easily on your most demanding lifting operations. They feature specially designed contoured wheels that ensure reliable tracking, and their sealed ball bearings avoid maintenance hassles and provide smooth operation.

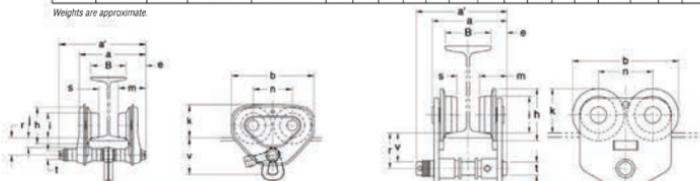
### PT PUSH TROLLEY — SPECIFICATIONS & DIMENSIONS

Cap. (Tons)	Product Code	Min. Radius for Curve (in)	Flange Width Adjustability B (in)		a max (in)	a' (in)	b (in)	e (in)	h (in)	i (in)	j (in)	k (in)	m (in)	n (in)	r (in)	s (in)	t (in)	v (in)	Net Weight (lbs)	Shipping Weight (lbs)
			Standard	Option																
1/2	PTF2005	13.8	2.28 to 4.00	4.01 to 8.00 or 8.01 to 12.00	6.8	8.0	7.2	1.8	3.2	2.36	0.80	3.0	2.7	3.3	1.5	B-1.8	0.87	3.7	9	9
1	PTF2010	17.7	2.28 to 5.00	5.01 to 8.00 or 8.01 to 12.00	8.5	9.8	9.3	2.2	4.2	2.80	1.1	3.7	3.1	4.4	2.0	B-1.9	0.98	4.2	15	16
1 1/2-2	PTF2020	21.7	3.23 to 6.02	6.03 to 12.00	10.4	11.8	11.0	2.7	5.0	3.35	1.4	4.4	3.8	5.2	2.4	B-2.3	1.26	5.1	29	30
2 1/2-3	PTF2030	25.6			11.0	12.6	12.8	3.1	5.8	3.94		5.3	4.3	6.0	2.7		1.42	6.7	46	47
5	PTF2050	78.7	4.92 to 7.02	7.03 to 12.00	10.7	11.7	13.7	2.1	5.7	4.65	—	5.7	3.6	7.0	4.6	B-3.0	1.73	3.7	95	98
8	PT080	118.1	5.50 to 8.66	8.67 to 12.00	14.4	17.6	18.9	4.1	7.3	6.10		6.7	5.9	7.7	6.0	B-3.6	2.76	4.6	212	254
10	PT100				14.4	17.6	18.9	4.1	7.3	6.10		6.7	5.9	7.7	6.0	B-3.6	2.76	4.6	212	254

Weights are approximate.



PT Push Trolley



1/2 – 3 Ton

5 – 10 Ton

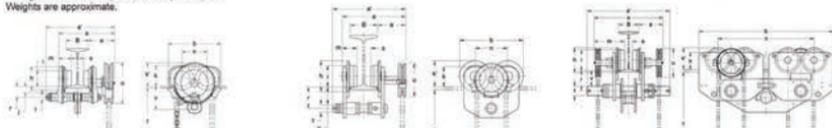
### GT GEARED TROLLEY — SPECIFICATIONS & DIMENSIONS

Cap. (Tons)	Product Code	Min. Radius for Curve (in)	Flange Width Adjustability B (in)		a max (in)	b (in)	e (in)	f* (in)	h (in)	i (in)	j (in)	k (in)	k' (in)	m (in)	n (in)	r (in)	s (in)	t (in)	u (in)	v (in)	Net Weight (lbs)	Shipping Weight (lbs)	
			Standard	Option																			
1/2-1	GT2010	17.7	2.28 to 5.00	5.01 to 8.00 or 8.01 to 12.00	10.8	12.2	9.3	4.6	4.2	2.80	1.1	3.7	4.2	2.2	4.4	2.0	B-1.9	0.98	—	4.2	24	25	
1 1/2-2	GT2020	21.7	3.23 to 6.02	6.03 to 12.00	13.7	15.2	11.0	6.1	8	5.0	3.35	4.4	4.3	2.8	5.2	2.4	B-2.3	1.26	7.2	5.1	37	39	
2 1/2-3	GT2030	25.6			14.1	12.8	6.2	5.8	3.94	5.3	4.5	3.1	6.0	2.7	1.42	6.7		55		57			
5	GT2050	78.7	4.92 to 7.02	7.03 to 12.00	14.8	15.7	13.7	6.1	5.7	4.65	—	5.7	5.2	3.2	7.0	4.6	B-3.0	1.73	3.7	104	107		
8	GT080	118.1	5.50 to 8.66	8.67 to 12.00	17.4	20.6	18.9	—	—	—		—	4.7	7.7	6.0	—	—	—	—	—	4.6	218	260
10	GT100				17.4	20.6	18.9	—	—	—			—	—	—	4.7	7.7	6.0	—	—	—	—	4.6
15	GT150	—	5.50 to 8.66	8.67 to 12.00	22.7	21.3	39.8	—	7.0	12	7.3	6.10	—	—	—	—	—	—	—	8.4	6.3	534	615
20	GT200	—			22.7	21.3	39.8	—	7.0	12	7.3	6.10	—	—	—	—	—	—	—	—	8.4	6.3	534

\* Longer hand chain drops available upon request. Weights are approximate.



GT Geared Trolley





## Lifting Beam

Lifting Beams and Lifting Frames are typically low-height solutions - they are the optimum solution for indoor lifts or where lifts have restricted headroom. Lifting Beams tend to be for lifts where the lifting points on the load are all in-line, whereas a Lifting Frame is used for a square/rectangular pattern of lifting points.



For lifts where height is severely restricted, Caldwell can design and manufacture low-height lifting frames. Similar to spreader frames, but whereas spreader frames have top slings attached between the frame corners up to the crane hook in the centre, instead a Lifting Frame generally has no top slings – rather the crane hook attaches directly to a large lug on the top of the frame in the centre

## 4-Point Lifting Beam





## Spreader Beam

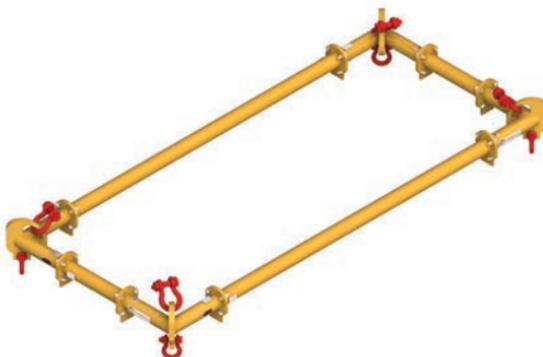
The Modular Spreader Beam configuration and interchangeable components enable Caldwell spreader beams to be reused over many lifts. Designed by engineering experts and manufactured in Caldwell manufacturing facilities; Dura-Mod is the leading Modular Spreader Beam on the market. These range from small sizes such as the MOD6 (6 ton) up to large sizes such as the MOD600 (600 ton).

### Dura-Mod Spreader Beam



Spreader Frames and Lifting Frames are recommended for loads that have more than two lifting points; they can also be the ideal lifting equipment for when headroom is limited. Caldwell offers several types of Spreader Frames and Lifting Frames for multi-point lifts.

### Modular DM30 Box Spreader Beam





## The Difference Between Spreader & Lifting Beams

Lifting beams are used when available headroom is not sufficient for top rigging. Lifting beams must be designed structurally larger than spreader beams to adequately handle load stress. Spreader beams with top rigging are smaller because most load stress is absorbed by the rigging. This differentiation is critical in order to properly specify the equipment required. **Make sure you know the difference.**

### Practical Tips for Using Overhead Lifting Attachments

#### INSPECTION

The lifter should be visually inspected by or under the direction of an appointed person on a daily or weekly schedule depending on the nature of the lifter and the severity of the service. Defects to look for include but are not limited to:

1. Structural deformation.
2. Cracks in the structural frame, welds, hoist hook attachment points, mechanically operating parts, and attached slings, clevises and hooks.
3. Malfunctions during operation of a mechanically operating lifter.
4. Loose covers, fasteners and stops.
5. Faulty operation of automatic hold and release mechanisms.
6. Wear of hoist hooking points, load supporting clevises, pins, slings, linkages and mechanical parts.
7. Missing nameplates and markings.

#### OPERATING PRACTICES

1. The operator should watch carefully that the lifter is performing properly during the lifting procedure.
2. The operator should be familiar with the standard crane directing hand signals.
3. The operator should respond to signals from an appointed person only. However, stop signals from anyone shall be obeyed.
4. The operator should notify a designated person when he considers a load to be unsafe.

5. The operator should observe the lifter before using. A defect observed shall be examined by a qualified person to determine if it is a hazard.

#### HANDLING THE LOAD

1. The lifter should not be loaded in excess of its rated load.
2. The combined weight of the lifter and load should not exceed the rated load of the crane or hoist.
3. The lifter should be applied to the load in accordance with the manufacturer's recommended operating procedures.
4. Lifter ropes and chains should not be kinked, and multiple part lines shall not be twisted about each other.
5. The lifter should not touch obstructions during load movement.
6. The operator or other personnel should not ride suspended loads or enter restricted spaces adjacent to them.
7. The load or lifter should not be slid on the floor or other surface.
8. The lifter should not be used for loads for which it is not designed.
9. If suspended loads are moved manually, they should be pushed, not pulled.
10. A preliminary lift of a few inches should be made to establish that the load is stable.
11. All loads should be accelerated and decelerated smoothly

THERN



When it comes to equipment for heavy-duty lifting and positioning, Thern has the experience you are looking for. Large or small, heavy or light, Thern has design and manufactured standard and custom cranes and winches for countless customer applications around the world

**STATIONARY CRANES**

CAPACITY @ TO >>	1500 LBS	2200 LBS	3000 LBS
Max Lift	up to 240 ft	up to 350 ft	up to 378 ft
Series	Captain	Captain	Admiral
Model	571	572	5PT30



**PORTABLE CRANES**

CAPACITY @ TO >>	500 LBS	500 LBS	1000 LBS	1000 LBS	2000 LBS
Max Lift	65 ft	95 ft	65 ft	up to 240 ft	up to 350 ft
Series	First Mate	Ensign	Ensign	Commander	Commander
Model	5122	5PA5	5PA10	5PT10	5PT20



**Winches**

**PORTABLE POWER WINCHES**

MAX CAPACITY	2000 LBS	1500 LBS	2000 LBS	4600 LBS
Line Speed	8 - 19 fpm	65 - 97 fpm	13 - 22 fpm	24 fpm
Travel Distance	190 - 280 ft	280 ft	90 ft	140 ft
HP	1.3	3	1.2	3
Model	4WP2T8	4WP2D8	4771	3WG4



**SPUR GEAR**



Up to 10,000 lb Capacity  
LIFTS FASTER, but takes  
MORE FORCE than a worm gear.

**WORM GEAR**



Up to 4,000 lb Capacity  
LIFTS SLOWER, but takes  
LESS FORCE than a spur gear.

# Crosby® Straightpoint



know the load

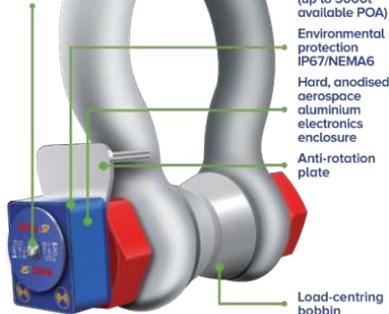


- Hardened bushes to accept industry standard shackles
- Std. AA Batteries 1200hrs Easy no tools access
- Internal Antennae
- Environmental protection IP67 or NEMA6
- High-quality hard anodised aerospace aluminium
- Angular ends to reduce weight and snagging when rigged

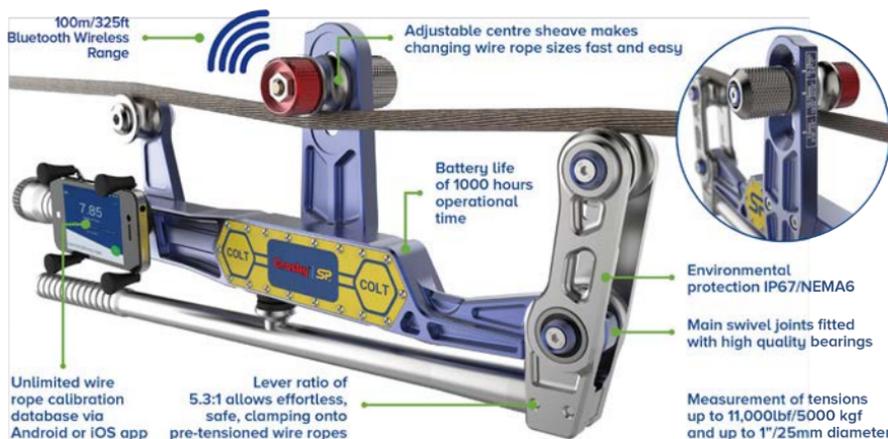
Internal Antennae  
1000m/3280ft



Std. AA Batteries  
1200hrs  
Easy no tools access



- Crosby G2130 & G2140 shackle < 120t
- Capacities from 3.25-500t (up to 3000t available POA)
- Environmental protection IP67/NEMA6
- Hard, anodised aerospace aluminium electronics enclosure
- Anti-rotation plate
- Load-centring bobbin



100m/325ft  
Bluetooth Wireless  
Range



Adjustable centre sheave makes  
changing wire rope sizes fast and easy

Battery life of 1000 hours  
operational  
time



Environmental  
protection IP67/NEMA6

Main swivel joints fitted  
with high quality bearings

Unlimited wire  
rope calibration  
database via  
Android or iOS app

Lever ratio of  
5.3:1 allows effortless,  
safe, clamping onto  
pre-tensioned wire ropes

Measurement of tensions  
up to 11,000lb/5000 kgf  
and up to 1"/25mm diameter

## Crosby® Wire Rope Clips

### CROSBY® FORGED WIRE ROPE CLIP WARNINGS & APPLICATION INSTRUCTIONS



G-450  
(Red-U-Bolt®)

#### ⚠️ WARNING

- Failure to read, understand, and follow these instructions may cause death or serious injury.
- Read and understand these instructions before using clips.
- Match the same size clip to the same size wire rope.
- Prepare wire rope end termination only as instructed.
- Do not use with plastic coated wire rope.
- Apply first load to test the assembly. This load should be of equal or greater weight than loads expected in use. Next, check and retighten nuts to recommended torque (See Table 1).

Efficiency ratings for wire rope end terminations are based upon the minimum breaking force of wire rope. The efficiency rating of a properly prepared loop or thimble-eye termination for clip sizes 1/8" through 7/8" is 80%, and for sizes 1" through 3-1/2" is 90%.

The number of clips shown (see Table 1) is based upon using RRL or RLL wire rope, 6 x 19 or 6 x 37 Class, FC or IWRC; IPS or XIP, XXIP. If Seale construction or similar large outer wire type construction in the 6 x 19 Class is to be used for sizes 1 inch and larger, add one additional clip. If a pulley (sheave) is used for turning back the wire rope, add one additional clip.

The number of clips shown also applies to rotation-resistant RRL wire rope, 8 x 19 Class, IPS, XIP, XXIP sizes 1-1/2 inch and smaller; and to rotation-resistant RLL wire rope, 19 x 7 Class, IPS, XIP, XXIP sizes 1-1/2 inch and smaller.

For other classes of wire rope not mentioned above, we recommend contacting Crosby Engineering at the address or telephone number on the back cover to ensure the desired efficiency rating.

The style of wire rope termination used for any application is the obligation of the user.

#### For OSHA (Construction) applications, see OSHA 1926.251.

1. Refer to Table 1 following these instructions.

Turn back specified amount of rope from thimble or loop. Apply first clip one base width from dead end of rope. Apply U-Bolt over dead end of wire rope – live end rests in saddle (Never saddle a dead horse!). Use torque wrench to tighten nuts evenly, alternate from one nut to the other until reaching the recommended torque. (See Figure 1)



Figure 1

2. When two clips are required, apply the second clip as near the loop or thimble as possible. Use torque wrench to tighten nuts evenly, alternating until reaching the recommended torque. When more than two clips are required, apply the second clip as near the loop or thimble as possible, turn nuts on second clip firmly, but do not tighten. (See Figure 2)



Figure 2

3. When three or more clips are required, space additional clips equally between first two – take up rope slack – use torque wrench to tighten



Figure 3

nuts on each clip evenly, alternating from one nut to the other until reaching recommended torque (See Figure 3).

4. If a pulley (sheave) is used in place of a thimble, add one additional clip. Clip spacing should be as shown (See Figure 4).

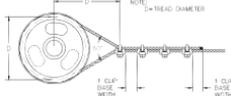


Figure 4

#### 5. WIRE ROPE SPlicing PROCEDURES:

The preferred method of splicing two wire ropes together is to use inter-locking turnback eyes with thimbles, using the recommended number of clips on each eye (See Figure 5).



Figure 5

An alternate method is to use twice the number of clips as used for a turnback termination. The rope ends are placed parallel to each other,

overlapping by twice the turnback amount shown in the application instructions. The minimum number of clips should be installed on each dead end (See Figure 6). Spacing, installation torque, and other instructions still apply.



Figure 6

#### 6. IMPORTANT

Apply first load to test the assembly. This load should be of equal or greater weight than loads expected in use. Next, check and use torque wrench to retighten nuts to recommended torque.

In accordance with good rigging and maintenance practices, the wire rope end termination should be inspected periodically for wear, abuse, and general adequacy.

Clip Size/ Rope Size		Minimum No. of Clips	Amount of Rope to Turn Back in inches	* Torque in ft-lbf
(in)	(mm)			
1/8	3-4	2	3-1/4	4.5
3/16	5	2	3-3/4	7.5
1/4	6-7	2	4-3/4	15
5/16	8	2	5-1/4	30
3/8	9-10	2	6-1/2	45
7/16	11-12	2	7	65
1/2	13	3	11-1/2	65
9/16	14-15	3	12	95
5/8	16	3	12	95
3/4	18-20	4	18	130
7/8	22	4	19	225
1	24-25	5	26	225
1-1/8	28-30	6	34	225
1-1/4	33-34	7	44	360
1-3/8	36	7	44	360
1-1/2	38-40	8	54	360
1-5/8	41-42	8	58	430
1-3/4	44-46	8	61	590
2	48-52	8	71	750
2-1/4	56-58	8	73	750
2-1/2	62-65	9	84	750
2-3/4	68-72	10	100	750
3	75-78	10	106	1200
3-1/2	85-90	12	149	1200

If a pulley (sheave) is used for turning back the wire rope, add one additional clip. See Figure 4.

If a greater number of clips are used than shown in the table, the amount of turnback should be increased proportionately.

\*The tightening torque values shown are based upon the threads being clean, dry, and free of lubrication.

## Crosby® Wire Rope Clips

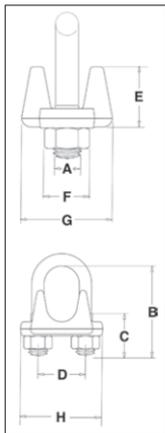


**G-450  
Red-U-Bolt® Clip**

Crosby Clips, all sizes 1/4" and larger, meet the performance requirements of Federal Specification FF-C-450E TYPE 1 CLASS 1, except for those provisions required of the contractor.

- Each base has a Product Identification Code (PIC) for material traceability, the name CROSBY or CG, and a size forged into it.
- Based on the catalog breaking strength of wire rope, Crosby wire rope clips have an efficiency rating of 80% for 1/8" through 7/8" sizes, and 90% for sizes 1" through 3-1/2".
- Entire Clip is Galvanized to resist corrosive and rusting action.
- Sizes 1/8" through 2-1/2" and 3" have forged bases.
- All Clips are individually bagged or tagged with proper application instructions and warning information.
- Clip sizes up through 1-1/2" have rolled threads.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these wire rope clips meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.
- Look for the Red-U-Bolt®, your assurance of Genuine Crosby Clips.

### G-450 Crosby Clips

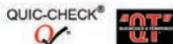


Rope Size		G-450 Stock No.	Std. Package Qty.	Weight Per 100 (lb)	Dimensions (in)							
(in)	(mm)				A	B	C	D	E	F	G	H
1/8	3-4*	1010015	100	6	.22	.72	.44	.47	.37	.38	.81	.99
3/16*	5*	1010033	100	10	.25	.97	.56	.59	.50	.44	.94	1.18
1/4	6-7	1010051	100	19	.31	1.03	.50	.75	.66	.56	1.19	1.43
5/16	8	1010079	100	28	.38	1.38	.75	.88	.73	.69	1.31	1.66
3/8	9-10	1010097	100	48	.44	1.50	.75	1.00	.91	.75	1.63	1.94
7/16 - 1/2	11-13	1010131	50	80	.50	1.88	1.00	1.19	1.13	.88	1.91	2.28
9/16 - 5/8	14-16	1010177	50	110	.56	2.25	1.25	1.31	1.34	.94	2.06	2.50
3/4	18-20	1010195	25	142	.62	2.75	1.44	1.50	1.39	1.06	2.25	2.84
7/8	22	1010211	25	212	.75	3.12	1.62	1.75	1.58	1.25	2.44	3.16
1	24-26	1010239	10	252	.75	3.50	1.81	1.88	1.77	1.25	2.63	3.47
1-1/8	28-30	1010257	10	283	.75	3.88	2.00	2.00	1.91	1.25	2.81	3.59
1-1/4	32-34	1010275	10	438	.88	4.44	2.22	2.34	2.17	1.44	3.13	4.13
1-3/8	36	1010293	10	442	.88	4.44	2.22	2.34	2.31	1.44	3.13	4.19
1-1/2	38	1010319	10	544	.88	4.94	2.38	2.59	2.44	1.44	3.41	4.44
1-5/8	41-42	1010337	Bulk	704	1.00	5.31	2.62	2.75	2.66	1.63	3.63	4.75
1-3/4	44-46	1010355	Bulk	934	1.13	5.75	2.75	3.06	2.92	1.81	3.81	5.24
2	48-52	1010373	Bulk	1300	1.25	6.44	3.00	3.38	3.03	2.00	4.44	5.88
2-1/4	56-58	1010391	Bulk	1600	1.25	7.13	3.19	3.88	3.19	2.00	4.56	6.38
2-1/2	62-65	1010417	Bulk	1900	1.25	7.69	3.44	4.13	3.69	2.00	4.69	6.63
** 2-3/4	** 68-72	1010435	Bulk	2300	1.25	8.31	3.56	4.38	4.88	2.00	5.00	6.88
3	75-78	1010453	Bulk	3100	1.50	9.19	3.88	4.75	4.44	2.38	5.31	7.61
** 3-1/2	** 85-90	1010426	Bulk	4000	1.50	10.75	4.50	5.50	6.00	2.38	6.19	8.38

\* Electro-plated U-Bolt and Nuts. \*\* 2-3/4" and 3-1/2" base is made of cast steel.

## Crosby® Master Link

- Alloy Steel—Quenched and Tempered.
- Individually proof tested
- Proof test certification shipped with each link.
- Selected sizes designated with "W" in the size column have enlarged inside dimensions to allow additional room for sling hardware and crane hook.
- Meets or exceeds all requirements of ASME B30.26

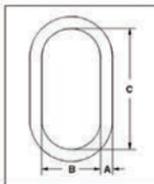


Size		A-342 Stock No.	Weight Each (lbs.)	Working Load Limit (lbs.) <sup>†</sup>	Proof Load (lbs.) <sup>**</sup>	Dimensions (in.)			Deformation Indicator
(in.)	(mm)					A	B	C	
1/2W	13W	1014266	1.3	7400	17200	62	2.80	5.00	3.50
5/8	16	1014280	1.5	9000	18000	62	3.00	6.00	3.50
3/4W	19W	1014285	2.0	12300	28400	73	3.20	6.00	4.00
7/8W	22W	3522213	3.3	15200	33600	88	3.75	6.38	4.50
1W	26W	3522214	6.1	26000	46500	110	4.30	7.50	6.50
1-1/4W	32W	3522215	12.0	39100	69750	133	5.50	9.50	7.00
1-1/2W	38W	3522216	18.6	61100	1152750	161	5.90	10.50	6.50
1-3/4	44	3522217	25.2	84900	1212250	175	6.00	12.00	7.50
2	51	3522218	37.0	102000	1256500	200	7.00	14.00	9.00
2-1/4	57	1014422	54.1	143100	292200	225	8.00	18.00	10.00
2-1/2	63	1014468	68.5	160000	320000	250	8.38	16.00	11.00
2-3/4	70	1014440	94.0	218900	433800	278	9.88	18.00	12.50
3	76	1014486	115	228000	456000	300	9.88	18.00	13.00
3-1/4	83	1014501	145	262200	524400	325	10.00	20.00	13.50
3-1/2	89	1014529	200	279000	548000	350	12.00	24.00	15.50
3-3/4	95	1015051	198	336000	672000	375	10.00	20.00	13.50
4	102	1015060	264	373000	746000	400	12.00	24.00	16.00
†† 4-1/4	†† 108	1015067	302	354000	708000	425	12.00	24.00	-
†† 4-1/2	†† 114	1015079	345	360000	720000	450	14.00	28.00	-
†† 4-3/4	†† 121	1015088	436	389000	778000	475	14.00	28.00	-
†† 5	†† 127	1015094	516	395000	790000	500	15.00	30.00	-

<sup>†</sup>Ultimate Load is 5 times the Working Load Limit. Based on single leg sling (in-line load), or resultant load on multiple legs with an included angle less than or equal to 120 degrees. Applications with wire rope and synthetic sling generally require a design factor of 5. <sup>\*\*</sup>Proof Test Load equals or exceeds the requirement of ASTM A952(8.1) and ASME B30.9. <sup>††</sup>Offshore Container Master Links Proof Tested to 2.5 times the Working Load Limit with 70 percent fixtures. <sup>†††</sup>Welded Master Link.



A-342



## Crosby Master Link Assembly

- Alloy Steel—Quenched and Tempered.
- Individually proof tested at 2 times Working Load Limit with certification.
- Proof test certification shipped with each link.



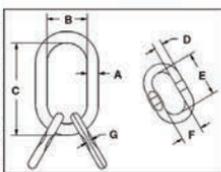
Size		A-345 Stock No.	Weight Each (lbs.)	Working Load Limit Based on S:1 Design Factor (lbs.)	Proof Load (lbs.) <sup>**</sup>	Dimensions (in.)							Deformation Indicator
(in.)	(mm)					A	B	C	D	E	F	G	
3/4W	19W	1014739	3.5	12900	28400	73	3.20	6.00	56	3.35	1.77	30	4.00
7/8W	22W	1014742	4.8	15200	35200	88	3.75	6.38	56	3.35	1.77	30	4.50
1W	26W	1014766	9.3	26000	60000	110	4.30	7.50	75	3.94	2.36	33	5.50
1-1/4W	32W	1014779	15.8	39100	90400	133	5.50	9.50	100	6.30	3.54	51	7.00
1-1/2W	38W	1014807	34.1	61100	141200	161	5.90	10.50	125	7.09	3.94	65	7.50
1-3/4	44	1014814	46.7	84900	212250	175	6.00	12.00	138	8.00	5.00	73	7.50
2	51	1014832	67.2	102600	256500	200	7.00	14.00	150	9.00	5.75	-	9.00
2-1/2	64	1014855	206	160000	320000	250	8.38	16.00	250	10.00	9.38	-	11.00
2-3/4	70	1014864	282	216900	433800	275	9.88	18.00	275	11.00	9.88	-	12.50
4	102	1014999	667	373000	746000	400	12.00	24.00	350	12.00	12.00	-	15.50***

<sup>†</sup>Ultimate Load is 5 times the Working Load Limit. The maximum individual sublink working load limit is 75% of the assembly working load limit except for 2-1/2" and 2-3/4", which are 100% of assembly working load limit. Applications with wire rope and synthetic sling generally require a design factor of 5.

<sup>\*\*</sup>Proof Test Load equals or exceeds the requirement of ASTM A952(8.1) and ASME B30.9. <sup>\*\*\*</sup>Sublink only.



A-345



## Forged Shackles

### SCREW PIN



G-209 S-209

Screw pin anchor shackles meet the requirements of Federal Specification RR-C-271D Type IVA, Grade A, Class 2.

**Load Rated**



- Working Load limit permanently shown on every shackle.
- Forged—Quenched and Tempered, with alloy pins.
- Capacities 1/3 thru 55 metric tons.
- Look for the Red Pin™... the mark of genuine Crosby quality.
- Shackles can be furnished proof tested with certificates to designated standards, such as ABS, DNV, Lloyds, or other certification available when requested at the time of order.
- Hot Dip galvanized or Self Colored.
- Fatigue rated.
- Meet or exceed all requirements of ASME B30.26.

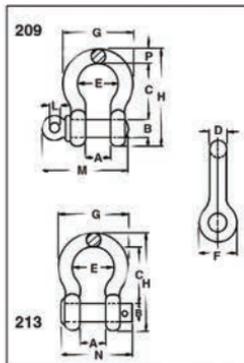
### ROUND PIN



G-213 S-213

Round pin anchor shackles meet the requirements of Federal Specification RR-C-271D Type IVA, Grade A, Class 1.

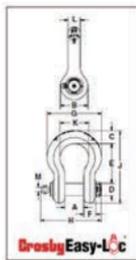
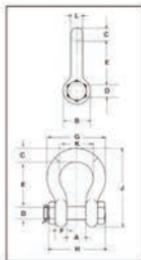
Nominal Size (in.)	Working Load Limit* (tons)	Stock No.				Weight Each (lbs.)	
		G-209 Galv.	S-209 S.C.	G-213 Galv.	S-213 S.C.	G-209 S-209	G-213 S-213
3/16	1/3	1018357	—	—	—	.06	—
1/4	1/2	1018375	1018384	1018017	1018026	.10	.13
5/16	3/4	1018393	1018400	1018035	1018044	.19	.18
3/8	1	1018419	1018428	1018053	1018062	.31	.29
7/16	1 1/2	1018437	1018446	1018071	1018080	.38	.38
1/2	2	1018455	1018464	1018099	1018106	.72	.71
5/8	3 1/4	1018473	1018482	1018115	1018124	1.37	1.50
3/4	4 3/4	1018491	1018507	1018133	1018142	2.35	2.32
7/8	6 1/2	1018516	1018525	1018151	1018160	3.62	3.49
1	8 1/2	1018534	1018543	1018179	1018188	5.03	5.00
1 1/8	9 1/2	1018552	1018561	1018197	1018204	7.41	6.97
1 1/4	12	1018570	1018589	1018213	1018222	9.50	9.75
1 3/8	13 1/2	1018598	1018605	1018231	1018240	13.53	13.25
1 1/2	17	1018614	1018623	1018259	1018268	17.20	17.25
1 3/4	25	1018632	1018641	1018277	1018286	27.78	29.46
2	35	1018650	1018669	1018295	1018302	45.00	45.75
2 1/2	55	1018678	1018687	—	—	85.75	—



Nominal Size (in.)	Working Load Limit* (tons)	Dimensions (in.)													Tolerance +/-	
		A	B	C	D	E	F	G	H	L	M	N	P	C	A	
3/16	†1/3	.38	.25	.88	.19	.60	.56	.98	1.47	.16	1.12	—	.19	.06	.06	
1/4	1/2	.47	.31	1.13	.25	.78	.61	1.28	1.84	.19	1.38	1.34	.25	.06	.06	
5/16	3/4	.53	.38	1.22	.31	.84	.75	1.47	2.09	.22	1.66	1.59	.31	.06	.06	
3/8	1	.66	.44	1.44	.38	1.03	.91	1.78	2.49	.25	2.03	1.88	.38	.13	.06	
7/16	1 1/2	.75	.50	1.69	.44	1.16	1.06	2.03	2.91	.31	2.38	2.13	.44	.13	.06	
1/2	2	.81	.63	1.88	.50	1.31	1.19	2.31	3.28	.38	2.69	2.38	.50	.13	.06	
5/8	3 1/4	1.06	.75	2.38	.63	1.69	1.50	2.94	4.19	.44	3.34	2.91	.69	.13	.06	
3/4	4 3/4	1.25	.88	2.81	.75	2.00	1.81	3.50	4.97	.50	3.97	3.44	.81	.25	.06	
7/8	6 1/2	1.44	1.00	3.31	.88	2.28	2.09	4.03	5.83	.50	4.50	3.81	.97	.25	.06	
1	8 1/2	1.69	1.13	3.75	1.00	2.69	2.38	4.69	6.56	.56	5.07	4.53	1.06	.25	.06	
1 1/8	9 1/2	1.81	1.25	4.25	1.16	2.91	2.69	5.16	7.47	.63	5.59	5.13	1.25	.25	.06	
1 1/4	12	2.03	1.38	4.69	1.29	3.25	3.00	5.75	8.25	.69	6.16	5.50	1.38	.25	.06	
1 3/8	13 1/2	2.25	1.50	5.25	1.42	3.63	3.31	6.38	9.16	.75	6.84	6.13	1.50	.25	.13	
1 1/2	17	2.38	1.63	5.75	1.54	3.88	3.63	6.88	10.00	.81	7.35	6.50	1.62	.25	.13	
1 3/4	25	2.88	2.00	7.00	1.84	5.00	4.19	8.86	12.34	1.00	9.08	7.75	2.25	.25	.13	
2	35	3.25	2.25	7.75	2.08	5.75	4.81	9.97	13.68	1.22	10.34	8.75	2.40	.25	.13	
2 1/2	†55	4.13	2.75	10.50	2.71	7.25	5.69	12.87	17.84	1.38	13.00	—	3.13	.25	.25	

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

## Alloy Bolt Type Anchor Shackles



G-2140 / S-2140

G-2140E

Meet the requirements of Federal Specification RR-C-271D  
Type IVA, Grade Bm Class 3

Load Rated



- Working Load Limit is permanently shown on every shackle.
- Alloy bows, alloy bolts.
- Quenched and Tempered.
- Forged Alloy Steel 30 thru 175 metric tons. Cast Alloy Steel 200 thru 400 metric tons.
- Pins are galvanized and painted red.
- All sizes are individually proof tested to 2.0 times the working load limit.
- Meet or exceed all of the requirements of ASME B30.26.
- Sizes 4<sup>3/4</sup>, 5, and 6 are style G2140-E with alloy Easy-Loc® bolt.

### G-2140E Crosby® Alloy Easy-Loc Shackles

Nominal Shackles Size (in.)	Working Load Limit (t) <sup>*</sup>	Stock No.			Weight Each (lbs.)	Dimensions (in.)													Tolerance +/-	
		G-2140E	S-2140E	S-2140E		A	B	C	D +/- .02	E	F	G	H	J	K	L	M	N	A	E
4-3/4	† 200	1021475	-	-	458	7.25	10.50	5.00	4.75	15.19	4.58	20.84	23.01	27.81	11.00	4.75	4.00	1.80	0.25	0.25
5	† 250	1021484	-	-	597	8.50	12.00	5.63	5.00	18.50	4.48	23.63	23.84	32.63	13.00	5.00	4.00	1.80	0.25	0.25
6	† 300	1021493	-	-	791	8.38	13.00	6.06	6.00	18.72	4.89	24.76	25.01	34.28	13.00	5.88	4.00	1.80	0.25	0.25

\* Note: Maximum Proof Load is 2.0 times the Working Load Limit. For sizes 30 thru 175 metric tons, Minimum Ultimate Load is 5 times the Working Load Limit for 200 thru 400 metric tons. Minimum Ultimate Load is 4 times the Working Load Limit. † Furnished with Round Head Bolts with an eyebolt for handling.

### G-2140 / S-2140 Crosby® Alloy Bolt Type Anchor Shackles

Nominal Shackles Size (in.)	Working Load Limit (t) <sup>*</sup>	Stock No.			Weight Each (lbs.)	Dimensions (in.)													Tolerance +/-	
		G-2140	S-2140	S-2140OC		A	B	C	D +/- .02	E	F	G	H	J	K	L	M	N	A	E
3/8	2	1021015	-	-	0.33	0.66	0.91	0.38	0.44	1.44	0.38	1.78	2.17	2.49	1.03	0.38	-	-	0.06	0.13
7/16	2 2/3	1021020	-	-	0.49	0.75	1.06	0.44	0.50	1.69	0.41	2.03	2.51	2.91	1.16	0.44	-	-	0.06	0.13
1/2	3 1/3	1021029	-	-	0.79	0.81	1.19	0.50	0.64	1.88	0.46	2.31	2.80	3.28	1.31	0.50	-	-	0.06	0.13
5/8	5	1021038	-	-	1.68	1.06	1.50	0.69	0.77	2.38	0.58	2.94	3.56	4.19	1.69	0.63	-	-	0.06	0.13
3/4	7	1021047	-	-	2.72	1.25	1.81	0.81	0.89	2.81	0.69	3.50	4.15	4.97	2.00	0.75	-	-	0.06	0.25
7/8	9 1/2	1021056	-	-	3.95	1.44	2.09	0.97	1.02	3.31	0.81	4.03	4.82	5.83	2.28	0.88	-	-	0.06	0.25
1	12 1/2	1021065	-	-	5.66	1.69	2.38	1.06	1.15	3.75	0.92	4.69	5.39	6.56	2.69	1.00	-	-	0.06	0.25
1 1/8	15	1021074	-	-	8.27	1.81	2.69	1.25	1.25	4.25	1.04	5.16	5.90	7.47	2.91	1.13	-	-	0.06	0.25
1 1/4	18	1021083	-	-	11.7	2.03	3.00	1.38	1.40	4.69	1.16	5.75	6.69	8.25	3.25	1.29	-	-	0.06	0.25
1 3/8	21	1021092	-	-	15.8	2.25	3.31	1.50	1.53	5.25	1.28	6.38	7.21	9.16	3.63	1.42	-	-	0.13	0.25
1-1/2	30	1021110	1021129	1262407	18.8	2.38	3.62	1.62	1.63	5.75	1.39	6.88	7.73	10.00	3.88	1.53	-	-	0.13	0.25
1-3/4	40	1021138	1021147	1262416	33.8	2.88	4.19	2.25	2.00	7.00	1.75	8.81	9.33	12.34	5.00	1.84	-	-	0.13	0.25
2	55	1021156	1021165	1262425	49.9	3.25	4.81	2.40	2.25	7.75	2.00	10.16	10.41	13.68	5.75	2.08	-	-	0.13	0.25
2-1/2	85	1021174	1021183	1262434	103	4.12	5.81	3.12	2.75	10.50	2.62	12.75	13.58	17.90	7.25	2.71	-	-	0.25	0.25
3	120	1021192	-	1262443	162	5.00	6.50	3.63	3.25	13.00	3.00	14.62	15.13	21.50	7.88	3.12	-	-	0.25	0.25
3-1/2	† 150	1021218	-	1262452	327	5.25	8.00	4.38	3.75	14.63	3.75	17.02	20.33	24.88	9.00	3.62	4.00	1.80	0.25	0.25
4	† 175	1021236	-	1262461	318	5.50	9.00	4.56	4.25	14.50	4.00	18.00	21.20	25.68	10.00	4.00	4.00	1.80	0.25	0.25
4-3/4	† 200	1021234	-	-	461	7.25	10.50	5.00	4.75	15.19	4.58	20.84	24.04	27.81	11.00	4.75	4.00	1.80	0.25	0.25
5	† 250	1021243	-	-	608	8.50	12.00	5.62	5.00	18.50	4.85	23.62	24.87	32.61	13.00	5.00	4.00	1.80	0.25	0.25
6	† 300	1021252	-	-	797	8.38	13.00	6.06	6.00	18.72	4.89	24.78	26.22	34.28	13.00	5.88	4.00	1.80	0.25	0.25
7**	† 400	1021478	-	-	1289	8.25	14.00	7.25	7.00	22.50	5.00	28.00	29.66	40.25	13.00	6.00	4.00	1.80	0.25	0.25

\* Note: Maximum Proof Load is 2.0 times the Working Load Limit. Minimum Ultimate Load is 5 times the Working Load Limit on 2 thru 21 metric tons. For sizes 30 thru 175 metric tons, Minimum Ultimate Load is 5.4 times the Working Load Limit for 200 thru 400 metric tons, Minimum Ultimate Load is 4 times the Working Load Limit. \*\* Cast Alloy Steel. † Furnished with Round Head Bolts with an eyebolt for handling.

## Bolt-Type Shackles

### BOLT TYPE ANCHOR SHACKLE



**G-2130 S-2130**

Bolt Type Anchor shackles with thin head bolt—nut with cotter pin. Meets the requirements of Federal Specification RR-C-271D Type IVA, Grade A, Class 3.

- Working Load Limit permanently shown on every shackle.
- Forged—Quenched and Tempered, with alloy pins.
- Capacities 1/3 thru 150 metric tons.
- Look for the Red Pin®... the mark of genuine Crosby quality.
- 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.
- Hot Dip galvanized or Self Colored.
- Fatigue rated.
- Meet or exceed all requirements of ASME B30.26.

### BOLT TYPE CHAIN SHACKLE

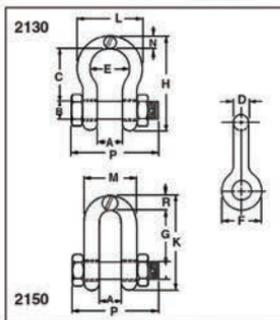


**G-2150 S-2150**

Bolt Type Chain shackles. Thin hex head bolt—nut with cotter pin. Meets the requirements of Federal Specification RR-C-271D Type IVB, Grade A, Class 3.

Nominal Shackle Size (In.)	Working Load Limit* (tons)	Stock No.				2130 Weight Each (lbs.)	2150 Weight Each (lbs.)
		G-2130 Galv.	S-2130 S.C.	G-2150 Galv.	S-2150 S.C.		
3/16	1/3	1019464	—	—	—	.06	—
1/4	1/2	1019466	—	1019768	—	.11	.13
5/16	3/4	1019468	—	1019770	—	.22	.23
3/8	1	1019470	—	1019772	—	.33	.33
7/16	1 1/2	1019471	—	1019774	—	.49	.49
1/2	2	1019472	1019481	1019775	1019784	.79	.75
5/8	3 1/4	1019490	1019506	1019793	1019800	1.68	1.47
3/4	4 3/4	1019515	1019524	1019819	1019828	2.72	2.52
7/8	6 1/2	1019533	1019542	1019837	1019846	3.95	3.85
1	8 1/2	1019551	1019560	1019555	1019864	5.66	5.55
1 1/8	9 1/2	1019579	1019588	1019873	1019882	8.27	7.60
1 1/4	12	1019597	1019604	1019891	1019908	11.71	10.81
1 3/8	13 1/2	1019613	1019622	1019917	1019926	15.83	13.75
1 1/2	17	1019631	1019640	1019935	1019944	20.80	18.50
1 3/4	25	1019659	1019668	1019953	1019962	33.91	31.40
2	35	1019677	1019686	1019971	1019980	52.25	46.75
2 1/2	55	1019696	1019702	1019999	1020004	98.25	85.00
3	85	1019711	—	1020013	—	154.00	124.25
3 1/2	1120	1019739	—	—	—	265.00	—
4	1150	1019757	—	—	—	338.00	—

Load Rated **OT**



Nominal Shackle Size (In.)	Working Load Limit* (tons)	Dimensions (In.)																Tolerance +/-	
		A	B	C	D	E	F	G	H	K	L	M	N	P	R	C&G	A		
3/16	1/3	.38	.25	.88	.19	.60	.56	—	1.47	—	.98	—	.19	1.29	—	.06	.06		
1/4	1/2	.47	.31	1.13	.25	.78	.61	—	1.84	—	1.28	—	.25	1.58	—	.06	.06		
5/16	3/4	.53	.38	1.22	.31	.84	.75	—	2.09	—	1.47	—	.31	1.82	—	.06	.06		
3/8	1	.66	.44	1.44	.38	1.03	.91	—	2.49	—	1.78	—	.38	2.17	—	.13	.06		
7/16	1 1/2	.75	.50	1.69	.44	1.16	1.06	—	2.91	—	2.03	—	.44	2.51	—	.13	.06		
1/2	2	.81	.63	1.88	.50	1.31	1.19	1.63	3.28	3.03	2.31	1.81	5.0	3.03	5.0	.13	.06		
5/8	3 1/4	1.06	.75	2.38	.63	1.69	1.50	2.00	4.22	3.75	2.94	2.31	6.9	3.63	6.3	.13	.06		
3/4	4 3/4	1.25	.88	2.81	.75	2.00	1.81	2.38	4.97	4.53	3.50	2.75	.81	4.44	.81	.25	.06		
7/8	6 1/2	1.44	1.00	3.31	.88	2.28	2.09	2.81	5.83	5.33	4.03	3.19	.97	5.00	.97	.25	.06		
1	8 1/2	1.69	1.13	3.75	1.00	2.69	2.38	3.19	6.56	5.94	4.69	3.69	1.00	5.69	1.00	.25	.06		
1 1/8	9 1/2	1.81	1.25	4.25	1.13	2.91	2.69	3.56	7.47	6.78	5.16	4.06	1.25	6.41	1.25	.25	.06		
1 1/4	12	2.03	1.38	4.69	1.25	3.25	3.00	3.94	8.28	7.50	5.75	4.53	1.38	6.97	1.38	.25	.06		
1 3/8	13 1/2	2.25	1.50	5.25	1.38	3.63	3.31	4.44	9.16	8.28	6.38	5.00	1.50	7.69	1.50	.25	.13		
1 1/2	17	2.38	1.63	5.75	1.50	3.88	3.63	4.88	10.00	9.06	6.88	5.38	1.62	8.25	1.62	.25	.13		
1 3/4	25	2.88	2.00	7.00	1.75	5.00	4.19	5.75	12.22	10.97	8.50	6.38	2.12	9.59	2.12	.25	.13		
2	35	3.25	2.25	7.75	2.00	5.75	4.81	6.75	13.28	12.28	9.75	7.25	2.40	11.00	2.00	.25	.13		
2 1/2	55	4.13	2.75	10.50	2.62	7.25	5.69	8.00	17.34	14.84	12.50	9.13	3.13	13.69	2.62	.25	.25		
3	85	5.00	3.25	13.00	3.00	7.88	6.50	8.50	21.50	16.88	14.50	11.00	3.62	16.50	3.50	.25	.25		
3 1/2	1120	5.25	3.75	14.63	3.50	9.00	8.00	—	24.63	—	16.50	—	4.12	19.00	—	.25	.25		
4	1150	5.50	4.25	14.50	4.00	10.00	9.00	—	25.69	—	18.38	—	4.56	19.75	—	.25	.25		

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

† Furnished with Round Head Bolts and welded handle.

## Alloy Wide Body Shackles

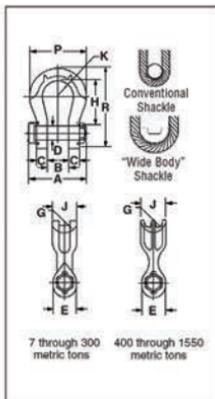


Patented



G-2160E

- Greatly improves wearability of wire rope slings.
- Can be used to connect HIGH STRENGTH Synthetic Web Slings, HIGH STRENGTH Synthetic Round Slings or Wire Rope Slings.
- Increase in shackle bow radius provides minimum 58% gain in sling bearing surface and eliminates need for a thimble.
- Increases usable sling strength minimum of 15%.
- Pin is non-rotating, with weld on handles for easier use. (75 ton and larger).
- All ratings are in metric tons, embossed on side of bow.
- Forged alloy steel from 7 through 300 metric tons.
- Cast alloy steel from 400 through 1550 metric tons.
- All 2160 shackles are individually proof tested, Crosby certification available at time of order. Shackles requiring ABS, DNV, Lloyds and other certifications are available upon special request and must be specified at time of order.
- All sizes Quenched and Tempered for maximum strength.
- Meet or exceed all requirements of ASME B30.26.
- Sizes 125T, 200T, and 300T are G2160E Easy-Loc® Wide Body Shackles



Load Rated

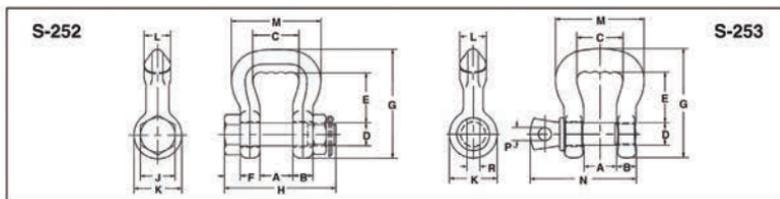


### G-2160 / S-2160 Crosby® "Wide Body" Shackles

Working Load Limit (T)*	Stock No.		Weight Each (lbs.)	Dimensions (in.)																Effective Body Diameter
	G-2160	S-2160		A	B +/- .25	C	D +/- .02	E	G	H	J	K	M	N	P	R				
7	1021256	1021548	4.0	4.14	1.25	.69	.88	1.82	1.25	3.56	1.60	1.25	-	-	4.10	5.87	2.1			
12.5	1021265	1021557	8.80	5.38	1.69	.92	1.13	2.38	1.37	4.63	2.13	1.63	-	-	5.51	7.63	2.4			
18	1021274	1021566	14.90	6.69	2.03	1.16	1.38	2.69	1.50	5.81	2.50	2.00	-	-	6.76	9.38	2.8			
30	1021283	1021575	26.50	7.69	2.37	1.38	1.63	3.50	2.50	6.94	3.13	2.50	-	-	8.50	11.38	4.1			
40	1021285	1021584	46.00	9.28	2.88	1.69	2.00	4.00	1.75	8.06	3.75	3.00	-	-	10.62	13.62	3.6			
55	1021287	1021593	68.00	10.36	3.25	2.00	2.25	4.63	2.00	9.36	4.50	3.50	-	-	12.26	15.63	4.3			
75	1022101	-	112	15.04	4.13	2.12	2.75	5.34	3.75	11.53	5.00	3.64	4.00	1.80	12.28	18.66	6.3			
125	1022110	-	193	17.70	5.12	2.66	3.15	6.50	3.75	14.37	5.91	4.33	4.00	1.80	15.47	23.00	6.8			
200	1022118	-	420	19.35	5.91	2.94	4.12	8.41	5.25	18.91	8.56	5.42	4.00	1.80	20.47	30.44	9.5			
300	1022127	-	805	22.61	7.38	3.84	5.25	10.50	6.13	23.63	10.38	6.31	4.00	1.80	24.00	37.66	11.4			
400	1021334	-	1143	30.27	8.66	5.16	6.30	12.56	7.99	22.64	12.60	7.28	4.00	1.80	27.17	38.78	14.3			
500	1021343	-	1439	33.35	9.84	5.73	7.09	13.39	8.09	24.81	13.39	8.86	4.00	1.80	31.10	42.72	14.8			
600	1021352	-	2132	36.02	10.83	6.23	7.87	15.50	13.00	27.56	14.57	9.74	5.75	2.25	34.05	47.24	20.3			
700	1021361	-	2579	38.91	11.81	6.59	8.46	17.03	8.87	28.94	15.75	10.63	5.75	2.25	37.01	50.18	16.6			
800	1021254	-	3025	41.66	12.80	7.30	9.06	17.69	9.76	29.53	16.54	10.92	5.75	2.25	38.39	52.09	18.0			
900	1021389	-	3678	43.73	13.78	7.78	9.84	18.81	13.00	29.82	18.81	11.52	5.75	2.25	40.35	54.59	22.4			
1000	1021370	-	4079	45.98	14.96	8.33	10.63	20.00	10.26	29.92	16.11	12.11	5.75	2.25	42.32	55.31	19.3			
1250	1021272	-	5320	49.86	16.99	9.16	11.81	22.56	13.92	36.61	20.87	12.70	-	-	46.26	65.35	24.4			
1550	1021281	-	6302	54.89	18.31	11.10	12.60	24.25	12.92	42.32	22.82	13.29	-	-	51.81	74.63	23.9			

\*Note: Maximum Proof Load is 2.0 times the Working Load Limit on 75 thru 300 metric tons (except for 125 metric tons which is proof tested to 1.6 times the Working Load Limit). Minimum Ultimate Load is 5 times the Working Load Limit on 75 thru 300 metric tons. Maximum Proof Load is 1.33 times the Working Load Limit on 400 thru 1550 metric tons. Minimum Ultimate Load is 4.5 times the Working Load Limit on 400 thru 1550 metric tons.

## Synthetic Sling Saver Shackles



- Shackles available in size 3-1/4 to 50 metric tons.
- All Alloy construction.
- Design factor of 5 to 1.
- Each shackle has a Product Identification Code (PIC) for material traceability along with a Working Load Limit and the name Crosby forged into it.
- Increased radius of bow gives wider sling bearing surface resulting in an increased area for load distribution, thus:
  - Increasing Synthetic Sling efficiency as compared to standard anchor and chain shackle bows and conventional hooks. This allows 100% of the slings rated Working Load Limit to be achieved.
  - Allows better load distribution on internal fibers.
- Shackles available in both a Screw Pin and Bolt, Nut and Cotter Pin configuration.
- Bolt (Pin) has a larger diameter that provides better load distribution.
- Look for the Red Pin\*... the mark of genuine Crosby quality.
- Meet or exceed all requirements of ASME B30.26.



**Load Rated**

Round Sling Size (Number)	Web Sling Nominal Size (in.)	Working Load Limit* (tons)	S-252 Bolt Type		S-253 Screw Pin	
			S-252 Stock No.	Weight Each (lbs.)	S-253 Stock No.	Weight Each (lbs.)
1 & 2	1	3 1/4	1020485	1.4	1020575	1.4
3 & 4	1.5	6 1/2	1020496	2.4	1020584	2.2
5 & 6	2	8 3/4	1020507	4.1	1020593	3.8
7 & 8	3	12 1/2	1020518	8.0	1020602	7.3
9 & 10	4	20 1/2	1020529	16.9	1020611	15.2
11 & 12	5	35	1020540	35.0	1020620	30.8
13	6	50	1020551	57.5	1020629	52.0

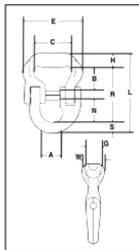
Round Sling Size (Number)	Web Sling Nominal Size (in.)	Working Load Limit* (tons)	Dimensions (in.)															
			A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	
1 & 2	1	3 1/4	.88	.62	1.36	.75	1.50	.44	3.38	3.68	1.12	1.50	.75	2.69	3.22	.44	1.00	
3 & 4	1.5	6 1/2	1.25	.75	1.75	.88	1.88	.50	4.15	4.25	1.31	1.81	1.00	3.38	4.03	.50	1.19	
5 & 6	2	8 3/4	1.38	.88	2.25	1.00	2.81	.56	5.50	4.72	1.50	2.09	1.12	4.19	4.50	.50	1.44	
7 & 8	3	12 1/2	1.62	1.12	3.25	1.25	3.06	.75	6.34	5.88	1.88	2.62	1.38	5.62	5.59	.62	1.81	
9 & 10	4	20 1/2	2.12	1.38	4.50	1.50	5.75	.88	9.75	7.19	2.25	3.12	1.75	7.50	6.88	.75	2.13	
11 & 12	5	35	2.50	1.75	5.50	2.00	6.34	1.12	11.50	9.31	3.00	4.19	2.25	9.19	8.66	1.00	2.88	
13	6	50	3.00	2.12	6.50	2.25	7.70	1.25	13.75	10.38	3.38	4.75	2.75	11.00	10.22	1.22	3.19	

\*Note: Maximum Proof Load is 2 1/2 times the Working Load Limit. Minimum Ultimate Strength is 5 times the Working Load Limit.

## Sling Saver Fittings/Accessories



S-237

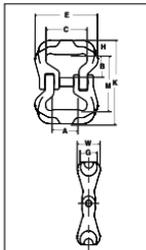


**High Performance Sling Connector is designed to connect High Performance Synthetic Slings of all materials.**

- Capacities available:
  - Working Load Limit (5 to 1): 5,000 through 60,000 lbs.
  - Sling Body Widths: 2" through 6".
- Allows easy connection to master links or eye hooks, and is ideal for bridles.
- Increased radius of bow gives wider sling bearing surface resulting in an increased area for load distribution, thus:
  - Increasing Synthetic Sling efficiency as compared to master links, shackle bows and conventional eye hooks. This allows 100% of the sling's rated Working Load Limit to be achieved.
  - Allows better load distribution on internal fibers.
- All Alloy Construction
- Design Factor of 5 to 1.
- Individually Proof Tested at 2.5 times the Working Load Limit.
- Each connector has a Product Identification Code (PIC) for material traceability, along with a frame size, and the name Crosby and USA in raised letters.



S-238



**Sling Saver® Load Rated**

### S-237 High Performance Sling Connector

Working Load Limit	S-237 Web to Lok-A-Loy Assy. Stock No.	Frame No.	Nominal Sling Body Width (in.)	Lok-A-Loy Size (in.)	Weight Each (lbs.)	Dimensions (in.)													
						A	B	C	E	G	H	L	N	R	S	W			
4:1 (lbs.)*	5:1 (lbs.)																		
6250	5000	1020695	5	2	3/8	1.14	.88	1.42	2.00	3.18	1.00	.80	4.20	1.04	2.92	.48	1.38		
12500	10000	1020704	10	3	5/8	2.96	1.42	1.52	2.75	4.13	1.25	.98	5.68	1.71	3.94	.75	1.75		
18750	15000	1020713	15	3	3/4	4.75	1.63	1.58	2.75	4.37	1.38	1.10	6.49	2.04	4.46	.93	1.88		
31250	25000	1020722	25	4	7/8	8.59	2.00	2.33	3.75	6.00	1.75	1.41	7.97	2.27	5.51	1.06	2.25		
37500	30000	1020731	30	4	7/8	9.24	2.00	2.20	3.75	6.19	1.75	1.41	7.84	2.27	5.38	1.06	2.38		
50000	40000	1020740	40	5	1	15.7	2.25	2.91	4.75	7.25	2.25	1.78	9.45	2.44	6.45	1.22	3.09		
75000	60000	1020759	60	6	1-1/4	26.0	2.56	3.36	5.75	9.13	2.31	1.86	11.08	3.07	7.72	1.50	3.16		

\* Maximum Proof Load is 2 times the Working Load Limit at 4:1 design factor. Minimum Ultimate strength is 5 times the Working Load Limit.

### S-238 High Performance Sling Connector

Working Load Limit (lbs.)	S-238 Web to Web Assembly Stock No.	Frame No.	Nominal Sling Body Width (in.)	Weight Each (lbs.)	Dimensions (in.)										
					A	B	C	E	G	H	K	M	W		
5000	1020415	5	2	1.6	.88	1.42	2.00	3.18	1.00	.80	4.90	3.30	1.38		
10000	1020423	10	3	3.3	1.42	1.52	2.75	4.13	1.25	.98	5.72	3.76	1.75		
15000	1020432	15	3	4.9	1.63	1.58	2.75	4.37	1.38	1.10	6.16	3.96	1.88		
25000	1020441	25	4	10.1	2.00	2.33	3.75	6.00	1.75	1.41	8.40	5.58	2.25		
30000	1020450	30	4	11.4	2.00	2.20	3.75	6.19	1.75	1.41	8.14	5.32	2.38		
40000	1020469	40	5	20.7	2.25	2.91	4.75	7.25	2.25	1.78	10.48	6.92	3.09		
60000	1020478	60	6	32.0	2.56	3.36	5.75	9.13	2.31	1.86	11.72	8.00	3.16		

# Crosby Sling and Hoist Hooks

## Crosby® HOIST HOOKS

### WARNINGS & APPLICATION INSTRUCTIONS



**WARNING**

- Loads may disengage from hook if proper procedures are not followed.
- A falling load may cause serious injury or death.
- See OSHA Rule 1926.1431(g)(1)(i)(A) and 1926.1501(g)(4)(iv)(B) for personnel hoisting by cranes and derricks, and OSHA Directive CPL 2-136 - Interim Inspection Procedures During Construction Tower Construction Activities. A Crosby 319, L-320 or L-322 hook with a PL latch attached and secured with a bolt, nut and cotter pin (or toggle pin) may be used for lifting personnel. A Crosby 319N, L-320N or L-322N hook with an S-4320 latch attached and secured with cotter pin or bolt, nut and pin; or a PL-N latch attached and secured with toggle pin may be used for lifting personnel. A hook with a Crosby SS-4055 latch attached shall NOT be used for personnel lifting.
- See OSHA Directive CPL 2-136 - Crosby does not recommend the placement of lanyards directly into the positive locking Crosby hook when hoisting personnel. Crosby requires that all suspension systems (vertical lifelines / lanyard) shall be gathered at the positive locked load hook by use of a master link, or a bolt-type shackle secured with cotter pin.
- Threads may corrode and/or strip and drop the load.
- Remove securement nut to inspect or to replace L-322, S-3316, and S-3319 bearing washers (2).
- Hook must always support the load. The load must never be supported by the latch.
- Never apply more force than the hook's assigned Working Load Limit (WLL) rating.
- Read and understand these instructions before using hook.

Note: A latch will not work properly on a hook with a bent or worn tip.

- Never use a hook that is worn beyond the limits shown in Figure 1.
- Remove from service any hook with a crack, nick, or gouge. Hooks with a nick or gouge shall be repaired by grinding lengthwise, following the contour of the hook, provided that the reduced dimension is within the limits shown in Figure 1. Contact Crosby Engineering to evaluate any crack.
- Never repair, alter, rework, or reshape a hook by welding, heating, burning, or bending.
- Never side load, back load, or tip load a hook (Side loading, back loading and tip loading are conditions that damage and reduce the capacity of the hook). (See Figure 2.)
- Eye hooks, shank hooks and swivel hooks are designed to be used with wire rope or chain. Efficiency of assembly may be reduced when used with synthetic material.
- Do not swivel the L-322, S-3316, or S-3319 swivel hooks while supporting a load. These hooks are distinguishable by hex nuts and flat washers.
- The L-3322 swivel hook is designed to rotate under load. The L-3322 is distinguishable from the L-322 by use of a round nut designed to shield bearing.
- The frequency of bearing lubrication on the L-3322 depends upon frequency and period of product use as well as environmental conditions, which are contingent upon the user's good judgment.
- The use of a latch may be mandatory by regulations or safety codes; e.g., OSHA, MSHA, ANSI/ASME B30, Insurance, etc. (Note: When using latches, see instructions in "Understanding The Crosby Group Warnings" for further information.)
- Always make sure the hook supports the load. (See Figure 3). The latch must never support the load (See Figure 4).
- When multiple slings are placed in the base (bowl/saddle) of the hook, the maximum included angle between sling legs shall be 90 deg. The maximum sling leg angle with respect to the hook centerline for any rigging arrangement shall be 45 degrees. A collector ring, such as a link or shackle, should be used to maintain in-line load when more than two legs are placed in a hook or for angles greater than 45 degrees with respect to hook centerline. When more than two legs are placed in the hook bunching of the legs shall be avoided.
- See ASME B30.10 "Hooks" for additional information.

**QUIC-CHECK®** Hoist hooks incorporate markings forged into the product which address two (2) **QUIC-CHECK®** features:

1. **Deformation Indicators** – Two strategically placed marks, one just below the shank or eye and the other on the hook tip, which allows for a **QUIC-CHECK®** measurement to determine if the throat opening has changed, thus indicating abuse or overload. To **check**, use a measuring device (i.e., tape measure) to measure the distance between the marks. The marks should align to either an inch or half-inch increment on the measuring device. If the measurement does not meet criteria, the hook should be inspected further for possible damage.
2. **Angle Indicators** – Indicates the maximum included angle which is allowed between two (2) sling legs in the hook. These indicators also provide the opportunity to approximate other included angles between two sling legs.

**QUIC-CHECK®**



### IMPORTANT SAFETY INFORMATION - READ & FOLLOW

A visual periodic inspection for cracks, nicks, wear, gouges and deformation as part of a comprehensive documented inspection program, should be conducted by trained personnel in compliance with the schedule in ASME B30.10.

- For hooks used in frequent load cycles or pulsating loads, the hook and threads should be periodically inspected by Magnetic Particle or Dye Penetrant. (Note: Some disassembly may be required.)
- Never use a hook whose throat opening has been increased, or whose tip has been bent more than 10 degrees out of plane from the hook body, or is in any other way distorted or bent.

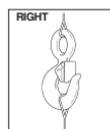
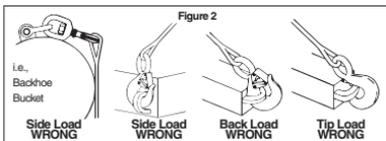
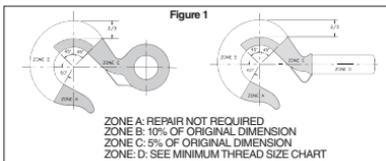


Figure 3



Figure 4



Figure 5

## Crosby® Eye Hooks



**L-320CN  
EYE HOOK**



**L-320C  
EYE HOOK**

All Crosby L-320 Eye Hoist Hooks incorporate the following features:

- The most complete line of Eye hoist hooks.
- Available in carbon steel and alloy steel.
- Designed with a 5:1 Design Factor for (Carbon Steel); 4.5:1 Design Factor for 30t - 60t (Alloy Steel).
- Eye hooks are load rated.
- Proper design, careful forging and precision controlled quenched and tempering give maximum strength without excessive weight and bulk.
- Every Crosby Eye Hook is equipped with a latch. Even years after purchase of the original hook, latch assemblies can be added.
- Chemical analysis and tensile tests performed on each PIC to verify chemistry and mechanical properties.
- Type Approval certification in accordance with ABS 2016 Steel Vessel and Guide for Certification of Lifting Appliances 2016 available. Certificates available when requested at time of order and may include additional charges.
- Meets ASME B30.10
- Hoist hooks incorporate two types of strategically placed markings forged into the product which address two (2) **QUIC-CHECK®** features:
- Deformation Indicators and Angle Indicators (see following page for detailed definition)

The following additional features have been incorporated in the new Crosby L-320N Eye Hoist Hooks. (Sizes 3/4 metric ton Carbon through 22 metric ton Alloy.)

- Metric Rated at 5:1 Design Factor for (Carbon Steel); 5:1 Design Factor for 1t - 22t (Alloy Steel).
- Can be proof tested to 2 times the Working Load Limit.
- Low profile hook tip
- New integrated latch (S-4320) meets the world-class standard for lifting.
  - Heavy duty stamped latch interlocks with the hook tip.
  - High cycle, long life spring.
  - When secured with proper cotter pin through the hole in the tip of hook, meets the intent of OSHA Rule 1926.1431(g) and 1926.1501(g) for personnel hoisting.



### L-320N / L-320 EYE HOOKS

Working Load Limit (t)		Hook ID Code	Eye Hook Stock No.			Weight Each (lb)	Replacement Latch Kits		
Carbon	Alloy		Carbon L-320C L-320CN S.C.	Carbon GL-320CN Galv.	Alloy L-320A L-320AN S.C.		S-4320 Stock No.	PL Stock No.	SS-4055 Stock No.
3/4	1	†D	1022205	1022208	1022380	.61	1096325	-	-
1	1-1/2	†F	1022216	1022219	1022391	.89	1096374	-	-
1-1/2	2	†G	1022227	1022230	1022402	1.44	1096421	-	-
2	3	†H	1022238	1022241	1022413	2.07	1096468	-	-
3	5	†I	1022246	1022249	1022424	4.30	1096515	1092000	-
5	7	†J	1022260	1022262	1022435	8.30	1096562	1092001	-
7-1/2	11	†K	1022271	1022274	1022446	15.00	1096609	1092002	-
10	15	†L	1022282	1022285	1022457	20.77	1096657	1092003	-
15	22	†N	1022293	1022296	1022468	39.50	1096704	1092004	-
20	30	O	1022302	-	1022477	60.00	-	1093716	1090161
25	37	P	1023306	-	1023565	105.00	-	1093717	1090189
30	45	S	1023324	-	1023583	148.00	-	1093718	1090189
40	60	T	1023342	-	1023609	228.00	-	1093719	1090205

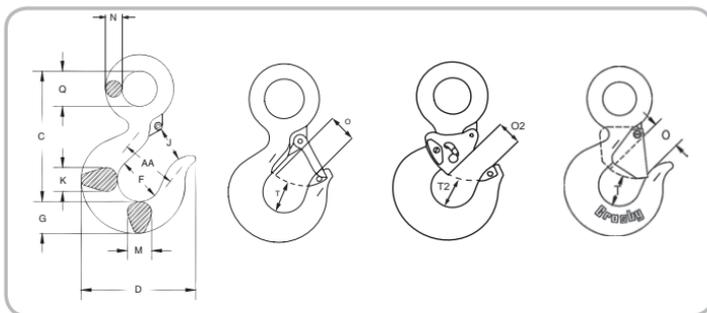
\*Eye Hooks (3/4 TC - 22TA), Proof load is 2 times Working Load Limit. Eye Hooks (20 TC - 60TA). All carbon hooks-average straightening load (ultimate load) is 5 times Working Load Limit. Alloy eye hooks 1 ton through 22 ton-average straightening load (ultimate load) is 5 times Working Load Limit. Alloy eye hooks 30 tons through 60 tons-average straightening load (ultimate load) is 4.5 times Working Load Limit. † New 320N style hook.

## Crosby® Eye Hooks



**L-320AN  
EYE HOOK**

- Hoist hooks incorporate markings forged into the product which address two (2) **QUIC-CHECK®** features.
- **Deformation Indicators** – Two strategically placed marks, one just below the shank or eye and the other on the hook tip, which allows for a **QUIC-CHECK®** measurement to determine if the throat opening has changed, thus indicating abuse or overload. To check, use a measuring device (i.e. tape measure) to measure the distance between the marks. The marks should align to either an inch or half-inch increment on the measuring device. If the measurement does not meet this criteria, the hook should be inspected further for possible damage.
- **Angle Indicators** – Indicates the maximum included angle which is allowed between two (2) sling legs in the hook. These indicators also provide the opportunity to approximate other included angles between two sling legs.



*Load Rated*

*Fatigue Rated*



### L-320N / L-320 EYE HOOKS

Hook ID Code*	Dimensions (in)													
	C	D	F	G	J	K	M	N	O †	O2 ††	Q	T †	T2 ††	AA**
D	3.34	2.83	1.25	.73	.90	.63	.63	.36	.89	-	.75	.87	-	1.50
F	3.81	3.11	1.38	.84	.93	.71	.71	.42	.91	-	.91	.98	-	2.00
G	4.14	3.53	1.50	1.00	1.00	.88	.88	.55	1.00	-	1.13	1.03	-	2.00
H	4.69	3.97	1.63	1.13	1.13	.94	.94	.58	1.09	-	1.25	1.16	-	2.00
I	5.77	4.81	2.00	1.44	1.47	1.31	1.31	.72	1.36	1.00	1.56	1.53	1.50	2.50
J	7.37	6.27	2.50	1.81	1.75	1.66	1.66	.90	1.61	1.31	2.00	1.96	1.88	3.00
K	9.07	7.45	3.00	2.25	2.29	1.88	1.83	1.11	2.08	1.81	2.44	2.47	2.25	4.00
L	10.08	8.30	3.25	2.59	2.50	2.19	1.94	1.27	2.27	2.00	2.84	2.62	2.31	4.00
N	12.53	10.30	4.25	3.00	3.30	2.69	2.38	1.56	3.02	2.75	3.50	2.83	2.56	5.00
O	14.06	13.62	5.00	3.62	4.00	3.00	3.00	1.75	3.25	-	3.50	3.44	-	6.50
P	18.19	14.06	5.38	4.56	4.25	3.75	3.19	2.00	3.00	-	4.50	3.88	-	7.00
S	20.12	15.44	6.00	5.06	4.75	4.50	3.25	2.18	3.38	-	4.94	4.75	-	8.00
T	23.72	18.50	7.00	6.00	5.75	5.50	3.91	2.53	4.12	-	5.69	5.69	-	10.00

\*Eye Hooks (3/4 TC-22TA). Proof load is 2 times Working Load Limit. Eye Hooks (20 TC-60TA). All carbon hooks - average straightening load (ultimate load) is 5 times Working Load Limit. Alloy eye hooks 11 through 22 - average straightening load (ultimate load) is 5 times Working Load Limit. Alloy eye hooks 30 through 60 - average straightening load (ultimate load) is 4.5 times Working Load Limit.

\*\* Deformation Indicators † 3/4C - 22A dimensions shown are for S-4320 Latch Kits. Dimensions for "O" frame size and larger are for PL Latch Kits.

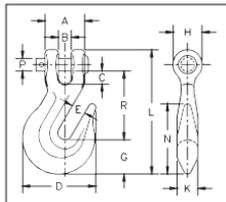
†† Dimensions are for PL-N latch kits.

## Crosby® Chain Hooks



**H-330 / A-330**  
Clevis Grab Hook

- Forged Steel - Quenched and Tempered.
- Design factor is 4:1.
- Features quick and easy assembly.
- H-330 designed for Grade 4 chain.
- A-330 designed for Grade 7 chain.



### H-330 / A-330 Clevis Grab Hooks

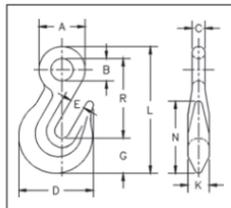
Chain Size (in)	Stock No.		Working Load Limit (lb)		Weight Each (lb)	Dimensions (in)											
	H-330 Carbon	A-330 Alloy*	H-330 Carbon	A-330 Alloy		A	B	C	D	E	G	H	K	L	N	P	R
	1/4	1027105	1027249*	2600		3500	.36	1.00	.32	.31	1.81	.34	.88	.72	.47	3.05	1.75
5/16	1027123	1027267*	3900	4700	.62	1.22	.43	.36	2.12	.44	.97	.91	.59	3.66	2.06	.38	2.02
3/8	1027141	1027285*	5400	7100	1.00	1.42	.48	.49	2.53	.50	1.17	1.00	.72	4.42	2.34	.44	2.41
7/16	1027169	1027301	7200	8750	1.31	1.66	.66	.62	3.09	.56	1.31	1.13	.69	4.94	2.66	.56	2.75
1/2	1027187	1027329*	9200	12000	2.22	1.88	.57	.51	3.56	.66	1.53	1.25	.78	5.72	2.97	.63	3.19
5/8	1027203	1027347	13000	18100	4.41	2.31	.71	.67	4.39	.78	1.78	1.56	1.09	6.83	4.31	.75	4.09
3/4	1027221	1027365	20200	24700	6.50	2.62	.94	.94	5.22	.94	2.13	1.88	1.31	8.13	5.09	.88	4.63

\* These A-330 hooks are forged with an "8" designating Grade 80, and are suitable for use with Grade 8 chain in overhead lifting applications as long as hook is proof-tested as part of the chain sling assembly or as an individual component per ASME B30.9. We recommend the use of the A-338 which is proof tested and supplied with a proof test certificate



**H-323 / A-323**  
Eye Grab Hook

- Forged Steel - Quenched and Tempered.
- Design Factor is 4:1.
- H-323 designed for Grade 4 chain.
- A-323 designed for Grade 7 chain.



### H-323 / A-323 Eye Grab Hooks

Chain Size (in)	Stock No.		Working Load Limit (lb)		Weight Each (lb)	Dimensions (in)										
	H-323 Carbon	A-323 Alloy*	H-323	A-323		A	B	C	D	E	G	K	L	N	R	
	1/4	1026204	1026384*	2600		3500	.28	1.09	.53	.31	1.81	.34	.88	.47	3.05	1.75
5/16	1026222	1026400*	3900	4700	.45	1.31	.62	.38	2.12	.44	.97	.59	3.59	2.06	2.28	
3/8	1026240	1026428*	5400	7100	.79	1.56	.75	.44	2.53	.50	1.17	.72	4.28	2.34	2.69	
1/2	1026286	1026464*	9200	12000	1.75	1.94	.88	.53	3.56	.66	1.53	.78	5.44	2.97	3.38	
5/8	1026302	1026482*	13000	18100	3.25	2.48	1.16	.66	4.41	.79	1.89	1.16	6.82	4.25	4.25	
3/4	1026320	1026507	20200	24700	5.94	2.88	1.38	.75	5.22	.94	2.13	1.31	8.06	5.09	5.16	

\* These A-323 hooks are forged with an "8" designating Grade 80, and are suitable for use with Grade 8 chain in overhead lifting applications as long as hook is proof-tested as part of the chain sling assembly or as an individual component per ASME B30.9. We recommend the use of the A-338 which is proof tested and supplied with a proof test certificate

## Crosby® Hooks Barrel • Replacement • Sorting



**S-377  
BARREL HOOKS**

- Forged Carbon Steel - Quenched and Tempered.
- Meets the performance requirements of Federal Specification RR-C-271G, Type V, Class 6, except for those provisions required of the contractor.



### S-377 Barrel Hooks

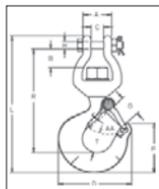
Working Load Limit Per Pair (Tons)*	S-377 Stock No. Per Pair	Weight Each Per Pair (lb)	Dimensions (in)			
			I.D. of Eye	O.D. of Eye	Overall Length	Width of Lip
1	1028248	3.56	1.56	2.81	5.00	2.88

\*Ultimate Load is 4 times the Working Load Limit.



**S-3316  
REPLACEMENT HOOK**

- Easily attaches to any chain and electric hoist with welded link load chain, roller chain or wire rope with suitable end fitting
- Swivel jaw is forged.
- Suitable for infrequent, non-continuous rotation under load.
- Use in corrosive environment requires shank and nut inspection in accordance with ASME B30.10-1.10.4(b)(5)(c).



Load Rated



### S-3316 Replacement Hook

Working Load Limit (Tons)*	Frame Code	S-3316 Stock No.	Weight Each (lb)	Dimensions (in)									Replacement Latch Kit Stock No.	
				A	B	C	D	H	L	O	P	R		T
1/2	F	1023029	1.25	1.31	.76	.56	3.19	.38	6.12	.97	2.25	4.59	.81	1096374
1	H	1023047	2.61	1.56	1.00	.69	4.09	.44	7.69	1.12	2.84	5.81	1.19	1096468

\*Ultimate Load is 5 times the Working Load Limit.



**A-378  
SORTING  
HOOK**

- Forged Alloy Steel - Quenched and Tempered.
- Deep straight throat permits efficient handling of flat plates or large cylindrical shapes.



**A-378  
SORTING  
HOOK**

### A-378 Sorting Hook

Working Load Limit at tip of Hook (Tons)*	Working Load Limit at bottom of Hook (Tons)*	A-378 Stock No	Style	Weight Each (lb)	Dimensions (in)			
					I.D. of Eye	Overall Length	Opening at top of Hook	Radius at bottom of Hook
2	7-1/2	1028024	No Handle	6.42	1.38	9.69	2.81	.625
2	7-1/2	1028033	With Handle	6.42	1.38	9.69	2.81	.625

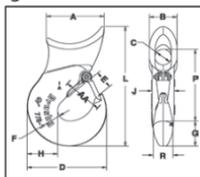
\*Ultimate Load is 4 times the Working Load Limit.

## Crosby® Hooks Sliding Choker • Snap • Reverse Eye



**A-350L**  
SLIDING CHOKER HOOK

- New style incorporates throat opening equal to or larger than old style hooks.
- Each product has a Product Identification Code (PIC) for material traceability, along with a Working Load Limit, and the name Crosby or "CG" forged into it.
- All hooks incorporate Crosby's patented QUIC-CHECK® marks to help in determining if throat opening dimension has changed.
- Each hook is equipped with a Crosby S-4320 heavy duty stamped latch with the high cycle, long life spring.
- Forged Alloy Steel -- Quenched and Tempered.



### A-350L Sliding Choker Hook

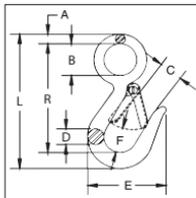
Single Part Rope Size (in)	Eight Part Rope Size (in)	A-350L Stock No.	Working Load Limit (lb)	Weight Each (lb.)	Dimensions (in)													Hook Frame Code	Replacement Latch Kit Stock No.
					A	B	C	D	E	F	G	H	L	P	R	AA**			
3/8	-	1011802	2500	1.0	2.06	1.13	.63	2.41	.63	.38	.84	.91	4.28	2.59	.63	1.50	D	1096325	
1/2	1/8	1011811	3800	1.4	2.25	1.31	.75	2.97	.78	.50	.97	1.06	4.97	3.09	.75	1.50	F	1096374	
† 5/8	-	1011820	5800	3.0	3.06	1.63	.75	3.56	.94	.56	1.13	1.31	6.38	3.88	1.00	2.00	G	1096421	
† 5/8	3/16	1011839	5800	2.7	3.06	1.63	1.00	3.56	.94	.56	1.13	1.31	6.38	4.00	1.13	2.00	G	1096421	
† 3/4	-	1011848	8200	4.4	3.38	2.13	1.00	4.25	1.16	.63	1.44	1.63	7.66	4.58	1.13	2.50	H	1096468	
† 3/4	1/4	1011857	8200	3.8	3.38	2.13	1.44	4.25	1.16	.63	1.44	1.63	7.66	4.78	1.13	2.50	H	1096468	
†† 7/8-1	-	1028177	15000	9.70	4.41	2.12	1.25	6.06	1.41	.88	2.00	2.33	9.55	5.72	1.50	3.00	I	1096515	

\*\* Deformation Indicators. † Determine EYE diameter "C", before ordering. †† 7/8-1" is Cast Steel.



**G-3315**  
SNAP HOOK

- Forged Carbon Steel -- Quenched and Tempered.
- Pressed steel latches and stainless steel springs, bolts and nuts.
- For replacement latch kit, order Stock No. 9900299.
- Hook Body -- Galvanized.



### G-3315 Snap Hook

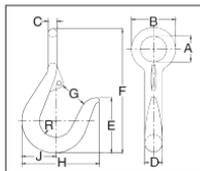
Hook Size (in)	G-3315 Stock No.	Working Load Limit (lb)**	Weight Each (lb)	Dimensions (in)							
				A	B	C	D	E	F	L	R
7/16	1023056	750	.23	.25	.75	.75	.44	2.25	.75	3.94	3.25
9/16	1023074	1000	.48	.34	1.12	.81	.56	2.69	.88	4.75	3.84

\*Ultimate Load is 4 times the Working Load Limit.



**1210 Round**  
REVERSE  
EYE HOOK

- Forged Carbon Steel -- Galvanized.



### 1210 Round Reverse Eye Hook

Size (in)	1210 Stock No.	Working Load Limit (lb)**	Weight Each (lb)	Latch Stock No.	Dimensions (in)									
					A	B	C	D	E	F	G	H	J	R
1/2	919019	300	.4	1090027	.81	1.38	.28	.50	1.62	4.00	.75	2.25	.97	.47
5/8	919037	400	.6	1090027	.94	1.56	.31	.62	2.00	4.50	.94	2.75	1.22	.59
3/4	919055	700	1.1	1090045	1.12	1.88	.38	.75	2.25	5.25	1.06	3.00	1.44	.69
7/8	919073	1200	1.6	1096468	1.19	2.06	.44	.88	3.00	6.50	1.25	3.38	1.63	.75
1 - 1-1/8	919091	1800	2.0	1090081	1.50	2.75	.62	1.12	3.50	8.00	1.50	4.38	2.00	.94
1-1/4 - 1-3/8	919135	2700	5.5	1090081	1.88	3.50	.81	1.38	4.00	9.12	1.62	5.00	2.38	1.06

\*Ultimate Load is 4 times the Working Load Limit.

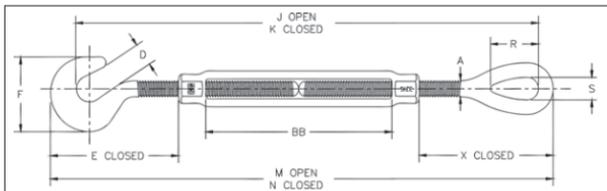
## Hook & Eye Turnbuckles



**HG -225**  
Hook & Eye

Meets the performance requirements of Federal Specifications FF-791b, Type 1 Form 1 - CLASS 6, and ASTM F-1145, except for those provisions required of the contractor.

- End fittings are Quenched and Tempered or Normalized, bodies heat treated by normalizing.
  - Hot Dip galvanized steel.
  - Turnbuckle eyes are forged elongated, by design, to maximize easy attachment in system and minimize stress in the eye. For turnbuckles sizes 1/4" through 1", a shackle one size smaller can be reeved through eye.
  - Turnbuckle hooks are forged with a greater cross sectional area that results in a stronger hook with better fatigue properties.
  - **TURNBUCKLES RECOMMENDED FOR STRAIGHT OR IN-LINE PULL ONLY.**
  - Modified UNJ thread on end fittings for improved fatigue propertie
  - Body has UNC threads.
- Fatigue Rated.
  - Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these turnbuckles meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.



**OT** Fatigue Rated

### HG-225 Hook & Eye

Thread Dia. & Take Up (in)	HG-225 Stock No.	Working Load Limit (lb)*	Weight Each (lb)	Dimensions (in)												
				A	D	E Closed	F	J Open	K Closed	M Open	N Closed	R	S	X Closed	BB	
† 1/4 x 4	1030636	400	.31	25	.44	167	127	11.66	7.66	12.29	8.29	.81	.34	1.76	4.07	
† 5/16 x 4-1/2	1030654	700	.50	.31	.50	2.00	1.50	13.50	9.00	14.28	9.78	.95	.44	2.20	4.58	
† 3/8 x 6	1030672	1000	.79	.38	.56	2.28	1.76	17.09	11.09	18.04	12.04	1.13	.53	2.48	6.10	
1/2 x 6	1030690	1500	1.80	.50	.65	3.53	2.28	19.57	13.57	20.79	14.79	1.41	.71	3.56	6.03	
1/2 x 12	1030734	1500	2.70	.50	.65	3.51	2.28	31.86	19.86	33.08	21.08	1.41	.71	3.54	12.36	
5/8 x 6	1030752	2250	2.98	.63	.90	4.24	2.81	21.11	15.11	22.61	16.61	1.80	.88	4.35	6.03	
5/8 x 12	1030798	2250	4.35	.63	.90	4.23	2.81	33.45	21.45	34.95	22.95	1.80	.88	4.34	12.39	
3/4 x 6	1030814	3000	4.21	.75	.98	5.07	3.33	22.61	16.61	24.45	18.45	2.09	1.00	5.12	6.13	
3/4 x 12	1030850	3000	6.52	.75	.98	5.04	3.33	35.01	23.01	36.85	24.85	2.09	1.00	5.09	12.59	
3/4 x 18	1030878	3000	8.24	.75	.98	5.07	3.33	47.01	29.01	48.85	30.85	2.09	1.00	5.12	18.53	
7/8 x 12	1030896	4000	9.34	.88	1.13	5.82	3.78	36.11	24.11	38.23	26.23	2.38	1.25	5.79	12.16	
1 x 12	1030958	5000	13.9	1.00	1.25	6.56	4.25	37.65	25.65	40.06	28.06	3.00	1.43	6.50	12.18	

\*Proof Load is 2.5 times the Working Load Limit. Ultimate Load is 5 times the Working Load Limit. † Mechanical Galvanized

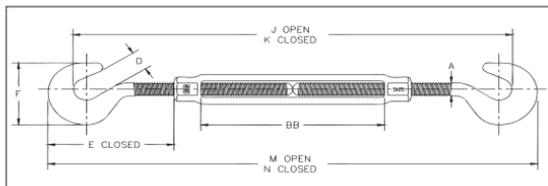
## Hook & Hook Turnbuckles



**HG -223**  
Hook & Hook

Meets the performance requirements of Federal Specifications FF-791b, Type 1 Form 1 - CLASS 5, and ASTM F-1145, except for those provisions required of the contractor.

- End fittings are Quenched and Tempered or Normalized, bodies heat treated by normalizing.
  - Hot Dip galvanized steel.
  - Hooks are forged with a greater cross sectional area that results in a stronger hook with better fatigue properties.
  - **TURNBUCKLES RECOMMENDED FOR STRAIGHT OR IN-LINE PULL ONLY.**
  - Modified UNJ thread on end fittings for improved fatigue properties
  - Body has UNC threads.
- 
- Fatigue Rated.
  - Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these turnbuckles meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.



### HG-223 Hook & Hook

Thread Dia. & Take Up (in)	HG-223 Stock No.	Working Load Limit (lb)*	Weight Each (lb)	Dimensions (in)										
				A	D	E Closed	F	J Open	K Closed	M Open	N Closed	BB		
† 1/4 x 4	1030011	400	.33	.25	.44	1.67	1.27	9.79	7.38	12.20	8.20	4.07		
† 5/16 x 4-1/2	1030039	700	.52	.31	.50	2.00	1.50	11.58	8.58	14.08	9.58	4.58		
† 3/8 x 6	1030057	1000	.83	.38	.56	2.28	1.77	15.23	10.62	17.84	11.84	6.10		
1/2 x 6	1030075	1500	1.88	.50	.65	3.53	2.28	17.98	13.20	20.76	14.76	6.03		
1/2 x 12	1030119	1500	2.77	.50	.65	3.51	2.28	30.27	19.49	33.05	21.05	12.36		
5/8 x 6	1030137	2250	3.21	.63	.90	4.24	2.81	19.50	14.50	22.50	16.50	6.03		
5/8 x 12	1030173	2250	4.58	.63	.90	4.23	2.81	31.84	20.84	34.84	22.84	12.39		
3/4 x 6	1030191	3000	4.20	.75	.98	5.07	3.33	21.19	15.98	24.40	18.40	6.13		
3/4 x 12	1030235	3000	6.92	.75	.98	5.04	3.33	33.59	22.38	36.80	24.80	12.59		
3/4 x 18	1030253	3000	8.65	.75	.98	5.07	3.33	45.59	28.38	48.80	30.80	18.53		
7/8 x 12	1030271	4000	9.85	.88	1.13	5.82	3.78	34.89	23.52	38.26	28.26	12.16		
1 x 12	1030333	5000	14.8	1.00	1.25	6.56	4.25	36.59	25.06	40.12	28.12	12.18		

\*Proof Load is 2.5 times the Working Load Limit. Ultimate Load is 5 times the Working Load Limit. † Mechanical Galvanized

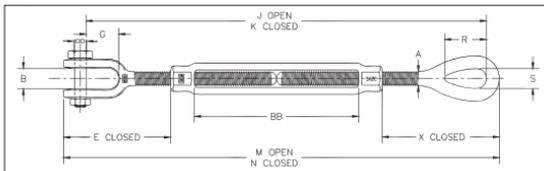
## Jaw & Eye Turnbuckles



HG-227  
Jaw & Eye

Meets the performance requirements of Federal Specifications FF-791b, Type 1 Form 1 - CLASS 8, and ASTM F-1145, except for those provisions required of the contractor.

- End fittings are Quenched and Tempered or Normalized, bodies heat treated by normalizing.
  - Hot Dip galvanized steel.
  - Turnbuckles eyes are forged and elongated, by design, to maximize easy attachment in system and minimize stress in the eye. For turnbuckles size 1/4" through 2-1/2", a shackle one size smaller can be reeved through eye.
  - Forged jaw ends are fitted with bolts and nuts for 1/4" through 5/8", and pins and cotters on 3/4" through 2-3/4" sizes.
  - Modified UNJ thread on end fittings for improved fatigue properties
  - Body has UNC threads.
  - **TURNBUCKLES RECOMMENDED FOR STRAIGHT OR IN-LINE PULL ONLY.**
- 
- Fatigue Rated.
  - Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these turnbuckles meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.



### HG-227 Jaw & Eye

Thread Dia. & Take Up (in)	HG-227 Stock No.	Working Load Limit (lb)*	Weight Each (lb)	Dimensions (in)															
				A	B	E Closed	G	J Open	K Closed	M Open	N Closed	R	S	X Closed	BB				
† 1/4 x 4	1031877	500	.33	25	.45	1.66	.64	11.57	7.57	12.28	8.28	.81	.34	1.76	4.07				
† 5/16 x 4-1/2	1031895	800	.52	.31	.50	2.02	.87	13.50	9.00	14.30	9.80	.95	.44	2.20	4.58				
† 3/8 x 6	1031911	1200	.80	.38	.53	2.11	.85	16.91	10.91	17.87	11.87	1.13	.53	2.48	6.10				
1/2 x 6	1031939	2200	1.77	.50	.64	3.22	1.07	19.30	13.30	20.48	14.48	1.41	.71	3.56	6.03				
1/2 x 9	1031957	2200	2.25	.50	.64	3.20	1.07	25.59	16.59	26.77	17.77	1.41	.71	3.54	9.36				
1/2 x 12	1031975	2200	2.67	.50	.64	3.20	1.07	31.59	19.59	32.77	20.77	1.41	.71	3.54	12.36				
5/8 x 6	1031993	3500	2.98	.63	.79	3.90	1.32	20.73	14.73	22.27	16.27	1.80	.88	4.35	6.03				
5/8 x 9	1032019	3500	3.72	.63	.79	3.89	1.32	27.07	18.07	28.61	19.61	1.80	.88	4.34	9.39				
5/8 x 12	1032037	3500	4.35	.63	.79	3.89	1.32	33.07	21.07	34.61	22.61	1.80	.88	4.34	12.39				
3/4 x 6	1032055	5200	4.51	.75	.97	4.71	1.52	22.17	16.17	24.09	18.09	2.09	1.00	5.12	6.13				
3/4 x 9	1032073	5200	5.56	.75	.97	4.68	1.52	28.57	19.57	30.49	21.49	2.09	1.00	5.09	9.59				
3/4 x 12	1032091	5200	6.42	.75	.97	4.68	1.52	34.57	22.57	36.49	24.49	2.09	1.00	5.09	12.59				
3/4 x 18	1032117	5200	8.14	.75	.97	4.71	1.52	46.57	28.57	48.49	30.49	2.09	1.00	5.12	18.53				
7/8 x 12	1032135	7200	9.10	.88	1.16	5.50	1.77	35.68	23.68	37.91	25.91	2.38	1.25	7.19	12.16				
7/8 x 18	1032153	7200	11.6	.88	1.16	5.50	1.77	48.15	30.15	50.38	32.38	2.38	1.25	5.79	18.63				
1 x 6	1032171	10000	10.0	1.00	1.34	6.09	2.05	25.03	19.03	27.59	21.59	3.00	1.43	6.50	6.18				
1 x 12	1032199	10000	13.4	1.00	1.34	6.09	2.05	37.03	25.03	39.59	27.59	3.00	1.43	6.50	12.18				
1 x 18	1032215	10000	16.7	1.00	1.34	6.09	2.05	49.03	31.03	51.59	33.59	3.00	1.43	6.50	18.18				
1 x 24	1032233	10000	20.6	1.00	1.34	6.06	2.05	61.63	37.63	64.19	40.19	3.00	1.43	6.47	24.84				
1-1/4 x 12	1032251	15200	20.9	1.25	1.84	8.09	2.82	40.76	28.76	43.98	31.98	3.59	1.82	8.49	12.06				
1-1/4 x 18	1032279	15200	24.8	1.25	1.84	8.09	2.82	52.76	34.76	55.98	37.98	3.59	1.82	8.49	18.06				
1-1/4 x 24	1032297	15200	28.8	1.25	1.84	8.09	2.82	65.32	41.32	68.54	44.54	3.59	1.82	8.49	24.62				
1-1/2 x 12	1032313	21400	30.6	1.50	2.06	8.93	2.81	42.50	30.50	46.21	34.21	4.09	2.12	9.46	12.32				
1-1/2 x 18	1032331	21400	36.0	1.50	2.06	8.93	2.81	54.50	36.50	58.21	40.21	4.09	2.12	9.46	18.32				
1-1/2 x 24	1032359	21400	41.5	1.50	2.06	8.93	2.81	67.12	43.12	70.83	46.83	4.09	2.12	9.46	24.94				
1-3/4 x 18	1032395	28000	52.1	1.75	2.60	9.36	3.35	55.37	37.37	59.77	41.77	4.65	2.38	9.97	18.37				
1-3/4 x 24	1032411	28000	59.7	1.75	2.60	9.36	3.35	67.57	43.57	71.77	47.77	4.65	2.38	9.97	24.37				
2 x 24	1032439	37000	89.9	2.00	2.62	11.80	3.74	72.66	48.66	77.95	53.95	5.81	2.69	13.03	24.48				
2-1/2 x 24	1032457	60000	158	2.50	3.06	13.26	4.44	76.08	52.08	82.68	58.68	6.49	3.12	13.76	24.60				
2-3/4 x 24	1032475	75000	187	2.75	3.69	14.92	4.19	78.05	54.05	85.67	61.67	7.00	3.25	15.09	24.65				

\*Proof Load is 2.5 times the Working Load Limit. Ultimate Load is 5 times the Working Load Limit. † Mechanical Galvanized

## Eye & Eye Turnbuckles

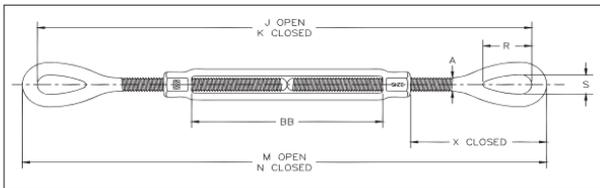


**HG-226**  
Eye & Eye

Meets the performance requirements of Federal Specifications FF-791b, Type 1 Form 1 - CLASS 4, and ASTM F-1145, except for those provisions required of the contractor.

- End fittings are Quenched and Tempered or Normalized, bodies heat treated by normalizing.
- Hot Dip galvanized steel.
- Turnbuckle eyes are forged elongated, by design, to maximize easy attachment in system and minimize stress in the eye. For turnbuckle sizes 1/4" through 2-1/2", a shackle one size smaller can be reeved through eye.
- Modified UNJ thread on end fittings for improved fatigue properties. Body has UNC thread
- **TURNBUCKLES RECOMMENDED FOR STRAIGHT OR IN-LINE PULL ONLY.**

- Fatigue Rated.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these turnbuckles meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.



### HG-226 Eye & Eye

Thread Dia. & Take Up (in)	HG-226 Stock No.	Working Load Limit (lb)*	Weight Each (lb)	Dimensions (in)								
				A	J Open	K Closed	M Open	N Closed	R	S	X Closed	BB
† 1/4 x 4	1031252	500	29	25	11.94	7.94	12.38	8.38	.81	.34	1.76	4.07
† 5/16 x 4-1/2	1031270	800	48	31	13.92	9.42	14.48	9.98	.95	.44	2.20	4.58
† 3/8 x 6	1031298	1200	75	38	17.56	11.56	18.24	12.24	1.13	.53	2.48	6.10
1/2 x 6	1031314	2200	1.72	50	19.94	13.94	20.82	14.82	1.41	.71	3.56	6.03
1/2 x 12	1031350	2200	2.63	50	32.23	20.23	33.11	21.11	1.41	.71	3.54	12.36
5/8 x 6	1031378	3500	2.75	63	21.72	15.72	22.72	16.72	1.80	.88	4.35	6.03
5/8 x 12	1031412	3500	4.12	63	34.06	22.06	35.06	23.06	1.80	.88	4.34	12.39
3/4 x 6	1031430	5200	4.22	75	23.24	17.24	24.50	18.50	2.09	1.00	5.12	6.13
3/4 x 12	1031476	5200	6.12	75	35.64	23.64	36.90	24.90	2.09	1.00	5.09	12.59
3/4 x 18	1031494	5200	7.83	75	47.64	29.64	48.90	30.90	2.09	1.00	5.12	18.53
7/8 x 12	1031519	7200	8.83	88	36.70	24.70	38.20	26.20	2.38	1.25	5.79	12.16
7/8 x 18	1031537	7200	11.5	88	49.17	31.17	50.67	32.67	2.38	1.25	5.79	18.63
1 x 6	1031555	10000	9.62	100	26.24	20.24	28.00	22.00	3.00	1.43	6.50	6.18
1 x 12	1031573	10000	13.0	100	38.24	26.24	40.00	28.00	3.00	1.43	6.50	12.18
1 x 18	1031591	10000	16.3	100	50.24	32.24	52.00	34.00	3.00	1.43	6.50	18.18
1 x 24	1031617	10000	20.2	100	62.84	38.84	64.60	40.60	3.00	1.43	6.47	24.84
1-1/4 x 12	1031635	15200	19.9	125	42.14	30.14	44.38	32.38	3.59	1.82	8.49	12.06
1-1/4 x 18	1031653	15200	23.8	125	54.14	36.14	56.38	38.38	3.59	1.82	8.49	18.06
1-1/4 x 24	1031671	15200	27.8	125	66.70	42.70	68.94	44.94	3.59	1.82	8.49	24.62
1-1/2 x 12	1031699	21400	28.7	150	44.24	32.24	46.74	34.74	4.09	2.12	9.46	12.32
1-1/2 x 18	1031715	21400	34.1	150	56.24	38.24	58.74	40.74	4.09	2.12	9.46	18.32
1-1/2 x 24	1031733	21400	39.6	150	68.86	44.86	71.36	47.36	4.09	2.12	9.46	24.94
1-3/4 x 18	1031779	28000	50.7	175	57.38	39.38	60.38	42.38	4.65	2.38	9.97	18.37
1-3/4 x 24	1031797	28000	58.2	175	69.38	45.38	72.38	48.38	4.65	2.38	9.97	24.37
2 x 24	1031813	37000	83.5	200	75.68	51.68	79.18	55.18	5.81	2.69	13.03	24.48
2-1/2 x 24	1031831	60000	149	250	79.18	55.18	83.18	59.18	6.49	3.12	13.76	24.60
2-3/4 x 24	1031859	75000	174	275	81.34	57.34	85.84	61.84	7.00	3.25	15.09	24.65

\*Proof Load is 2.5 times the Working Load Limit. Ultimate Load is 5 times the Working Load Limit. † Mechanical Galvanized

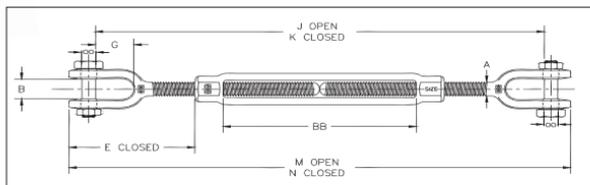
## Jaw & Jaw Turnbuckles



**HG-228**  
Jaw & Jaw

Meets the performance requirements of Federal Specifications FF-791b, Type 1 Form 1 - CLASS 7, and ASTM F-1145, except for those provisions required of the contractor.

- End fittings are Quenched and Tempered or Normalized, bodies heat treated by normalizing.
  - Hot Dip galvanized steel.
  - **TURNBUCKLES RECOMMENDED FOR STRAIGHT OR IN-LINE PULL ONLY.**
  - Forged jaw ends are fitted with bolts and nuts for 1/4" through 5/8", and pins and cotters for 3/4" through 2-3/4" sizes.
  - Modified UNJ thread on end fittings for improved fatigue properties
  - Body has UNC threads.
- 
- Fatigue Rated.
  - Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these turnbuckles meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.



**QTF** Fatigue Rated

### HG-228 Jaw & Jaw

Thread Dia. & Take Up (in)	HG-228 Stock No.	Working Load Limit (lb)*	Weight Each (lb)	Dimensions (in)								
				A	B	E Closed	G	J Open	K Closed	M Open	N Closed	BB
† 1/4 x 4	1032493	500	.37	25	.45	1.66	.64	11.19	7.19	12.18	8.18	4.07
† 5/16 x 4-1/2	1032518	800	.56	.31	.50	2.02	.87	13.07	8.57	14.12	9.62	4.58
† 3/8 x 6	1032536	1200	.85	.38	.53	2.11	.85	16.25	10.25	17.50	11.50	6.10
1/2 x 6	1032554	2200	1.82	.50	.64	3.22	1.07	18.65	12.65	20.14	14.14	6.03
1/2 x 9	1032572	2200	2.29	.50	.64	3.20	1.07	24.94	15.94	26.43	17.43	9.36
1/2 x 12	1032590	2200	2.71	.50	.64	3.20	1.07	30.94	18.94	32.43	20.43	12.36
5/8 x 6	1032616	3500	3.21	.63	.79	3.90	1.32	19.74	13.74	21.82	15.82	6.03
5/8 x 9	1032634	3500	3.95	.63	.79	3.89	1.32	26.08	17.08	28.16	19.16	9.39
5/8 x 12	1032652	3500	4.58	.63	.79	3.89	1.32	32.08	20.08	34.16	22.16	12.39
3/4 x 6	1032670	5200	4.80	.75	.97	4.71	1.52	21.09	15.09	23.68	17.68	6.13
3/4 x 9	1032698	5200	5.85	.75	.97	4.68	1.52	27.49	18.49	30.08	21.08	9.59
3/4 x 12	1032714	5200	6.72	.75	.97	4.68	1.52	33.49	21.49	36.08	24.08	12.59
3/4 x 18	1032732	5200	8.45	.75	.97	4.71	1.52	45.49	27.49	48.08	30.08	18.53
7/8 x 12	1032750	7200	9.37	.88	1.16	5.50	1.77	34.65	22.65	37.62	25.62	12.16
7/8 x 18	1032778	7200	11.8	.88	1.16	5.50	1.77	47.12	29.12	50.09	32.09	18.63
1 x 6	1032796	10000	10.4	1.00	1.34	6.09	2.05	23.82	17.82	27.18	21.18	6.18
1 x 12	1032812	10000	13.8	1.00	1.34	6.09	2.05	35.82	23.82	38.19	27.18	12.18
1 x 18	1032830	10000	17.1	1.00	1.34	6.09	2.05	47.82	29.82	51.18	33.18	18.18
1 x 24	1032858	10000	21.0	1.00	1.34	6.06	2.05	60.42	36.42	63.78	39.78	24.84
1-1/4 x 12	1032876	15200	21.9	1.25	1.84	8.09	2.82	39.37	27.37	43.58	31.58	12.06
1-1/4 x 18	1032894	15200	25.9	1.25	1.84	8.09	2.82	51.37	33.37	55.58	37.58	18.06
1-1/4 x 24	1032910	15200	29.8	1.25	1.84	8.09	2.82	63.93	39.93	68.14	44.14	24.62
1-1/2 x 12	1032938	21400	32.6	1.50	2.06	8.93	2.81	40.76	28.76	45.68	33.68	12.32
1-1/2 x 18	1032956	21400	38.0	1.50	2.06	8.93	2.81	52.76	34.76	57.68	39.68	18.32
1-1/2 x 24	1032974	21400	43.5	1.50	2.06	8.93	2.81	65.38	41.38	70.30	46.30	24.94
1-3/4 x 18	1033018	28000	53.5	1.75	2.60	9.36	3.35	53.35	35.35	59.16	41.16	18.37
1-3/4 x 24	1033036	28000	61.1	1.75	2.60	9.36	3.35	65.35	41.35	71.16	47.16	24.37
2 x 24	1033054	37000	96.3	2.00	2.62	11.80	3.74	69.64	45.64	76.72	52.72	24.48
2-1/2 x 24	1033072	60000	167	2.50	3.06	13.26	4.44	72.97	48.97	82.18	58.18	24.60
2-3/4 x 24	1033090	75000	199	2.75	3.69	14.92	4.19	74.75	50.75	85.50	61.50	24.65

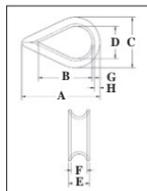
\*Proof Load is 2.5 times the Working Load Limit. Ultimate Load is 5 times the Working Load Limit. † Mechanical Galvanized

## Wire Rope Thimbles



G-411

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



### Standard Wire Rope Thimbles

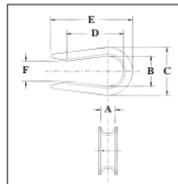
Rope Dia.		G-411 Stock No	Weight Per 100 (lb)	Dimensions (in)							
(in)	(mm)			A	B	C	D	E	F	G	H
1/8	3-4	1037256	3.50	1.94	1.31	1.06	.69	.25	.16	.05	.13
3/16	5	1037274	3.50	1.94	1.31	1.06	.69	.31	.22	.05	.13
1/4	6-7	1037292	3.50	1.94	1.31	1.06	.69	.38	.28	.05	.13
5/16	8	1037318	4.00	2.13	1.50	1.25	.81	.44	.34	.05	.13
3/8	9-10	1037336	6.70	2.38	1.63	1.47	.94	.53	.41	.06	.16
1/2	11-13	1037354	12.50	2.75	1.88	1.75	1.13	.69	.53	.08	.19
5/8	16	1037372	34.50	3.50	2.25	2.38	1.38	.91	.66	.13	.34
3/4	18-20	1037390	47.10	3.75	2.50	2.69	1.63	1.08	.78	.14	.34
7/8	22	1037416	84.60	5.00	3.50	3.19	1.88	1.27	.94	.16	.44
1	24-26	1037434	97.50	5.69	4.25	3.75	2.50	1.39	1.06	.16	.41
1-1/8 - 1-1/4	28-32	1037452	175.00	6.25	4.50	4.31	2.75	1.75	1.31	.22	.50

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



G-408  
(Open Pattern)

- Hot Dip galvanized Steel.
- Recommended for light duty applications in which it is being assembled into another fitting (i.e., shackle or master link).



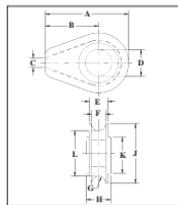
### Open Pattern Thimbles

Rope Dia.		G-408 Stock No	Weight Per 100 (lb)	Dimensions (in)					
(in)	(mm)			A	B	C	D	E	F
1/4	6-7	1037531	3.00	.28	.69	1.06	1.41	2.03	.38
5/16	8	1037559	3.80	.34	.81	1.25	1.53	2.16	.50
3/8	9-10	1037577	7.00	.44	.94	1.47	1.72	2.47	.62
1/2	11-13	1037595	12.50	.53	1.12	1.75	1.97	2.84	.75
5/8	16	1037611	25.00	.66	1.38	2.38	2.34	3.59	1.00



S-412

- Cast Ductile Iron.
- Fits pin for open wire rope socket, boom pendant deivis and wedge socket.

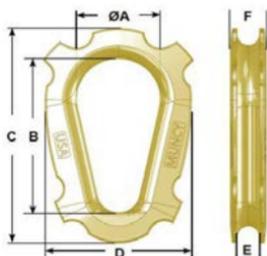


### Solid Wire Rope Thimbles

Rope Dia.		S-412 Stock No	Weight Per 100 (lb)	Dimensions (in)										
(in)	(mm)			A	B	C	D	E	F	G	H	J	K	L
1/2	13	1037121	.61	2.81	1.75	.25	1.06	.75	.56	.28	.88	2.13	1.63	1.56
5/8	16	1037149	2.21	4.69	3.00	.38	1.31	1.06	.81	.41	1.13	3.38	2.25	2.56
3/4	18-20	1037167	2.32	4.69	3.00	.38	1.50	1.06	.81	.41	1.38	3.38	2.25	2.56
7/8	22	1037185	5.45	6.06	3.81	.50	1.75	1.38	1.06	.53	1.63	4.50	3.25	3.44
1	24-26	1037201	5.25	6.06	3.81	.50	2.13	1.38	1.06	.53	1.81	4.50	3.25	3.44
1-1/8	28-30	1037229	9.29	7.25	4.56	.63	2.38	1.75	1.31	.66	2.06	5.38	3.88	4.06
1-1/4 - 1-3/8	32-35	1037247	9.81	7.25	4.56	.63	2.63	1.94	1.53	.78	2.31	5.38	3.88	4.13

## Thimbles

### SLIP-THRU THIMBLE



### CRESCENT THIMBLE



### SLIP-THRU THIMBLE

Stock No.	Single Part Rope Size	Six Part Rope Size	Eight Part Rope Size	Dimensions					
				A	B	C	D	E	F
ST-10	5/16 - 3/8	1/8	3/32	2.125	4.125	5.25	3.25	0.438	0.813
ST-16	1/2 - 9/16	3/16	3/16	2.34	4.38	6.09	4.09	0.69	1.00
ST-20	5/8 - 3/4	1/4 - 5/16	1/4	3.31	6.20	8.60	5.35	0.98	1.40
ST-24	7/8 - 1	3/8	5/16	3-3/4	7-1/8	9-3/8	6-1/4	1-1/8	1-5/8
ST-36	1-1/8 - 1-1/4	7/16	3/8	4-3/8	8-3/8	11	7-1/8	1-3/8	1-7/16
ST-44	1-3/8 - 1-1/2	1/2	7/16 - 1/2	5	9-1/2	12-1/2	8-1/8	1-5/8	2-1/8
ST-52	1-5/8 - 1-3/4	5/8	9/16	6-3/4	11-3/4	14-3/4	9-3/8	0.438	0.813

### CRESCENT THIMBLE

Stock NO.	Rope Size Single	8pt. Braid Rope Dia.	6pt. Braid Rope Dia.	A	B	C	D	E	F	G	H	Approximate WT. LBS.
CRT-6C	3/8 - 7/16	3/32 - 1/8	1/8	2	1	27/32	15/32	2-1/16	3/8	1/2	3/8	.50
CRT-8C	1/2 - 9/16	3/16	3/16	2-1/4	1-1/8	1	5/8	2-1/2	1/2	1/2	1/2	.75
CRT-9C	5/8	-	1/4	2-3/4	1-3/8	1-5/32	23/32	3	19/32	9/16	19/32	1.2
CRT-10C	3/4	1/4	5/16	3-1/4	1-5/8	1-5/16	13/16	3-1/2	5/8	5/8	5/8	2.0
CRT-14C	7/8	-	-	4-1/2	2-1/4	1-7/16	15/16	4-5/16	3/4	11/16	3/4	3.3
CRT-16C	1	5/16	3/8	4-1/2	2-1/4	1-9/16	1-1/16	4-19/32	13/16	3/4	7/8	3.75
CRT-18C	1-1/8	3/8	7/16	4-7/8	2-7/16	1-13/16	1-1/4	5-1/32	7/8	7/8	1	5.0
CRT-20C	1-1/4	7/16	1/2	5-1/2	2-3/4	2-1/16	1-7/16	5-3/4	15/16	15/16	1-1/8	6.75
CRT-22C	1-3/8 - 1-1/2	1/2	9/16	6	3	2-1/4	1-5/8	6-1/4	1-1/16	1-1/8	1-3/16	8.0
CRT-24C	1-5/8	9/16	5/8	6-1/2	3-1/4	2-1/2	1-3/4	6-11/16	1-1/8	1-1/4	1-1/4	12.0
CRT-28C	1-3/4 - 1-7/8	-	-	7	3-1/2	2-15/16	1-15/16	7-3/8	1-1/4	1-3/8	1-1/2	16.6
CRT-32C	2	5/8	3/4	7	3-1/2	3-3/16	2-3/16	7-13/16	1-1/2	1-1/2	1-5/8	21.8
CRT-40C	2-1/4 - 2-1/2	3/4 - 7/8	1	8-1/2	4-1/4	4-1/8	2-7/8	9-5/8	1-5/8	1-7/8	2	39.0
CRT-48C	2-3/4 - 3	1	1-1/8	10	5	4-7/8	3-3/8	11-1/4	1-3/4	2-1/4	2-1/2	67.0

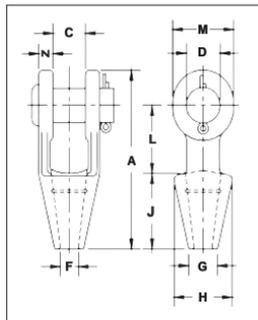
## Open Spelter Sockets



**G-416 / S-416**

Open Grooved Sockets meet the performance requirements of Federal Specification RR-S-650, Type A, except for those provisions required of the contractor.

- Forged Steel Sockets through 1-1/2", cast alloy steel 1-5/8" through 4".
- Spelter socket terminations have an efficiency rating of 100%, based on the catalog strength of wire rope.
- Ratings are based on the recommended use with 6 x 7, 6 x 19 or 6 x 37, IPS or XIP (EIP), XXIP (EEIP), RRL, FC or IWRC wire rope.
- Strand constructed with minimal number of wires (e.g. 1 x 7) requires special consideration that socket basket length be five (5) times the strand diameter or fifty (50) times the wire diameter, whichever is the greater.



**NOTICE: All cast steel sockets 1-5/8" and larger are magnetic particle inspected and ultrasonic inspected. Proof testing available on special order.**

**Drawing illustrates one groove used on sockets 5/16" through 3/4". Sizes 7/8" through 1-1/2" use 2 grooves. Sizes 1-5/8" and larger use 3 grooves.**

### G-416 / S-416 Open Spelter Sockets

Rope Dia.		Structural Strand Dia. (in)	Ultimate Load (t)	Stock No.	Weight Each (lb)	Dimensions (in)													Tolerance +/-
(in)	(mm)					G-416 Galv.	S-416 S.C.	A	C	D	F	G	H	J	L	M	N	C	
5/16-3/8	8-10	—	12	1039637	1039646	1.30	4.84	.81	.81	.50	.81	1.69	2.25	1.75	1.50	.44	.06		
7/16-1/2	11-13	—	20	1039655	1039664	2.25	5.56	1.00	1.00	.56	.94	1.88	2.50	2.00	1.88	.50	.06		
9/16-5/8	14-16	1/2	27	1039673	1039682	3.60	6.75	1.25	1.19	.69	1.13	2.25	3.00	2.50	2.25	.56	.06		
3/4	18	9/16-5/8	43	1039691	1039708	5.83	7.94	1.50	1.38	.81	1.25	2.62	3.50	3.00	2.62	.62	.06		
7/8	20-22	11/16-3/4	55	1039717	1039726	9.65	9.25	1.75	1.63	.94	1.50	3.25	4.00	3.50	3.13	.80	.06		
1	24-26	13/16-7/8	78	1039735	1039744	15.50	10.56	2.00	2.00	1.13	1.75	3.75	4.50	4.00	3.75	.88	.06		
1-1/8	28-30	15/16-1	92	1039753	1039762	21.50	11.81	2.25	2.25	1.25	2.00	4.12	5.00	4.62	4.12	1.00	.12		
1-1/4 - 1-3/8	32-35	1-1/16 - 1-1/8	136	1039771	1039780	31.00	13.19	2.50	2.50	1.50	2.25	4.75	5.50	5.00	4.75	1.13	.12		
1-1/2	38	1-3/16 - 1-1/4	170	1039799	1039806	47.25	15.12	3.00	2.75	1.63	2.75	5.25	6.00	6.00	5.38	1.19	.12		
* 1-5/8	* 40-42	1-5/16 - 1-3/8	188	1039815	1039824	55.00	16.25	3.00	3.00	1.75	3.00	5.50	6.50	6.50	5.75	1.31	.12		
* 1-3/4 - 1-7/8	* 44-48	1-7/16 - 1-5/8	268	1039833	1039842	82.00	18.25	3.50	3.50	2.00	3.13	6.38	7.50	7.00	6.50	1.56	.12		
* 2 - 2-1/8	* 50-54	1-11/16 - 1-3/4	291	1039851	1039860	129.00	21.50	4.00	3.75	2.25	3.75	7.38	8.50	9.00	7.00	1.81	.12		
* 2-1/4 - 2-3/8	* 56-60	1-13/16 - 1-7/8	360	1039879	1039888	167.00	23.50	4.50	4.25	2.50	4.00	8.25	9.00	10.00	7.75	2.13	.12		
* 2-1/2 - 2-5/8	* 64-67	1-15/16 - 2-1/8	424	1041633	1041642	252.00	25.50	5.00	4.75	2.88	4.50	9.25	9.75	10.75	8.50	2.38	.12		
* 2-3/4 - 2-7/8	* 70-73	2-3/16 - 2-7/16	511	1041651	1041660	315.00	27.25	5.25	5.00	3.12	4.88	10.50	11.00	11.00	9.00	2.88	.25		
* 3 - 3-1/8	* 75-80	2-1/2 - 2-5/8	563	1041679	1041688	380.00	29.00	5.75	5.25	3.38	5.25	11.12	12.00	11.25	9.50	3.00	.25		
* 3-1/4 - 3-3/8	* 82-86	2-3/4 - 2-7/8	722	1041697	1041704	434.00	30.88	6.25	5.50	3.62	5.75	11.88	13.00	11.75	10.00	3.12	.25		
* 3-1/2 - 3-5/8	* 88-92	3 - 3-1/8	779	1041713	1041722	563.00	33.25	6.75	6.00	3.88	6.50	12.38	14.00	12.50	10.75	3.25	.25		
* 3-3/4 - 4	* 94-102	—	875	1041731	1041740	783.00	36.25	7.50	7.00	4.25	7.25	13.62	15.00	13.50	12.50	3.50	.25		

\* Cast Alloy Steel. NOTE: AVAILABLE WITH BOLT NUT AND COTTER. CONTACT CROSBY FOR MORE INFORMATION.

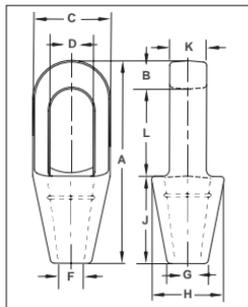
## Closed Spelter Sockets



**G-417 / S-417**

Closed Grooved Sockets meet the performance requirements of Federal Specification RR-S-550, Type B, except for those provisions required of the contractor.

- Forged Steel Sockets through 1-1/2", cast alloy steel 1-5/8" through 4".
- Spelter socket terminations have an efficiency rating of 100%, based on the catalog strength of wire rope.
- Ratings are based on recommended use with 6 x 7, 6 x 19, or 6 x 37, IPS or XIP (EIP), XXIP (EEIP), RRL, FC, or IWRC wire rope.
- Strand constructed with minimal number of wires (e.g. 1 x 7) requires special consideration that socket basket length be five (5) times the strand diameter or fifty (50) times the wire diameter, whichever is the greater.



**NOTE:** All cast steel sockets 1-5/8" and larger are magnetic particle inspected and ultrasonic inspected. Proof testing available on special order.

*Drawing illustrates one groove used on sockets 5/16" through 3/4". Sizes 7/8" through 1-1/2" use 2 grooves. Sizes 1-5/8" and larger use 3 grooves.*

### G-417 / S-417 Closed Spelter Sockets

Rope Dia.		Structural Strand Dia. (in)	Ultimate Load (t)	Stock No.		Weight Each (lb)	Dimensions (in)										
(in)	(mm)			G-417 Galv.	S-417 S.C.		A	B	C	D*	F	G	H	J	K	L	
5/16 - 3/8	8-10	—	12.0	1039913	1039922	.75	4.94	.62	1.69	.97	.50	.81	1.69	2.25	.69	2.06	
7/16 - 1/2	11-13	—	20.0	1039931	1039940	1.50	5.50	.69	2.00	1.16	.56	.94	2.00	2.50	.88	2.31	
9/16 - 5/8	14-16	1/2	30.8	1039959	1039968	2.50	6.31	.81	2.63	1.41	.69	1.12	2.38	3.00	1.00	2.50	
3/4	18	9/16 - 5/8	43.5	1039977	1039986	4.25	7.62	1.06	3.00	1.66	.88	1.25	2.75	3.50	1.25	3.50	
7/8	20-22	11/16 - 3/4	65.3	1039995	1040000	7.25	8.75	1.25	3.63	1.94	1.00	1.50	3.25	4.00	1.50	3.50	
1	24-26	13/16 - 7/8	81.6	1040019	1040028	10.50	9.91	1.41	4.13	2.30	1.13	1.75	3.75	4.50	1.75	4.00	
1-1/8	28-30	15/16 - 1	100	1040037	1040046	14.25	11.00	1.50	4.50	2.56	1.25	2.00	4.13	5.00	2.00	4.50	
1-1/4 - 1-3/8	32-35	1-1/16 - 1-1/8	136	1040055	1040064	19.75	12.12	1.63	5.00	2.81	1.50	2.25	4.75	5.50	2.25	5.00	
1-1/2	38	1-3/16 - 1-1/4	170	1040073	1040082	29.20	13.94	1.94	5.38	3.19	1.63	2.75	5.25	6.00	2.50	6.00	
† 1-5/8	† 40-42	1-5/16 - 1-3/8	188	1040091	1040108	36.00	15.13	2.13	5.75	3.25	1.75	3.00	5.50	6.50	2.75	6.50	
† 1-3/4 - 1-7/8	† 44-48	1-7/16 - 1-5/8	268	1040117	1040126	57.25	17.25	2.19	6.75	3.75	2.00	3.13	6.38	7.50	3.00	7.56	
† 2 - 2-1/8	† 50-54	1-11/16 - 1-3/4	309	1040135	1040144	79.00	19.87	2.44	7.63	4.38	2.25	3.75	7.38	8.50	3.25	8.81	
† 2-1/4 - 2-3/8	† 56-60	1-13/16 - 1-7/8	360	1040153	1040162	105.00	21.50	2.75	8.50	5.00	2.63	4.13	8.25	9.00	3.63	9.75	
† 2-1/2 - 2-5/8	† 64-67	1-15/16 - 2-1/8	424	1041759	1041768	140.00	23.50	3.12	9.50	5.50	2.88	4.50	9.25	9.75	4.00	10.62	
† 2-3/4 - 2-7/8	† 70-73	2-3/16 - 2-7/16	549	1041777	1041786	220.00	25.38	3.12	10.75	6.25	3.12	4.88	10.19	11.00	4.88	11.25	
† 3 - 3-1/8	† 75-80	2-1/2 - 2-5/8	656	1041795	1041802	276.00	27.12	3.37	11.50	6.75	3.38	5.25	11.50	12.00	5.25	11.75	
† 3-1/4 - 3-3/8	† 82-86	2-3/4 - 2-7/8	750	1041811	1041820	313.00	29.25	4.00	12.25	7.25	3.62	5.75	12.25	13.00	5.75	12.25	
† 3-1/2 - 3-5/8	† 88-92	3 - 3-1/8	820	1041839	1041848	400.00	31.00	4.00	13.00	7.75	3.88	6.31	13.00	14.00	6.25	13.00	
† 3-3/4 - 4	† 94 - 102	—	1005	1041857	1041866	542.00	33.25	4.25	14.25	8.50	4.25	7.25	14.25	15.00	7.00	14.00	

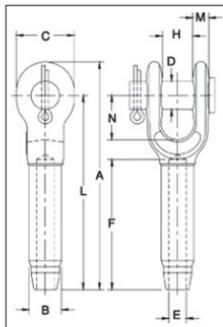
\* Diameter of pin must not exceed pin used on companion 416 socket. Reference adjacent page "D" dimension. † Cast Alloy Steel.

## Open Swage Sockets



S-501  
Open Swage  
Sockets

- Forged from special bar quality carbon steel, suitable for cold forming.
- Swage Socket terminations have an efficiency rating of 100% based on the catalog strength of wire rope.
- Hardness controlled by spheroidize annealing.
- Stamp for identification after swaging without concern for fractures
- Swage sockets incorporate a reduced machined area of the shank which is equivalent to the proper "After Swage" dimension. Before swaging, this provides for an obvious visual difference in the shank diameter. After swaging, a uniform shank diameter is created allowing for a QUIC-CHECK® and permanent visual inspection opportunity.
- Designed to quickly determine whether the socket has been through the swaging operation and assist in field inspections, it does not eliminate the need to perform standard production inspections which include gauging for the proper "After Swage" dimensions or proof loading.



NOTE: S-501 Swage Sockets are recommended for use with 6 x 19 or 6 x 37, IPS or XIP (EIP), XXIP (EPIP), RRL, FC or IWRC wire rope. Before using any National Swage fitting with any other type fit, construction or grade of wire rope, it is recommended that the termination be destructive tested and documented to prove the adequacy of the assembly to be manufactured. In accordance with ASME B30.9, all slings terminated with swage sockets shall be proof loaded.\*



### S-501 Open Swage Sockets

		S-501 and S-501B Open Socket Specifications														Swager / Die Data								
S-501 Stock No.	S-501B Stock No. †	Rope Size		Wt. Each (lb)	Ultimate Load** (t)	Before Swage Dimensions (in)										Tolerance +/-	Max. After Swage Dim. (in)	Die Description	Stock No. / Side Load					
		(in)	(mm)			A	B	C	D	E	F	H	L	M	N				H	500 Ton	1500 Ton	1500 Ton	3000 Ton	3000 Ton
		1-1/4	3/4			1-1/8	1-1/2	1-3/8	1-3/4	2	2 1/2	3	3 1/2	4	4 1/2				5	5 1/2	6	6 1/2	7	7 1/2
1039021	1054001	1/4	6	.52	5.4	4.78	.50	1.38	.69	.27	2.19	.69	4.00	.38	1.47	.06	.46	1/4 Socket	1192845	-	-	-		
1039049	1054010	5/16	8	1.12	11.8	6.30	.78	1.62	.81	.34	3.25	.80	5.34	.48	1.67	.06	.71	5/16-3/8 Socket	1192863	-	-	-		
1039067	1054029	3/8	9-10	1.30	13.6	6.30	.78	1.62	.81	.41	3.25	.80	5.34	.48	1.67	.06	.91	5/16-3/8 Socket	1192863	-	-	-		
1039085	1054038	7/16	11-12	2.08	18.1	7.82	1.01	2.00	1.00	.49	4.31	1.00	6.69	.56	1.96	.06	.91	7/16-1/2 Socket	1192881	-	-	-		
1039101	1054047	1/2	13	2.08	21.3	7.82	1.01	2.00	1.00	.55	4.31	1.00	6.69	.56	1.96	.06	.91	7/16-1/2 Socket	1192881	-	-	-		
1039129	1054056	9/16	14	4.67	31.8	9.54	1.27	2.38	1.19	.61	5.38	1.25	8.13	.68	2.21	.06	1.16	9/16-5/8 Socket	1192907	-	-	-		
1039147	1054065	5/8	16	4.51	34.9	9.54	1.27	2.38	1.19	.68	5.38	1.25	8.13	.68	2.21	.06	1.16	9/16-5/8 Socket	1192907	-	-	-		
1039165	1054074	3/4	18-20	7.97	43.5	11.61	1.56	2.75	1.38	.80	6.44	1.50	10.00	.80	2.69	.06	1.42	3/4 Socket	1192925	-	-	-		
1039183	1054083	7/8	22	11.52	51.5	13.37	1.72	3.13	1.63	.94	7.50	1.75	11.63	.94	3.20	.07	1.55	7/8 Socket	1192943	-	-	-		
1039209	1054092	1	24-26	17.80	71.4	15.47	2.00	3.69	2.00	1.07	8.63	2.00	13.38	1.07	3.68	.08	1.80	1 Socket	1192961	-	-	-		
1039227	1054104	1-1/8	28	25.25	83.3	17.35	2.25	4.12	2.25	1.19	9.63	2.25	15.00	1.19	4.18	.10	2.05	1-1/8 Socket	1192989	-	-	-		
1039245	1054113	1-1/4	32	35.56	109	19.20	2.53	4.59	2.50	1.34	10.69	2.50	16.50	1.27	4.68	.10	2.30	1-1/4 Socket	1193005	-	-	-		
1039263	1054122	1-3/8	34-36	43.75	136	21.10	2.81	5.25	2.50	1.46	11.88	2.41	18.13	1.46	5.25	.10	2.56	1-3/8 Socket	1193023	-	-	-		
1039281	1054131	1-1/2	38-40	58.50	181	23.17	3.08	5.50	2.75	1.59	12.81	3.00	19.75	1.70	5.70	.10	2.81	1-1/2 Socket	1193041	1191267	1195355	1195192		
1039307	1054140	1-3/4	44	88.75	228	26.70	3.40	6.25	3.50	1.87	15.06	3.50	23.00	2.11	6.67	.10	3.06	1-3/4 Socket	1193069	1191276	1195367	1195209		
1042767	1054159	2	48-52	146.2	272	31.15	3.94	7.80	3.75	2.12	17.06	4.00	26.75	1.81	8.19	.10	3.56	2 Socket	1193087	1191294	1195379	1195218		

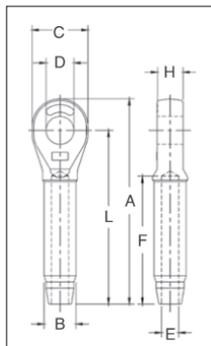
\*Maximum Proof Load shall not exceed 50% of XXIP rope catalog breaking strength. \*\* The Ultimate Loads of 3/4" through 1 1/4" sizes have been increased to meet the requirements for 8 strand 2160 Grade pendants. † Assembly with bolt, nut and cotter pin. Note: Fittings designed only to be used on exact sizes listed.

## Closed Swage Sockets



S-502  
Closed Swage  
Sockets

- Forged from special bar quality carbon steel, suitable for cold forming.
- Swage Socket terminations have an efficiency rating of 100% based on the catalog strength of wire rope.
- Hardness controlled by spheroidize annealing.
- Stamp for identification after swaging without concern for fractures (as per directions in Wire Rope End Terminations User's Manual).
- Swage sockets incorporate a reduced machined area of the shank which is equivalent to the proper "After Swage" dimension. Before swaging, this provides for an obvious visual difference in the shank diameter. After swaging, a uniform shank diameter is created allowing for a **QUIC-CHECK®** and permanent visual inspection opportunity.
- Designed to quickly determine whether the socket has been through the swaging operation and assist in field inspections, it does not eliminate the need to perform standard production inspections which include gauging for the proper "After Swage" dimensions or proof loading.



**NOTE:** S-502 Swage Sockets are recommended for use with 6 x 19 or 6 x 37, IPS or XIP (EIP), XXIP (EEIP), RRL, FC or IWRC wire rope. Before using any National Swage fitting with any other type la , construction or grade of wire rope, it is recommended that the termination be destructive tested and documented to prove the adequacy of the assembly to be manufactured. In accordance with ASME B30.9, all slings terminated with swage sockets shall be proof loaded.\*



### S-502 Closed Swage Sockets

S-502 Stock No.	Rope Size		S-502 Closed Socket Specifications										Max. After Swage Dim. (in)	Swager / Die Data				
			Wt. Each (lb)	Ultimate Load** (t)	Before Swage Dimensions (in)										Stock No.	Side Load		
	A	B			C	D	E	F	H	L	Die Description	500 1000 1500 Ton 5 x 7		1500 3000 Ton 6 x 12		1500 Ton 6 x 12	3000 Ton 6 x 12	
1039325	1/4	6	33	5.4	4.28	.50	1.38	.76	.27	2.19	.50	3.50	.46	1/4 Socket	1192845	-	-	-
1039343	5/16	8	75	11.8	5.42	.77	1.62	.88	.34	3.25	.68	4.50	.71	5/16-3/8 Socket	1192863	-	-	-
1039361	3/8	9-10	72	13.6	5.42	.78	1.62	.88	.41	3.25	.68	4.50	.71	5/16-3/8 Socket	1192863	-	-	-
1039389	7/16	11-12	142	18.1	6.88	1.01	2.00	1.07	.49	4.31	.87	5.75	.91	7/16-1/2 Socket	1192881	-	-	-
1039405	1/2	13	142	21.3	6.88	1.01	2.00	1.07	.55	4.31	.87	5.75	.91	7/16-1/2 Socket	1192881	-	-	-
1039423	9/16	14	292	31.8	8.59	1.27	2.38	1.28	.61	5.38	1.14	7.25	1.16	9/16-5/8 Socket	1192907	-	-	-
1039441	5/8	16	285	34.9	8.59	1.27	2.38	1.28	.68	5.38	1.14	7.25	1.16	9/16-5/8 Socket	1192907	-	-	-
1039469	3/4	18-20	5.00	43.5	10.25	1.56	2.88	1.49	.80	6.44	1.33	8.63	1.42	3/4 Socket	1192925	-	-	-
1039487	7/8	22	6.80	51.5	11.87	1.72	3.12	1.73	.94	7.50	1.53	10.09	1.55	7/8 Socket	1192943	-	-	-
1039502	1	24-26	10.40	71.4	13.56	2.00	3.62	2.11	1.07	8.63	1.78	11.50	1.80	1 Socket	1192961	-	-	-
1039520	1-1/8	28	14.82	83.3	15.03	2.25	4.00	2.37	1.19	9.75	2.03	12.75	2.05	1-1/8 Socket	1192989	-	-	-
1039548	1-1/4	32	21.57	109	16.94	2.53	4.50	2.62	1.34	10.81	2.25	14.38	2.30	1-1/4 Socket	1193005	-	-	-
1039566	1-3/8	34-36	28.54	136	18.59	2.81	5.00	2.62	1.46	11.88	2.29	15.75	2.56	1-3/8 Socket	1193023	-	-	-
1039584	1-1/2	38-40	38.06	181	20.13	3.08	5.38	2.87	1.59	12.81	2.56	17.00	2.81	1-1/2 Socket	1193041	1191267	1195355	1195192
1039600	1-3/4	44	51.00	228	23.56	3.40	6.25	3.63	1.87	15.06	3.08	20.00	3.06	1-3/4 Socket	1193069	1191276	1195367	1195209
1042589	2	48-52	89.25	272	27.13	3.94	7.25	3.88	2.12	17.06	3.31	23.00	3.56	2 Socket	1193087	1191294	1195379	1195218

\* Maximum Proof Load shall not exceed 50% of XXIP rope catalog breaking strength. \*\*The Ultimate Loads of 3/4" through 1 1/4" sizes have been increased to meet the requirements for 8 strand 2160 Grade pendants. Note: Fittings designed only to be used on exact sizes listed.

## Eye bolts

### FORGED EYE BOLT

#### WARNINGS & APPLICATION INSTRUCTIONS



Regular Nut Eye Bolt G-291

Shoulder Nut Eye Bolt G-277

Machinery Eye Bolt S-279 / M-279

### Important Safety Information - Read & Follow

#### Inspection/Maintenance Safety:

- Always inspect eye bolt before use.
- Never use eye bolt that shows signs of wear or damage.
- Never use eye bolt if eye or shank is bent or elongated.
- Always be sure threads on shank and receiving holes are clean.
- Never machine, grind, or cut eye bolt.
- Do not leave threaded end of machinery eye bolt in aluminum loads for long periods of time as it may cause corrosion.

#### Assembly Safety:

- Never exceed load limits specified in Table 1 and Table 2.
- Never use regular nut eye bolts for angular lifts.
- Always use shoulder nut eye bolts (or machinery eye bolts) for angular lifts.
- For angular lifts, adjust working load as follows:

ANGLE FROM "IN-LINE"	ADJUSTED WORKING LOAD LIMIT
5 degrees	100% of rated working load
15 degrees	80% of rated working load
30 degrees	65% of rated working load
45 degrees	30% of rated working load
90 degrees	25% of rated working load

- Never undercut eye bolt to seat shoulder against the load.
- Always countersink receiving hole or use washers with sufficient I.D. to seat shoulder.
- Always screw eye bolt down completely for proper seating.
- Always tighten nuts securely against the load.

Size (in)	Working Load Limit (lb)
1/4	650
5/16	1,200
3/8	1,550
1/2	2,600
5/8	5,200
3/4	7,200
7/8	10,600
1	13,300
1-1/8	15,000
1-1/4	21,000
1-1/2	24,000
1-3/4	34,000
2	42,000
2-1/2	65,000

**⚠ WARNING**

- Load may slip or fall if proper eye bolt assembly and lifting procedures are not used.
- A falling load can seriously injure or kill.
- Read and understand these instructions, and follow all eye bolt safety information presented here.
- Read, understand, and follow information in diagrams and charts below before using eye bolt assemblies.

### Shoulder Nut Eye Bolt – Installation for Angular Loading

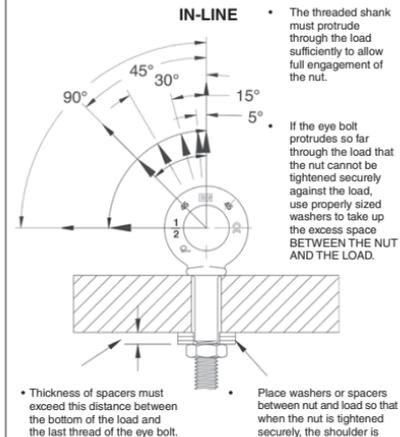
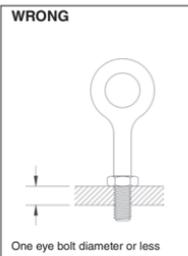
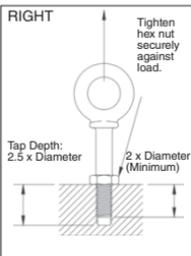
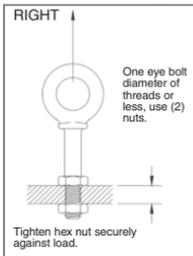
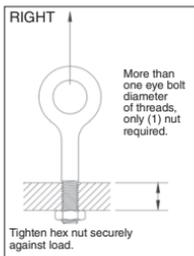


Figure 1

Metric Size	Working Load Limit - kg
m6	200
m8	400
m10	640
m12	1000
m16	1800
m20	2500
m24	4000
m27	5000
m30	6000
m36	8500
m42	14000
m48	17300
m64	29500

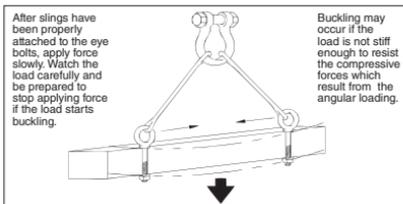
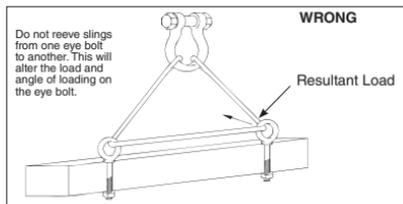
## Eye bolts

### Important – Read and understand these instructions before using eye bolts. Regular Nut & Shoulder Nut Eye Bolt – Installation for In-Line Loading



### Operating Safety

- Always stand clear of load.
- Always lift load with steady, even pull – do not jerk.
- Always apply load to eye bolt in the plane of the eye – not at an angle.
- Never exceed the capacity of the eye bolt—see Table 1 & 2.
- When using lifting slings of two or more legs, make sure the loads in the legs are calculated using the angle from the vertical sling angle to the leg and properly size the shoulder nut or machinery eye bolt for the angular load.



### Machinery Eye Bolt - Installation for In-Line & Angular Loading

These eye bolts are primarily intended to be installed into tapped holes.

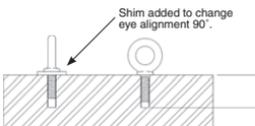
1. After the loads on the eye bolts have been calculated, select the proper size eye bolt for the job.

For angular lifts, adjust working load as follows:

Direction of Pull (from In-Line)	Adjusted Working Load
45 degrees	30% of rated working load
90 degrees	25% of rated working load

2. Drill and tap the load to the correct sizes to a minimum depth of one-half the eye bolt size beyond the shank length of the machinery eye bolt.
3. Thread the eye bolt into the load until the shoulder is flush and securely tightened against the load.
4. If the plane of the machinery eye bolt is not aligned with the sling line, estimate the amount of unthreading rotation necessary to align the plane of the eye properly.
5. Remove the machinery eye bolt from the load and add shims (washers) of proper thickness to adjust the angle of the plane of the eye to match the sling line. Use Table 3 to estimate the required shim thickness for the amount of unthreading rotation required.

Eye Bolt Size (in)	Shim Thickness Required to Change Rotation 90°	
	(in)	(mm)
1/4	.0125	M6
5/16	.0139	M8
3/8	.0156	M10
1/2	.0192	M12
5/8	.0227	M16
3/4	.0250	M20
7/8	.0278	M24
1	.0312	M27
1-1/8	.0357	M30
1-1/4	.0357	M36
1-1/2	.0417	M42
1-3/4	.0500	M48
2	.0556	M64
2-1/2	.0625	—



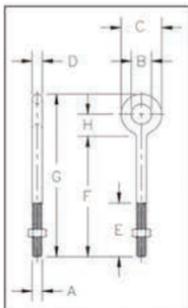
Minimum tap depth is basic shank length plus one-half the nominal eye bolt diameter.

## Forged Eye Bolts



**G-291**  
Regular Nut  
Eye Bolt

- Forged Steel - Quenched and Tempered.
- Fatigue rated at 1-1/2 times the Working Load Limit at 20,000 cycles.
- All Bolts Hot Dip galvanized after threading (UNC).
- Furnished with standard Hot Dip galvanized hex nuts.
- Recommended for in-line pull.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these bolts meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.



**Fatigue Rated**

### G-291 Regular Nut Eye Bolts

Shank Dia. & Length (in.)	G-291 Stock No.	Working Load Limit (lbs.) <sup>*</sup>	Weight Per 100 (lbs.)	Dimensions (in.)							
				A	B	C	D	E	F	G	H
3/8 x 4-1/2	1043338	1550	29.50	.38	.75	1.50	.38	2.50	4.50	6.12	.88
1/2 x 3-1/4	1043374	2600	50.30	.50	1.00	2.00	.50	1.50	3.25	5.38	1.12
1/2 x 6	1043392	2600	66.10	.50	1.00	2.00	.50	3.00	6.00	8.12	1.12
1/2 x 8	1043418	2600	82.00	.50	1.00	2.00	.50	3.00	6.00	10.12	1.12
1/2 x 10	1043436	2600	88.00	.50	1.00	2.00	.50	3.00	10.00	12.12	1.12
1/2 x 12	1043454	2600	114.20	.50	1.00	2.00	.50	3.00	12.00	14.12	1.12
5/8 x 4	1043472	5200	103.10	.62	1.25	2.50	.62	2.00	4.00	6.69	1.44
5/8 x 6	1043480	5200	118.20	.62	1.25	2.50	.62	3.00	6.00	8.69	1.44
5/8 x 8	1043515	5200	135.10	.62	1.25	2.50	.62	3.00	8.00	10.69	1.44
5/8 x 10	1043533	5200	153.60	.62	1.25	2.50	.62	3.00	10.00	12.69	1.44
5/8 x 12	1043551	5200	167.10	.62	1.25	2.50	.62	4.00	12.00	14.69	1.44
3/4 x 4-1/2	1043579	7200	168.60	.75	1.50	3.00	.75	2.00	4.50	7.69	1.69
3/4 x 6	1043597	7200	184.50	.75	1.50	3.00	.75	3.00	6.00	9.19	1.69
3/4 x 8	1043613	7200	207.90	.75	1.50	3.00	.75	3.00	8.00	11.19	1.69
3/4 x 10	1043631	7200	235.00	.75	1.50	3.00	.75	3.00	10.00	13.19	1.69
3/4 x 12	1043659	7200	257.50	.75	1.50	3.00	.75	4.00	12.00	15.19	1.69
3/4 x 15	1043677	7200	298.00	.75	1.50	3.00	.75	5.00	15.00	18.19	1.69
7/8 x 5	1043685	10600	270.00	.88	1.75	3.50	.88	2.50	5.00	8.75	2.00
7/8 x 8	1043711	10600	308.00	.88	1.75	3.50	.88	4.00	8.00	11.75	2.00
7/8 x 12	1043739	10600	400.88	.88	1.75	3.50	.88	4.00	12.00	15.75	2.00
1 x 6	1043757	13300	421.00	1.00	2.00	4.00	1.00	3.00	6.00	10.31	2.31
1 x 9	1043775	13300	468.50	1.00	2.00	4.00	1.00	4.00	9.00	13.31	2.31
1 x 12	1043793	13300	540.00	1.00	2.00	4.00	1.00	4.00	12.00	16.31	2.31
1 x 18	1043819	13300	650.00	1.00	2.00	4.00	1.00	7.00	18.00	22.31	2.31
1-1/4 x 8	1043837	21000	750.00	1.25	2.50	5.00	1.25	4.00	8.00	13.38	2.88
1-1/4 x 12	1043855	21000	900.00	1.25	2.50	5.00	1.25	4.00	12.00	17.38	2.88
1-1/4 x 20	1045873	21000	1210.00	1.25	2.50	5.00	1.25	6.00	20.00	25.38	2.88

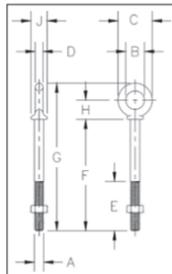
<sup>\*</sup>Ultimate Load is 5 times the Working Load Limit. Working Load Limit shown is for in-line pull. Maximum Proof Load is 2 times the Working Load Limit.

## Forged Eye Bolts



**G-277**  
Shoulder Nut  
Eye Bolts

- Forged Steel - Quenched and Tempered.
- Fatigue rated at 1-1/2 times the Working Load Limit at 20,000 cycles.
- Working Load Limits shown are for in-line pull.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these bolts meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.
- All Bolts Hot Dip Galvanized after threading (UNC).
- Furnished with standard Hot Dip galvanized, heavy hex nuts.



**Fatigue Rated**

### G-277 Shoulder Nut Eye Bolts

Shank Diameter & Length (in)	G-277 Stock No.	Working Load Limit (lb)*	Weight Per 100 (lb)	Dimensions (in)									
				A	B	C	D	E	F	G	H	J	
5/16 x 2-1/4	1045050	1200	12.50	.31	.62	1.12	.25	1.50	2.25	3.50	.69	.56	
5/16 x 4-1/4	1045078	1200	18.80	.31	.62	1.12	.25	2.50	4.25	5.50	.69	.56	
3/8 x 2-1/2	1045096	1550	21.40	.38	.75	1.38	.31	1.50	2.50	3.97	.78	.66	
3/8 x 4-1/2	1045112	1550	25.30	.38	.75	1.38	.31	2.50	4.50	5.97	.78	.66	
1/2 x 3-1/4	1045130	2600	42.60	.50	1.00	1.75	.38	1.50	3.25	5.12	1.00	.91	
1/2 x 6	1045158	2600	56.80	.50	1.00	1.75	.38	3.00	6.00	7.88	1.00	.91	
5/8 x 4	1045176	5200	68.60	.62	1.25	2.25	.50	2.00	4.00	6.44	1.31	1.12	
5/8 x 6	1045194	5200	102.40	.62	1.25	2.25	.50	3.00	6.00	8.44	1.31	1.12	
3/4 x 4-1/2	1045210	7200	144.50	.75	1.50	2.75	.62	2.00	4.50	7.44	1.56	1.38	
3/4 x 6	1045238	7200	167.50	.75	1.50	2.75	.62	3.00	6.00	8.94	1.56	1.38	
7/8 x 5	1045256	10600	225.00	.88	1.75	3.25	.75	2.50	5.00	8.46	1.84	1.56	
1 x 6	1045292	13300	366.30	1.00	2.00	3.75	.88	3.00	6.00	9.97	2.09	1.81	
1 x 9	1045318	13300	422.50	1.00	2.00	3.75	.88	4.00	9.00	12.97	2.09	1.81	
1-1/4 x 8	1045336	21000	650.00	1.25	2.50	4.50	1.00	4.00	8.00	12.72	2.47	2.28	
1-1/4 x 12	1045354	21000	795.00	1.25	2.50	4.50	1.00	4.00	12.00	16.72	2.47	2.28	
1-1/2 x 15	1045372	24000	1425.00	1.50	3.00	5.50	1.25	6.00	15.00	20.75	3.00	2.75	

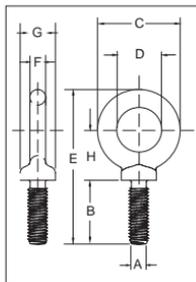
\*Ultimate Load is 5 times the Working Load Limit. Maximum Proof Load is 2 times the Working Load Limit.

## Shoulder Type Machinery Eye Bolts



**S-279 / M-279**  
Shoulder Type  
Machinery Eye Bolts

- Forged Steel - Quenched & Tempered.
- Working Load Limits shown are for in-line pull.
- Fatigue rated at 1-1/2 times the Working Load Limit at 20,000 cycles.
- Recommended for in-line pull.
- S-279 threaded UNC.
- M-279 metric threaded.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these bolts meet other critical performance requirements including fatigue life, impact properties and material traceability, not addressed by ASME B30.26.



**Fatigue Rated**



### S-279 UNC Shoulder Type Machinery Eye Bolts

Size (in)	S-279 Stock No.	Working Load Limit (lb)*	Weight Per 100 (lb)	Dimensions (in)							
				A** Thread	B	C	D	E	F	G	H
1/4 x 1	9900182	650	5.00	1/4 - 20	102	113	.75	2.29	.19	.53	.77
5/16 x 1-1/8	9900191	1200	9.00	5/16 - 18	115	138	.88	2.74	.25	.59	.95
3/8 x 1-1/4	9900208	1550	15.00	3/8 - 16	127	162	1.00	3.07	.31	.69	1.05
1/2 x 1-1/2	9900217	2600	28.00	1/2 - 13	153	195	1.19	3.70	.38	.91	1.27
5/8 x 1-3/4	9900226	5200	55.00	5/8 - 11	179	238	1.38	4.45	.50	1.13	1.53
3/4 x 2	9900235	7200	96.00	3/4 - 10	205	276	1.50	5.07	.63	1.38	1.71
7/8 x 2-1/4	9900244	10600	154.00	7/8 - 9	231	325	1.75	5.87	.75	1.56	2.00
1 x 2-1/2	9900253	13300	238.00	1 - 8	257	376	2.00	6.66	.88	1.81	2.30
1-1/8 x 2-3/4	9900257	15000	320.00	1-1/8 - 7	275	419	2.25	7.20	.97	2.06	2.35
1-1/4 x 3	9900262	21000	399.00	1-1/4 - 7	309	450	2.50	7.95	1.00	2.28	2.73
1-1/2 x 3-1/2	9900271	24000	720.00	1-1/2 - 6	360	550	3.00	9.49	1.25	2.75	3.28
1-3/4 x 3-3/4	9900280	34000	1040.00	1-3/4 - 5	375	626	3.50	10.48	1.38	3.00	3.60
2 x 4	9900289	42000	1880.00	2 - 4-1/2	400	762	4.00	12.31	1.81	3.38	4.50
2-1/2 x 5	9900298	65000	3250.00	2-1/2 - 4	500	876	4.50	14.88	2.12	4.25	5.50

\*Ultimate Load is 5 times the Working Load Limit. Maximum Proof Load is 2 times the Working Load Limit. \*\* All bolts threaded UNC.



### M-279 Metric

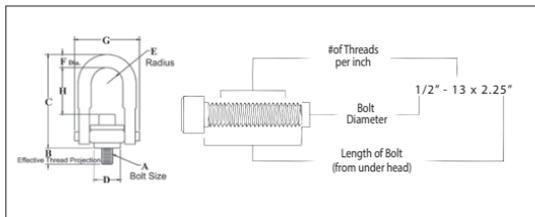
Size (mm)	M-279 Stock No.	Working Load Limit (kg)*	Weight Each (kg)	Dimensions (mm)							
				A** Thread	B	C	D	E	F	G	H
M6 x 13	1045753	200	.03	M6 x 10	13.0	28.7	19.1	4.70	4.9	13.5	19.6
M8 x 13	1045789	400	.05	M8 x 125	13.0	35.1	22.4	54.6	6.4	15.0	24.1
M10 x 17	1045833	640	.07	M10 x 15	17.0	41.1	25.4	64.3	7.9	17.5	26.5
M12 x 20.5	1045869	1000	.11	M12 x 175	20.5	49.5	30.2	77.7	9.7	23.1	32.8
M16 x 27	1045913	1800	.25	M16 x 20	27.0	60.5	35.1	96.0	12.7	28.7	38.9
M20 x 30	1045995	2500	.42	M20 x 25	30.0	70.0	38.1	108	16.0	35.1	43.4
M24 x 36	1046029	4000	1.05	M24 x 30	36.0	95.5	51.0	142	22.4	46.0	58.4
M27 x 69.8	1046038	5000	1.05	M27 x 30	69.8	107	57.1	183	24.6	52.3	59.7
M30 x 45	1046075	6000	1.77	M30 x 35	45.0	114	63.5	171	25.4	58.0	69.3
M36 x 54	1046109	8500	3.12	M36 x 40	54.0	140	76.0	207	31.8	70.0	83.3
M42 x 95.2	1046118	14000	4.58	M42 x 45	95.2	159	88.9	266	35.0	76.2	91.4
M48 x 102	1046127	17300	8.71	M48 x 5.0	102	194	101	313	46.0	85.9	114
M64 x 127	1046136	29500	14.74	M64 x 6.0	127	223	114	378	53.8	108	140

\*Ultimate Load is 5 times the Working Load Limit. Maximum Proof Load is 2 times the Working Load Limit. \*\* On Request: Special threading or as forged bolts for customer conversion.

## Hoist Rings



**HR-125**  
Swivel Hoist Ring



- Top washer has the following features:
  - The Working Load Limit and Recommended Torque value are permanently stamped into each washer.
  - Washer is color coded for easy identification: Red - UNC thread.
- Individually Proof Tested to 2-1/2 times Working Load Limit.
- Bolt specification is an Alloy socket head cap screw to ASTM A 574.
- All threads listed are UNC.
- **BOLT SIZE IDENTIFICATION:** The size of the bolt will be stated as in the drawing above. Illustration shows meaning of each dimension given.
- Frame 2 and larger are **RFID EQUIPPED**.



### HR-125 UNC Threads

Frame Size No.	HR-125 Stock No.	Working Load Limit (lb)*	Torque in (ft·lbf)	Dimensions (in)								Weight Each (lb)
				Bolt Size A †	Effective Thread Projection Length B	C	D	Radius E	Diameter F	G	H	
1 †	1016887	800	7	5/16 - 18 x 1.50	.58	2.72	.97	.46	.34	1.87	1.12	.37
1 †	1016898	1000	12	3/8 - 16 x 1.50	.58	2.72	.97	.46	.34	1.87	1.05	.39
2	1016909	2500	28	1/2 - 13 x 2.00	.70	4.85	1.96	.87	.75	3.35	2.29	2.33
2 †	1016912	2500	28	1/2 - 13 x 2.50	1.20	4.85	1.96	.87	.75	3.35	2.29	2.36
2	1016920	4000	60	5/8 - 11 x 2.00	.70	4.85	1.96	.87	.75	3.35	2.16	2.41
2 †	1016924	4000	60	5/8 - 11 x 2.75	1.45	4.85	1.96	.87	.75	3.35	2.16	2.47
2	1016931	5000	100	3/4 - 10 x 2.25	.95	4.85	1.96	.87	.75	3.35	2.04	2.52
2 †	1016935	5000	100	3/4 - 10 x 2.75	1.45	4.85	1.96	.87	.75	3.35	2.04	2.59
3	1016942	7000 **	100	3/4 - 10 x 2.75	.89	6.57	2.96	1.36	.94	4.87	2.97	6.72
3 †	1016946	7000 **	100	3/4 - 10 x 3.50	1.64	6.57	2.96	1.36	.94	4.87	2.97	6.81
3	1016953	8000	160	7/8 - 9 x 2.75	.89	6.57	2.96	1.36	.94	4.87	2.84	6.84
3 †	1016957	8000	160	7/8 - 9 x 3.50	1.64	6.57	2.96	1.36	.94	4.87	2.84	6.96
3 †	1016964	10000	230	1 - 8 x 3.00	1.14	6.57	2.96	1.36	.94	4.87	2.72	7.09
3 †	1016969	10000	230	1 - 8 x 4.00	2.14	6.57	2.96	1.36	.94	4.87	2.72	7.31
4	1016975	15000	470	1-1/4 - 7 x 4.50	2.21	8.72	3.71	1.75	1.19	6.18	3.93	14.51
5	1016986	24000	800	1-1/2 - 6 x 6.75	3.00	12.55	4.71	2.39	1.75	8.48	5.52	37.73
5	1016997	30000	1100	2 - 4-1/2 x 6.75	3.00	12.55	4.71	2.39	1.75	8.48	5.02	40.69
6	1017001	50000	2100	2-1/2 - 4 x 8.0	4.00	16.88	5.75	3.00	2.25	11.00	8.03	88.00
7	1017005	75000	4300	3 - 4 x 10.5	5.00	19.50	6.45	3.75	2.75	14.16	8.50	166.00
8	1017009	100000	5100	3-1/2 - 4 x 13.0 #	7.00	22.09	7.75	4.00	3.25	15.91	9.28	265.00

\*Ultimate Load is 5 times the Working Load Limit.

\*\* Ultimate Load is 4.5 times the Working Load Limit for 7000# Hoist Ring when tested in 90 degree orientation.

† Long Bolts are designed to be used with soft metal (i.e., aluminum) workpiece. While the long bolts may also be used with ferrous metal (i.e. steel & iron) workpiece, short bolts are designed for ferrous workpieces only.

‡ Bolt specification is an Alloy socket head cap screw to ASTM A 574.

# Hex head bolt used on Frame 8 (100,000lb.) Hoist Ring.

## Lifting Clamps



**IPU10**

The IPU10 vertical lifting clamp is used for lifting, turning, moving or vertical transfer of sheet, plates, or fabrications from horizontal to vertical and down to horizontal (180°) as needed. The hinged hoisting eye allows for the clamp to place and lift the load from any direction, or with a multiple leg sling without side-loading the clamp.

### Universal - for lifting in any direction

- Available in capacities of 5 thru 30 metric tons (Higher Working Load Limits are available upon request).
- Wide variety of jaw openings available: 0" to 6.1".
- Welded alloy steel body for strength and smaller size. Forged alloy components, where required.
- Individually Proof Tested to 2 times the Working Load Limit with certification.
- Company name (Crosby®), logo, Working Load Limit and jaw opening permanently stamped on body.
- Each product is individually serialized, with the serial number and Proof Load test date stamped on body. User manual with test certificate is included with each clamp
- Available in a variety of styles:
  - IPU10 - Standard clamp for materials with a surface hardness to 363HV10 (345 HB).
  - IPU10J - Larger jaw opening.
  - IPU10S - For use with Stainless Steel material.
  - IPU10H - For use with materials with a surface hardness to 472HV10 (450 HB).
- Full 180° turning range for material transfer, turning or moving.
- Lock open, lock closed ability with latch for prevention on material and then release of material.



**IPU10S**

**IPU10S:** For use with Stainless Steel material.  
**IPU10H:** For use with materials with a surface hardness to 472HV10 (450 HB).

- For use with materials with a surface hardness to 279HV10. Only 5% minimum WLL is needed.
- Maintenance and repair kits are available.
- Manufactured by an ISO 9001 facility.
- All sizes are **RFID EQUIPPED**.
- Minimum WLL is 5% of maximum WLL for .5X IPU10 only.
- Minimum WLL is 10% of maximum WLL for all other IPU10, IPU10J, IPU10S, IPU10H clamps.

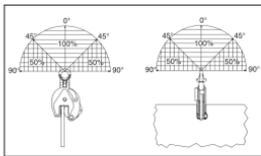
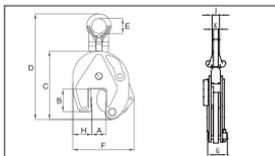


**Load Rated**

### Model IPU10 / IPU10J / IPU10S / IPU10H

Model	Working Load Limit (T) <sup>1</sup>	IPU10 Stock No.	Weight Each (lb)	Dimensions (in)										
				Jaw A	B	C	D	E	F	G	H	J	K	
IPU10	0.5	2701675	4.19	0 - 0.63	1.73	5.12	8.50	1.57	4.53	1.65	1.10	-	0.43	
IPU10	1	2701663	5.29	0 - 0.75	1.77	5.47	8.86	1.57	5.00	1.65	1.50	-	0.43	
IPU10	2	2702167	18.3	0 - 1.38	3.07	7.91	14.49	2.76	7.40	2.52	2.17	-	0.63	
IPU10	3	2701865	32.6	0 - 1.56	3.94	9.96	17.17	2.95	8.74	3.07	2.36	-	0.79	
IPU10	4.5	2701667	35.3	0 - 1.56	3.94	9.96	17.17	2.95	8.94	3.23	2.56	-	0.79	
IPU10	6	2701669	52.9	0 - 2.00	4.96	11.89	20.67	3.15	11.50	3.31	3.74	1.73	0.79	
IPU10	9	2701671	65.0	0 - 2.00	4.96	12.80	21.73	3.15	12.20	3.70	4.09	1.73	0.79	
IPU10	12	2701679	126	0 - 2.13	6.30	15.43	24.25	3.15	17.05	4.76	5.39	1.61	0.98	
IPU10	16	2701683	174	0.2 - 2.50	7.09	18.23	28.98	3.46	19.37	4.76	6.02	1.77	0.98	
IPU10	22.5	2701687	278	0.2 - 3.13	8.74	21.81	33.98	4.33	22.24	5.47	7.32	1.93	0.98	
IPU10	30	2701691	311	0.2 - 3.13	8.74	21.81	34.17	4.33	22.83	6.02	7.32	2.13	1.16	
IPU10J	3	2702465	38.1	1.57 - 3.15	4.53	10.63	17.01	2.95	10.91	3.07	2.64	-	0.79	
IPU10J	6	2702469	58.4	2.00 - 4.00	4.96	11.89	20.28	3.15	13.23	3.31	3.74	1.73	0.79	
IPU10J	9	2701673	67.2	2.00 - 4.00	4.96	12.80	21.65	3.15	14.17	3.70	4.13	1.73	0.79	
IPU10J	12	2701681	143	2.13 - 4.25	7.01	17.24	26.06	3.15	19.33	4.76	5.35	1.61	0.98	
IPU10J	16	2701685	187	2.50 - 5.00	8.19	20.51	30.87	3.46	22.13	4.76	6.30	1.77	0.98	
IPU10J	22.5	2701689	328	3.13 - 6.13	10.04	24.72	36.93	4.33	25.98	5.47	7.72	1.93	0.98	
IPU10J	30	2701693	364	3.13 - 6.13	10.04	24.72	37.09	4.33	25.98	6.02	7.72	2.13	1.16	
<b>For stainless steel - with universal hoisting eye</b>														
IPU10S	0.5	2702275	4.19	0 - 0.63	1.73	5.12	8.50	1.57	4.53	1.65	1.10	-	0.43	
IPU10S	1	2702263	5.29	0 - 0.75	1.77	5.47	8.86	1.57	5.00	1.61	1.50	-	0.43	
IPU10S	2	2702277	18.7	0 - 1.38	3.07	7.91	14.49	2.76	7.40	2.52	2.17	-	0.63	
IPU10S	3	2702265	32.6	0 - 1.56	3.94	9.96	17.17	2.95	8.74	3.07	2.36	-	0.79	
IPU10S	4.5	2702267	35.3	0 - 1.56	3.94	9.96	17.17	2.95	8.94	3.23	2.56	-	0.79	
IPU10S	6	2702269	52.9	0 - 2.00	4.96	11.89	20.67	3.15	11.50	3.31	3.74	1.73	0.79	
IPU10S	9	2702271	65.0	0 - 2.00	4.96	12.80	21.73	3.15	12.20	3.70	4.09	1.73	0.79	
IPU10S	12	2702279	126	0 - 2.13	6.30	15.43	24.25	3.15	17.05	4.76	5.39	1.61	0.98	
<b>For very hard materials - with universal hoisting eye</b>														
IPU10H	0.5	2702175	4.19	0 - 0.63	1.73	5.12	8.50	1.57	4.53	1.65	1.10	-	0.43	
IPU10H	0.75	2702163	5.29	0 - 0.79	1.77	5.47	8.86	1.57	5.00	1.61	1.50	-	0.43	
IPU10H	1	2702177	18.3	0 - 1.38	3.07	7.91	14.49	2.76	7.40	2.52	2.17	-	0.63	
IPU10H	2	2702165	32.6	0 - 1.56	3.94	9.96	17.17	2.95	8.74	3.07	2.36	-	0.79	
IPU10H	3	2702167	35.3	0 - 1.56	3.94	9.96	17.17	2.95	8.94	3.23	2.56	-	0.79	
IPU10H	4.5	2702169	52.9	0 - 2.00	4.96	11.89	20.67	3.15	11.50	3.31	3.74	1.73	0.79	
IPU10H	6	2702171	65.0	0 - 2.00	4.96	12.80	21.73	3.15	12.20	3.70	4.09	1.73	0.79	

<sup>1</sup> Design Factor based on EN 13155 and ASME B30.20. Model IPU10R (remote control opening and closing via a cable) on request. Model IPU10W (wedge) available on request.



## Lifting Clamps



**IPBHZ**

The IPBHZ beam clamp is used for lifting, transferring and stacking H-Beams. A ring-center hoist eye allows for the beam flange to remain vertical. This series of clamps can be used in vertical and horizontal moving, transferring and stacking of different types of structural designs, such as H-Beams, angles, etc. depending on the application desired.

### For the lifting and transfer of steel beams

- IPBHZ: Available in capacities of .75 thru 12 metric tons.
- IPBHZ: Wide variety of jaw openings available: 0 to 1.57".
- IPBSNZ: Available in capacities of 1.5 thru 4.5 metric tons.
- IPBSNZ: Wide variety of jaw openings available: 0 to 2.00".
- Welded alloy steel body for strength and smaller size. Forged alloy components, where required.
- Individually Proof Tested to 2 times the Working Load Limit with certification.
- Company name (CrosbyIP), logo, Working Load Limit and jaw opening permanently stamped on body.
- Each product is individually serialized, with the serial number and Proof Load test date stamped on body. User manual with test certificate is included with each clamp.



**IPBSNZ**

The IPBSNZ beam clamp is used for lifting, transferring and stacking H-Beams. A ring-center hoist eye allows for the beam flange to remain vertical. This series of clamps can be used in vertical and horizontal moving, transferring and stacking of different types of structural designs, such as H-Beams, angles, etc. depending on the application desired.

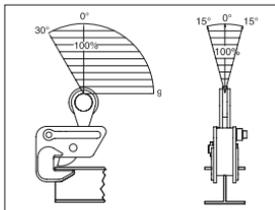
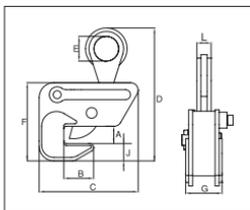
- Minimum WLL of 10% of Maximum WLL.
- Maintenance and repair kits are available.
- Manufactured by an ISO 9001 facility.
- All sizes are RFID EQUIPPED.



### Model IPBHZ

Model	Working Load Limit (t) <sup>*</sup>	IPBHZ Stock No.	Weight Each (lb)	Dimensions (in)								
				Jaw A	B	C	D	E	F	G	J	K
IPBHZ	0.75	2705461	6.61	0 - 1.00	1.57	5.83	8.66	1.97	5.12	2.72	1.30	0.87
IPBHZ	1.5	2705462	13.2	0 - 1.00	2.36	7.99	10.04	1.97	6.22	2.87	1.38	1.10
IPBHZ	3	2705463	23.2	0 - 1.56	3.15	8.94	12.80	2.76	7.40	4.41	1.50	1.26
IPBHZ	4.5	2705464	55.1	0 - 1.56	4.41	11.18	16.26	2.76	9.88	4.57	3.15	1.57
IPBHZ	12	2705467	93.3	0 - 1.56	4.92	18.35	19.29	3.54	12.48	3.54	3.54	1.85

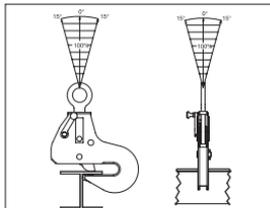
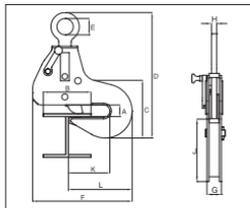
\* Design Factor based on EN 13155 and ASME B30.20.



### Model IPBSNZ

Model	Working Load Limit (t) <sup>*</sup>	IPBSNZ Stock No.	Weight Each (lb)	Dimensions (in)										
				Jaw A	B	C	D	E	F	G	H	J	K	L
IPBSNZ	1.5	2705925	30.9	0 - 1.25	3.94-10.63	11.97	18.90	2.76	12.56	1.85	0.63	6.50	5.83	9.45
IPBSNZ	3	2705926	48.5	0 - 1.56	3.94-12.99	13.86	19.45	2.95	16.06	2.20	0.79	8.15	7.17	10.24
IPBSNZ	4.5	2705927	67.2	0 - 2.00	3.94-14.17	16.54	24.80	2.95	17.99	2.20	0.79	9.84	7.40	11.54

\* Design Factor based on EN 13155 and ASME B30.20.

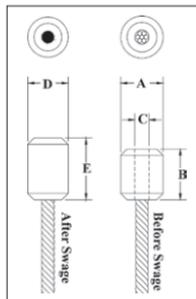


## Buttons - Ferrules



S-409  
Swage Buttons

- Swage Button terminations have an efficiency rating of 98% based on the catalog strength of wire rope.
- Special processed, low carbon steel.
- COLD TUFF® for better swageability.
- Stamp for identification after swaging without concern for fractures (as per directions in the Wire Rope End Terminations User's Manual).



**NOTE:** S-409 Buttons are recommended for use with 6 x 19 or 6 x 37, IPS or XIP (EIP), RRL, FC or IWRC wire rope. Before using any National Swage fitting with any other type, construction or grade of wire rope, it is recommended that the termination be destructively tested and documented to prove the adequacy of the assembly to be manufactured.

### S-409 COLD TUFF® Buttons

S-409 Steel Swage Button Specifications										Swager / Die Data	
S-409 Stock No.	Size No.	Rope Size		Weight Per 100 (lb)	Before Swage Dimensions (in)			After Swage Dimensions (in)		Die Description	Stock No. 500 Tons 1000 Tons 1500 Tons 5 x 7
		(in)	(mm)		A	B	C	D Maximum After Swage Dimensions	E Length*		
		1040171	1 SB		1/8	3	2	.42	.50		
1040215	3 SB	3/16	5	4	.56	.70	.20	.52	.84	1/4 1st Stage	1197528
1040251	5 SB	1/4	6-7	8	.68	1.06	.31	.58	1.41	1/8 - 1/4 Button	1191621
1040297	7 SB	5/16	8	16	.88	1.13	.36	.77	1.33	3/8 1st Stage	1192364
1040313	8 SB	3/8	9-10	15	.88	1.48	.42	.77	1.69	3/8 1st stage	1192364
1040331	9 SB	7/16	11	30	1.13	1.63	.48	1.03	1.94	1/2 1st Stage	1192408
1040359	10 SB	1/2	13	50	1.31	1.89	.55	1.16	2.17	5/8 Socket	1192907
1040377	11 SB	9/16	14	70	1.44	2.02	.61	1.29	2.41	9/16 - 5/8 Button	1191665
1040395	12 SB	5/8	16	100	1.56	2.42	.67	1.42	2.89	3/4 Socket	1192925
1040411	13 SB	3/4	18-20	131	1.68	2.74	.80	1.55	3.25	3/4 1st Stage	1192462
1040439	14 SB	7/8	22	220	2.00	3.27	.94	1.80	3.86	7/8 1st Stage	1192480
1040457	15 SB	1	25-26	310	2.25	3.67	1.06	2.05	4.36	1 1st Stage	1192505
1040475	16 SB	1-1/8	28-29	450	2.56	4.05	1.19	2.30	4.81	1-1/8 1st Stage	1192523
1040493	17 SB	1-1/4	31-32	650	2.81	4.57	1.33	2.56	5.42	1-3/8 Socket	1193023

\* NOTE: Length is measured from outside end of termination. Fittings designed only to be used on exact sizes listed.

## Crosby® Snatch Blocks: Single Sheave Hook

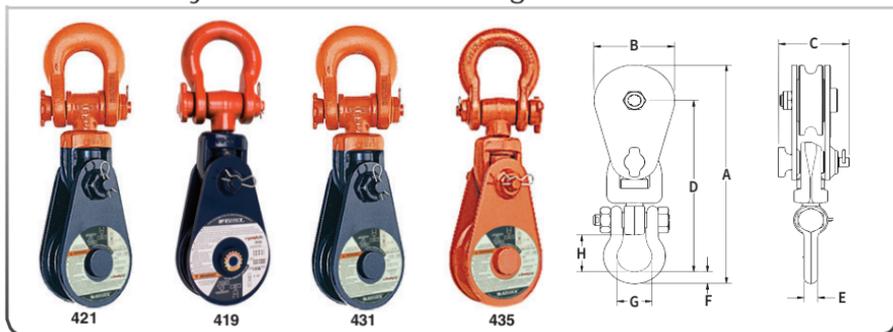


- Opening feature permits easy insertion of rope without reeving, or while the block is suspended.
- Bolt for opening feature is retained, to ensure no lost bolts.
- Forged steel swivel tees, yokes and hooks.
- Furnished with a latch installed.
- Can be furnished with bronze bushings or roller bearings.
- Center pin equipped with pressure lube fitting.
- All sizes feature sheave grooves suited for a range of wire line diameters.
- Meets or exceeds all requirements of ASME B30.26 including identification ductility, design factor, proof load and temperature requirements. Importantly, these blocks meet other critical performance requirements including fatigue life and material traceability, not addressed by ASME B30.26.
- All blocks are RFID EQUIPPED.
- \*All Alloy\* snatch blocks feature a significant reduction in weight compared to snatch blocks made of non-alloy materials.
- Crosby's Engineered Solutions Group is ready to discuss your requirements and help select or develop the ideal block for your application.

Working Load Limit (t)*	Wire Rope Size (in)	Sheave Diameter (in)	Bearing Code	Weight Each (lb)	Catalog No.	Description	Stock No.	Dimensions (in)																
								A	B	C	D	E	F	G	H									
15 tonnes																								
15	3/4 - 7/8	8	BB	51	420	Champion	108275	23.50	8.12	5.09	8.34	1.76	16.51	1.50	2.93									
15	3/4 - 7/8	8	RB	51	420	Champion	108276	23.50	8.12	5.09	8.34	1.76	16.51	1.50	2.93									
15	3/4 - 7/8	10	BB	63	420	Champion	108371	25.25	10.12	5.09	8.34	1.76	17.26	1.50	2.93									
15	3/4 - 7/8	10	RB	63	420	Champion	108372	25.25	10.12	5.09	8.34	1.76	17.26	1.50	2.93									
15	3/4 - 7/8	16	BB	130	418	Light Champion	108608	32.25	16.12	5.09	8.34	1.76	21.26	1.50	2.93									
15	3/4 - 7/8	16	RB	130	418	Light Champion	108626	32.25	16.12	5.09	8.34	1.76	21.26	1.50	2.93									
15	7/8 - 1	18	BB	150	418	Light Champion	108644	33.50	18.12	5.09	8.34	1.76	21.51	1.50	2.93									
15	7/8 - 1	18	RB	150	418	Light Champion	108662	33.50	18.12	5.09	8.34	1.76	21.51	1.50	2.93									
20 tonnes																								
20	1 - 1-1/8	8	BB	75	430	Super Champion	120023	25.87	8.12	6.00	9.39	2.00	18.43	1.50	3.38									
20	1 - 1-1/8	8	RB	75	430	Super Champion	120041	25.87	8.12	6.00	9.39	2.00	18.43	1.50	3.38									
20	1 - 1-1/8	10	BB	89	430	Super Champion	120096	27.94	10.12	6.00	9.39	2.00	19.50	1.50	3.38									
20	1 - 1-1/8	10	RB	89	430	Super Champion	120112	27.94	10.12	6.00	9.39	2.00	19.50	1.50	3.38									
20	1 - 1-1/8	12	BB	103	430	Super Champion	120176	30.00	12.25	6.00	9.39	2.00	20.50	1.50	3.38									
20	1 - 1-1/8	12	RB	103	430	Super Champion	120194	30.00	12.25	6.00	9.39	2.00	20.50	1.50	3.38									
20	1 - 1-1/8	14	BB	123	430	Super Champion	120256	32.34	14.00	6.00	9.39	2.00	21.96	1.50	3.38									
20	1 - 1-1/8	14	RB	123	430	Super Champion	120274	32.34	14.00	6.00	9.39	2.00	21.96	1.50	3.38									
25 tonnes																								
25	1 - 1-1/4	8	BB	90	434	All Alloy High Capacity	208896	26.56	8.25	6.13	9.36	2.00	19.06	1.50	3.38									
25	1 - 1-1/4	10	BB	107	434	All Alloy High Capacity	208910	28.63	10.25	6.13	9.36	2.00	20.13	1.50	3.38									
25	1 - 1-1/4	18	BB	240	430	Super Champion	119486	41.41	18.25	7.12	11.76	2.50	27.97	1.94	4.32									
25	1 - 1-1/4	18	RB	240	430	Super Champion	119487	41.41	18.25	7.12	11.76	2.50	27.97	1.94	4.32									
30 tonnes																								
30	1 - 1-1/4	12	BB	165	434	All Alloy High Capacity	208931	36.32	12.25	7.00	11.76	2.50	25.88	1.94	4.32									
30	1 - 1-1/4	14	BB	180	434	All Alloy High Capacity	208932	38.57	14.25	7.00	11.76	2.50	27.13	1.94	4.32									
30	1 - 1-1/4	20	BB	375	430	Super Champion	119507	52.15	20.25	8.31	15.24	3.00	36.12	2.25	5.91									
30	1 - 1-1/4	20	RB	375	430	Super Champion	119516	52.15	20.25	8.31	15.24	3.00	36.12	2.25	5.91									
30	1 - 1-1/4	24	BB	450	430	Super Champion	119525	55.75	24.25	8.31	15.24	3.00	37.75	2.25	5.91									
30	1 - 1-1/4	24	RB	450	430	Super Champion	119534	55.75	24.25	8.31	15.24	3.00	37.75	2.25	5.91									

\* Ultimate Load is 4 times the Working Load Limit.

## Crosby® Snatch Blocks: Single Sheave Shackle

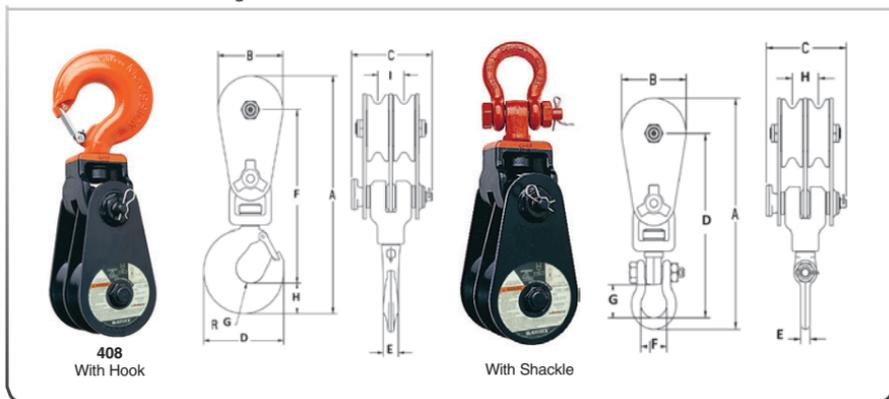


- Opening feature permits easy insertion of rope without reeving, or while the block is suspended.
  - Bolt for opening feature is retained, to ensure no lost bolts.
  - Forged steel swivel tees, yokes and shackles.
  - Can be furnished with bronze bushings or roller bearings.
  - Center pin equipped with pressure lube fitting.
  - All sizes feature sheave grooves suited for a range of wire line diameters.
  - Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements.
- Importantly, these blocks meet other critical performance requirements including fatigue life and material traceability, not addressed by ASME B30.26.
- All blocks are RFID EQUIPPED.
  - \*All Alloy\* snatch blocks feature a significant reduction in weight compared to snatch blocks made of non-alloy materials.
  - Crosby's Engineered Solutions Group is ready to discuss your requirements and help select or develop the ideal block for your application.

Working Load Limit (t)*	Wire Rope Size (in)	Sheave Diameter (in)	Bearing Code	Weight Each (lb)	Catalog No.	Description	Stock No.	Dimensions (in)							
								A	B	C	D	E	F	G	H
15 tonnes															
15	3/4 - 7/8	8	BB	59	421	Champion	108308	23.00	8.12	5.09	1719	1.50	1.75	3.12	3.12
15	3/4 - 7/8	8	RB	59	421	Champion	108309	23.00	8.12	5.09	1719	1.50	1.75	3.12	3.12
15	3/4 - 7/8	10	BB	68	421	Champion	108390	24.75	10.12	5.09	1794	1.50	1.75	3.12	3.12
15	3/4 - 7/8	10	RB	68	421	Champion	108391	24.75	10.12	5.09	1794	1.50	1.75	3.12	3.12
15	3/4 - 7/8	16	BB	130	419	Light Champion	109607	31.75	16.12	5.09	2200	1.50	1.75	3.12	3.12
15	3/4 - 7/8	16	RB	130	419	Light Champion	109625	31.75	16.12	5.09	2200	1.50	1.75	3.12	3.12
15	7/8 - 1	18	BB	159	419	Light Champion	109643	33.12	18.12	5.09	2225	1.50	1.75	3.12	3.12
15	7/8 - 1	18	RB	159	419	Light Champion	109661	33.12	18.12	5.09	2225	1.50	1.75	3.12	3.12
20 tonnes															
20	1 - 1-1/8	8	BB	92	431	Super Champion	121022	26.57	8.12	6.00	1976	2.00	2.75	3.72	4.00
20	1 - 1-1/8	8	RB	92	431	Super Champion	121040	26.57	8.12	6.00	1976	2.00	2.75	3.72	4.00
20	1 - 1-1/8	10	BB	112	431	Super Champion	121095	28.64	10.12	6.00	2072	2.00	2.75	3.72	4.00
20	1 - 1-1/8	10	RB	112	431	Super Champion	121111	28.64	10.12	6.00	2072	2.00	2.75	3.72	4.00
20	1 - 1-1/8	12	BB	130	431	Super Champion	121175	30.65	12.25	6.00	2178	2.00	2.75	3.72	4.00
20	1 - 1-1/8	12	RB	130	431	Super Champion	121193	30.65	12.25	6.00	2178	2.00	2.75	3.72	4.00
20	1 - 1-1/8	14	BB	160	431	Super Champion	121255	33.00	14.00	6.00	2325	2.00	2.75	3.72	4.00
20	1 - 1-1/8	14	RB	160	431	Super Champion	121273	33.00	14.00	6.00	2325	2.00	2.75	3.72	4.00
25 tonnes															
25	1 - 1-1/4	8	BB	103	435	All Alloy High Capacity	208954	27.08	8.25	6.13	2021	2.00	2.75	3.72	4.00
25	1 - 1-1/4	10	BB	117	435	All Alloy High Capacity	208965	29.33	10.24	6.13	2146	2.00	2.75	3.72	4.00
25	1 - 1-1/4	18	BB	270	431	Super Champion	119495	41.36	18.25	7.13	2912	2.00	3.12	3.50	4.81
25	1 - 1-1/4	18	RB	280	431	Super Champion	119496	41.36	18.25	7.13	2912	2.00	3.12	3.50	4.81
30 tonnes															
30	1 - 1-1/4	12	BB	208	435	All Alloy High Capacity	208976	36.61	12.25	7.00	2737	2.00	3.12	3.50	4.81
30	1 - 1-1/4	14	BB	230	435	All Alloy High Capacity	208977	38.86	14.25	7.00	2862	2.00	3.12	3.50	4.81
30	1 - 1-1/4	20	BB	503	431	Super Champion	119589	52.40	20.25	8.31	38.34	2.50	3.94	5.62	7.06
30	1 - 1-1/4	20	RB	485	431	Super Champion	119598	52.40	20.25	8.31	38.34	2.50	3.94	5.62	7.06
30	1 - 1-1/4	24	BB	581	431	Super Champion	119605	56.00	24.25	8.31	40.00	2.50	3.94	5.62	7.06
30	1 - 1-1/4	24	RB	575	431	Super Champion	119614	56.00	24.25	8.31	40.00	2.50	3.94	5.62	7.06
60 tonnes															
60	1 - 1-1/4	12	BB	315	435	All Alloy High Capacity	8027291	41.65	12.12	8.66	33.19	2.06	2.40	5.75	6.12

\* Ultimate Load is 4 times the Working Load Limit.

## Crosby® Snatch Blocks: Double Sheave



- Light champion snatch block as a double sheave block.
- Drop forged swivel hook or swivel shackle.
- Can be furnished with bronze bushings or roller bearings.
- Opening feature permits easy insertion of Wireline in both sheaves with removal of one bolt.
- 408 is furnished with S-4320 hook latch.
- Center Pin equipped with pressure lube fittings.
- All sizes feature sheave grooves suited for a range of wire line diameters.
- Meets or exceeds all requirements of ASME B30.26 including identification, ductility, design factor, proof load and temperature requirements. Importantly, these blocks meet other critical performance requirements including fatigue life and material traceability, not addressed by ASME B30.26.
- Crosby's Engineered Solutions Group is ready to discuss your requirements and help select or develop the ideal block for your application.

### 408 Light Champion Double Sheave with Hook

Working Load Limit (t)*	Wire Rope Size (in)	Sheave Diameter (in)	Bearing Code	Weight Each (lb)	Catalog No.	Stock No.	Dimensions (in)											
							A	B	C	D	E	F	G	H	I			
4 tonnes																		
4	3/8 - 1/2	4.5	BB	18	408	104023	14.77	4.24	5.25	5.24	1.00	10.78	0.94	1.87	1.72			
12 tonnes																		
12	5/8 - 3/4	6	BB	45	408	104103	21.12	6.00	6.13	7.86	1.56	15.50	1.44	2.62	2.03			
12	5/8 - 3/4	6	RB	45	408	104121	21.12	6.00	6.13	7.86	1.56	15.50	1.44	2.62	2.03			
12	5/8 - 3/4	8	BB	53	408	104185	23.18	8.12	6.13	7.86	1.56	16.50	1.44	2.62	2.03			
12	5/8 - 3/4	8	RB	53	408	104201	23.18	8.12	6.13	7.86	1.56	16.50	1.44	2.62	2.03			

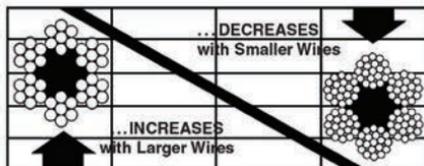
\* Ultimate Load is 4 times the Working Load Limit.

### 409 Light Champion Double Sheave with Shackle

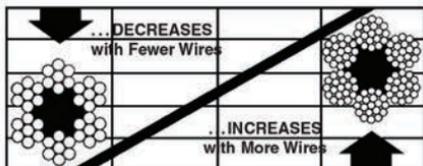
Working Load Limit (t)*	Wire Rope Size (in)	Sheave Diameter (in)	Bearing Code	Weight Each (lb)	Catalog No.	Stock No.	Dimensions (in)										
							A	B	C	D	E	F	G	H			
4 tonnes																	
4	3/8 - 1/2	4.5	BB	18	409	105022	14.03	4.24	5.25	11.22	0.62	1.70	2.01	1.72			
12 tonnes																	
12	5/8 - 3/4	6	BB	50	409	105102	21.12	6.00	6.13	16.36	1.50	3.12	3.12	2.03			
12	5/8 - 3/4	6	RB	50	409	105120	21.12	6.00	6.13	16.36	1.50	3.12	3.12	2.03			
12	5/8 - 3/4	8	BB	58	409	105184	23.17	8.12	6.13	17.36	1.50	3.12	3.12	2.03			
12	5/8 - 3/4	8	RB	58	409	105200	23.17	8.12	6.13	17.36	1.50	3.12	3.12	2.03			

\* Ultimate Load is 4 times the Working Load Limit.

### ABRASION RESISTANCE



### FATIGUE RESISTANCE



## Wire Rope

Nominal Strengths and Weights – 6 x 19 Class – 6 x 36 Class

DIAMETER IN INCHES	NOMINAL STRENGTH IN TONS OF 2000 POUNDS			APPROXIMATE WEIGHT PER FOOT IN POUNDS	
	IMPROVED PLOW STEEL		EXTRA IMPROVED PLOW STEEL		
	FIBER CORE	IWRC	IWRC	FIBER CORE	IWRC
3/16	1.55	1.67	—	.059	.065
1/4	2.74	2.94	3.40	.105	.116
5/16	4.26	4.58	5.27	.164	.18
3/8	6.10	6.56	7.55	.236	.26
7/16	8.27	8.89	10.2	.32	.35
1/2	10.7	11.5	13.3	.42	.46
9/16	13.5	14.5	16.8	.53	.59
5/8	16.7	17.9	20.6	.66	.72
3/4	23.8	25.6	29.4	.95	1.04
7/8	32.2	34.6	39.8	1.29	1.42
1	41.8	44.9	51.7	1.68	1.85
1-1/8	52.6	56.5	65.0	2.13	2.34
1-1/4	64.6	69.4	79.9	2.63	2.89
1-3/8	77.7	83.5	96.	3.18	3.50
1-1/2	92.0	98.9	114.	3.78	4.16
1-5/8	107.	115.	132.	4.44	4.88
1-3/4	124.	133.	153.	5.15	5.67
1-7/8	141.	152.	174.	5.91	6.50
2	160.	172.	198.	6.72	7.39
2-1/8	179.	192.	221.	7.59	8.35
2-1/4	200.	215.	247.	8.51	9.36
2-3/8	222.	239.	274.	9.48	10.4
2-1/2	244.	262.	302.	10.5	11.6
2-5/8	268.	288.	331.	11.6	12.8
2-3/4	292.	314.	361.	12.7	14.0
2-7/8	317.	341.	393.	13.9	15.3
3	—	370.	425.	—	16.6
3-1/8	—	399.	458.	—	18.0
3-1/4	—	429.	492.	—	19.5
3-3/8	—	459.	529.	—	21.0
3-1/2	—	491.	564.	—	22.6

Available galvanized at 10% lower strengths, or in equivalent strengths on special request.

## Rotation Resistant Wire Ropes

In certain instances the use of rotation resistant wire rope is necessary to provide rotational stability to the lifted load. In general, the use of these specialized wire ropes is limited to those situations where it is impractical to:

1. Use a tag line.
2. Relocate rope dead end.
3. Increase sheave sizes.
4. Eliminate "odd-part" reeving.
5. Significantly reduce rope loading and rope length.

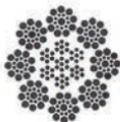
Rotation resistant wire ropes have less of a tendency to unlay when loaded than do conventional wire ropes. This results in improved rotational stability to the lifted load within a safe working load range. Rotation resistant wire ropes are designed in such a way that the rotational force of the outer rope is partially counteracted by the rotational force of the inner rope when the rope is subjected to a load.

The rated strengths of rotation resistant ropes are less than the conventional 6 x 19 and 6 x 36 Classification wire ropes, and larger sheaves and drums are required in order to achieve comparable fatigue life. Drum and sheave diameters should be 34 to 36 times rope diameter for the 19 x 7 and 35 x 7 rotation resistant ropes and 21 to 27 times rope diameter for 8 x 19 rotation resistant ropes.

Flex Pac 19 and Super Flex Pac 19 are rotation resistant ropes with the same nominal strengths as 6 x 19 IWRC ropes in the EIP and EEIP grades. The compacted strands resist drum crushing, and improve rope flexibility in this rotation resistant rope.

The required 5:1 strength design factor of rotation resistant rope becomes very important from the standpoint of maintaining the inherent low rotation of the rope and eliminating any tendency to overload the inner rope and thereby causing a reduction in rope strength. The use of a swivel must also be prohibited in actual operation, since this allows the inner rope to twist tighter and become weakened.

### 8 x 19 and 8 x 25 Rotation Resistant



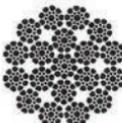
8 x 19 Seale with IWRC  
Rotation Resistant

### 19 x 7 Rotation Resistant



19 x 7 Rotation Resistant

### Flex Pac 19 Rotation Resistant



Flex Pac 19  
Rotation Resistant

Rope Diam. In.	Approx. Weight lb./ft.	Nominal Strength, tons of 2000 lbs.*	
		Purple	Purple Plus
1/2	.47	10.2	11.7
9/16	.60	12.8	14.7
5/8	.73	15.7	18.1
3/4	1.06	22.6	25.9
7/8	1.44	30.5	35.0
1	1.88	39.6	45.5
1 1/8	2.39	49.8	57.3
1 1/4	2.94	61.3	70.5
1 3/8	3.56	73.8	84.9
1 1/2	4.24	87.3	100.0

Rope Diam. In.	Approx. Weight lb./ft.	Nominal Strength, tons of 2000 lbs.*	
		Purple	Purple Plus
3/16	.064	1.42	1.57
1/4	.113	2.51	2.77
5/16	.177	3.90	4.30
3/8	.25	5.59	6.15
7/16	.35	7.58	8.33
1/2	.45	9.85	10.8
9/16	.58	12.4	13.6
5/8	.71	15.3	16.8
3/4	1.02	21.8	24.0
7/8	1.39	29.5	32.5
1	1.82	38.3	42.2
1 1/8	2.30	48.2	53.1
1 1/4	2.84	59.2	65.1
1 3/8	3.43	71.3	78.4
1 1/2	4.08	84.4	92.8
1 5/8	4.80	98.4	108.0
1 3/4	5.57	114.0	125.0

Rope Diam. In.	Approx. Weight lb./ft.	Nominal Strength, tons of 2000 lbs.*	
		Flex Pac	Super Flex Pac
3/8	.31	7.55	8.3
7/16	.42	10.2	11.2
1/2	.54	13.3	14.6
9/16	.69	16.8	18.5
5/8	.83	20.6	22.7
1/2	.45	9.85	10.8
9/16	.58	12.4	13.6
5/8	.71	15.3	16.8
3/4	1.19	29.4	32.3
7/8	1.62	39.8	43.8
1	2.12	51.7	57.5
1 1/8	2.68	65.0	71.5
1 1/4	3.31	79.9	87.9
1 3/8	4.01	96.0	78.4
1 1/2	4.77	114.0	125.0

\*These strengths apply only when a test is conducted with both ends fixed. When a rope is in use, its strength is reduced if one end is free to rotate. Acceptance strength is not less than 2 1/2% below the nominal strengths listed.

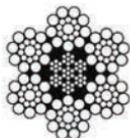


For further information on 35 x 7 Rotation Resistant Rope, please consult our Engineering Department.

35 x 7  
Rotation Resistant

## Wire Rope Cross Sections

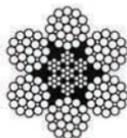
### 6 x 19 Classification



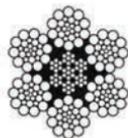
6 x 19 Seale  
IWRC



6 x 21 Filler Wire  
FC

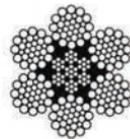


6 x 25 Filler Wire  
IWRC

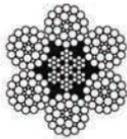


6 x 26 Warrington Seale  
IWRC

### 6 x 36 Classification



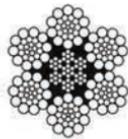
6 x 31 Warrington Seale  
IWRC



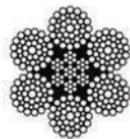
6 x 36 Seale Filler Wire  
IWRC



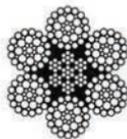
6 x 36 Warrington Seale  
FC



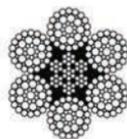
6 x 31 Filler Wire Seale  
IWRC



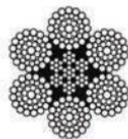
6 x 41 Warrington Seale  
IWRC



6 x 41 Seale Filler Wire  
IWRC



6 x 46 Seale Filler Wire  
IWRC

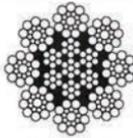


6 x 49 Filler Wire Seale  
IWRC

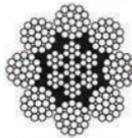
Cross sections of rotation resistant rope constructions.



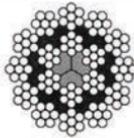
3 x 19 Seale



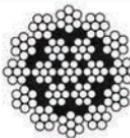
8 x 19 Seale  
IWRC



8 x 25 Filler Wire  
IWRC



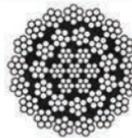
8 x 17  
FC



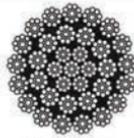
19 x 7



19 x 19 Seale



35 x 7



35 x 19 Seale

## Wire Rope Inspection

Any wire rope in use should be inspected on a regular basis. You have too much at stake in lives and equipment to ignore thorough examination of the rope at prescribed intervals.

The purpose of inspection is to accurately estimate the service life and strength remaining in a rope so that maximum service can be had within the limits of safety. Results of the inspection should be recorded to provide a history of rope performance on a particular job. On most jobs wire rope must be replaced before there is any risk of failure. A rope broken in service can destroy machinery and curtail production. It can also kill.

Because of the great responsibility involved in ensuring safe rigging on equipment, the man assigned to inspect should know wire rope and its operation thoroughly. Inspections should be made regularly and the results recorded.

When inspecting the rope, the condition of the drum, sheaves, guards, cable clamps and other end fittings should be noted. The condition of these parts affects rope wear: any defects detected should be repaired.

To ensure rope soundness between inspections, all workers should participate. The operator can be most helpful by watching the ropes under his control. If any accident involving the ropes occurs, the operator should immediately shut down his equipment and report the accident to his supervisor. The equipment should be inspected before resuming operation.

The Occupational Safety and Health Act has made periodic inspection mandatory for most wire rope applications.

### Just looking at the rope is not enough

When an inspector takes a look at a rope, he may see sections showing excessive wear. By flagging the rope, he can quickly determine where the rope is rubbing or contacting parts of the equipment, and then repair, replace, or modify the condition causing the wear.

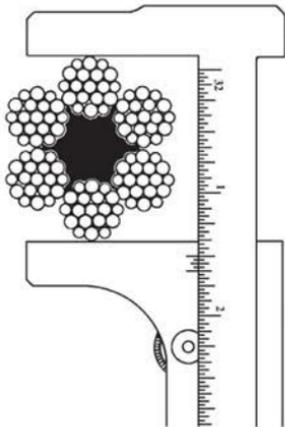
Inspections of sheaves is a relatively simple, yet very vital task. A sheave groove gauge, usually obtainable from a wire rope manufacturer, is used to check the grooves in a sheave. Hold the gauge perpendicular to the surface of the groove to observe properly the groove size and contour, as in this illustration.



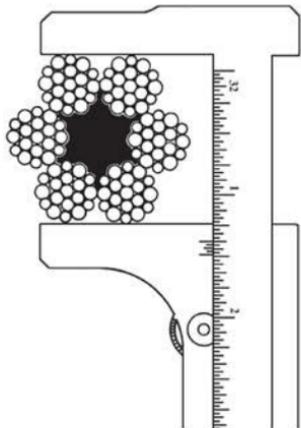
Photo shows new gauge and worn sheave. This new gauge is designed with one-half the allowable oversize (see table). Using the new gauge, when you do not see light, the sheave is OK. When you do see light under the new gauge, the sheave should be replaced.

Nominal Rope Diameter	Allowable Rope Oversize	One-half Allowable Rope Oversize
0" - 3/4"	+1/32"	+1/64"
13/16" - 1 1/8"	+3/64"	+3/128"
1 3/16" - 1 1/2"	+1/16"	+1/32"
1 9/16" - 2 1/4"	+3/32"	+3/64"
2 5/16" - and larger	+1/8"	+1/16"

## Wire Rope Inspection



**Right way.** Set the machinist's caliper to read the widest diameter. Vernier scale reads to 1/128th of an inch.



**Wrong way.** This is the wrong way to measure wire rope diameter. Widest diameter is not being read.

### Sheaves should be checked for:

1. Correct groove diameter
2. Roundness or contour to give proper support to the rope
3. Small holes, cracks, uneven surfaces, or other defects that might be detrimental to the rope
4. Extreme deep wear

A sheave should also be checked to make sure it turns freely, is properly aligned, has no broken or cracked flanges, and has bearings that work properly.

Drums should also be inspected for signs of wear that could damage rope.

Plain-faced or smooth drums can develop grooves or impressions that prevent rope from winding properly. Repair by resurfacing the face or replacing the lagging.

Scrubbing will occur if the rope tends to close wind. If the tendency is to open winding, the rope will encounter abnormal abuse as the second layer forces itself down between the open wraps of the first layer on the drum.

Operating with a smooth drum calls for special care. Be sure the rope is always tightly wound and thread laid on the first layer. Any loosening of the line is easily observed as the winding will be bad and the rope will be coming off with a series of "bad spots."

Grooved drums should be examined for tight or corrugated grooves and for differences in depth or pitch that could damage the second and subsequent layers. Worn grooves can develop extremely sharp edges that shave away small particles of steel from the rope. Correct this condition by grinding or filing a radius to replace the sharp edge.

Drum flanges, as well as the starter, filler and riser strips, should be checked. Excessive wear here often causes unnecessary rope abuse at the change of layers and cross-over points.

Other places of contact such as rollers, scrub boards, guides and end attachments should also be inspected.

### Measure the widest diameter

Ropes and sheave grooves must be precisely fitted to each other to get the most service out of your wire rope dollar. Make measurement of rope diameter a normal part of your inspection program.

There's only one right way to measure rope diameter: use machinist's calipers and be sure to measure the *widest* diameter. The drawings at the left compare the right way with the wrong way.

This method is not only useful for measuring the diameter of a new rope, but also for determining the amount of wear and compression that has occurred while the rope has been in use. Accurate recording of this information is essential in helping to decide when to replace wire rope.

## Common Wire Rope Abuses

Neglect and abuse are the two chief enemies of wire rope life. One costly form of neglect is lack of proper field lubrication. Abuse takes many forms: improper reeling or unreeling, wrong size or worn sheaves, improper storage, bad splicing are a few.

### Condition of Machinery

Wire rope performance depends upon the condition of the equipment on which it operates; poorly maintained equipment will usually result in reduced rope life.

### Effects of Shock-loading and Vibration

The destructive effects of jerking or shock-loading are visually noticeable. Vibration has somewhat the same effect, and is equally destructive. An individual shock may be slight, but many rapidly repeated slight shocks can have the effect of several large shocks.

Vibration which occurs directly above a load is often unavoidable. "Whipping" of the section of rope immediately above the load is also common. In these cases, rapid wire fatigue is possible. For reasons of safety, this section should be examined regularly.

Wire rope failure is usually cumulative. Each repeated overstress brings the rope nearer to failure. Thus, a wire rope may become fatigued to a point close to failure under a heavy load, and actually fail under a *much lighter load*.

### Overstressing

In any hoisting operation, there should be no slack in the wire rope when the load is applied. Otherwise, the resulting stress will be excessive.

Overstressing can also be the result of too-rapid acceleration or deceleration. Wire rope will withstand considerable stress if the load is applied slowly. As with ordinary twine, a quick snap will cause overstressing and breakage. This applies both when starting to lift a load, and when bringing it to a stop.

### Corrosion

Corrosion can seriously shorten wire rope life, both by metal loss and by formation of corrosion pits in the wires. These pits act as stress-concentration points in the wires in much the same manner as do nicks.



**Crushing.** Because of loose winding on drum, rope was pulled in between underlying wraps and crushed out of shape.



**Too sudden load release.** The sudden release of a load caused birdcaging. Here individual strands open away from each other, displacing the core.



**Lack of lubrication.** Premature breakage of wires resulted from "locking" of strands, which was caused by insufficient lubrication.



**Infrequent inspection.** Neglect of periodical inspection left this rope in service too long, resulting in considerable abrasion.



**Improper handling.** Kink or "dog leg" was caused by improper handling and/or installation. A kink causes excessive localized or spot abrasion.

## Wire Rope Abuse (continued)

Wire rope left on machines shut down for long periods of time deteriorates rapidly. To preserve the rope for future use, it should be removed, cleaned, and thoroughly lubricated.

### Causes of Corrosion Damage

Pitting, erosion, and surface effects of many different types can all result in corrosion damage. Because they tend to increase corrosion, the following conditions should be considered and noted when applicable, during the ordering of wire rope — acid and alkaline solutions, gases, fumes, brine and salt air, sulphurous compounds, and high humidity and temperature. Lubricants are readily available to reduce the severity of attack of most of these conditions.

### Effects of Severe Heat

Where wire rope is subjected to severe heat (e.g., foundry cranes) it will not give the service expected because it will deteriorate more quickly.

Wire ropes exposed to hot-metal handling or other extreme heat sometimes require independent wire rope cores.

### Shifting Ropes From One Job to Another

Sometimes an idle wire rope from one operation is installed on another to keep the rope in continuous service. This extremely poor practice is an expensive "economy."

Because wire rope tends to "set" to the conditions of its particular operating job, the differing bends, abrasions, and stresses of a new operations can produce premature failure. Therefore, for maximum life and efficiency, a rope should be used only on the job for which it has been specified.

### Machinery Operation

Some operators are harder on their machinery than others and as a result they get shorter rope life. In certain instances, enough extra work is done to more than offset the additional wear-and-tear on equipment and wire rope. The operation may be more efficient from the production standpoint as a result, but those in charge of rope purchases should be made aware of the probable reduction in rope life and increased rope costs.



**Reverse bending.** Running this rope over one sheave and under another caused fatigue breaks in wires.



**Excessive exposure to elements.** Too much exposure combined with surface wear and loss of lubrication caused corrosion and pitting.



**Too long in service.** Repeated winding and overwinding of this rope on a drum while it was under heavy stress caused the unusually severe wear shown.



**Undersize sheave grooves.** Sheaves were too small, causing strands to pinch. Wires then fail in the valley between the strands.



**Poor work procedures.** Damage to strands and wires resulted from electric arcing.



**Lack of knowledge.** Here's what occurs when a loop which has been "pulled through" and tightened remains in service.

## The “X Chart”—Abrasion Resistance vs. Bending—Fatigue Resistance

While there is a possibility, there is little likelihood that an application can be found for which there is a precisely suitable wire rope — one that can satisfy every indicated requirement.

As with all engineering design problems, feasible solutions demand compromise to some degree. At times, it becomes necessary to settle for less than optimum resistance to abrasion in order to obtain maximum flexibility; the latter being a more important requirement for the given job. A typical example of this kind of trade-off would be in selecting a highly flexible rope on an overhead crane. Conversely, in a haulage installation, a rope with greater resistance to abrasion would be chosen despite the fact that such ropes are markedly less flexible.

Two compelling factors that govern most decisions as to the selection of a wire rope are: *abrasion resistance*, and *resistance to bending fatigue*. Striking a proper balance with respect to these two important characteristics demands judgment of a very high order. A graphic presentation of just such comparison of qualities between the most widely used rope constructions and others is given by means of *X-chart*.

Referring to this chart when selecting a rope, the mid-point (at the X) comes closest to an even balance between abrasion resistance and resistance to bending fatigue. Reading up or down along either leg of the X, the inverse relationship becomes more apparent as one quality increases and the other decreases.

### Effect of Sheave Size

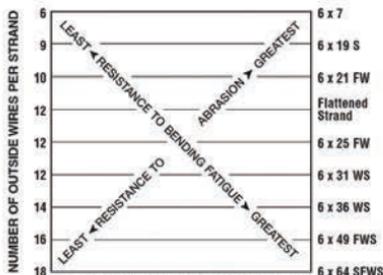
Wire ropes are manufactured in a great variety of constructions to meet the varying demands of wire rope usage. Where abrasion is an important factor, the rope must be made of a coarse construction containing relatively large wires. In other cases, the great amount of bending to which the rope is subjected is more important. Here, a more flexible construction,

containing many relatively small wires, is required. In either case, however, if the rope operates over inadequate size sheaves, the severe bending stresses imposed will cause the wires to break from fatigue, even though actual wear is slight. The smaller the diameter of the sheave, the sooner these fatigue breaks will occur and the shorter rope life becomes.

Another undesirable effect of small sheaves is accelerated wear of both rope and sheave groove. The pressure per unit area of rope on sheave groove for a given load is inversely proportional to the size of the sheave. In other words, the smaller the sheave the greater the rope pressure per unit area on the groove. Both sheaves and rope life can obviously be prolonged by using the proper diameter sheave for the size and construction of rope.

Sheave diameter can also influence rope strength. When a wire rope is bent around a sheave, there is a loss of effective strength due to the inability of the individual strands and wire to adjust themselves entirely to their changed position. Tests show that rope strength efficiency decreases to a marked degree as the sheave diameter is reduced with respect to the diameter of the rope.

Therefore, it is evident that a definite relationship exists between rope service and sheave size. As a guide to rope users, wire rope manufacturers have established standards for sheave sizes to be used with various rope constructions. To secure the most economical service, it is important that the suggested size of sheaves given below be used.



The wire rope industry refers to this as the X-chart. It serves to illustrate the inverse relationship between abrasion resistance and resistance to bending fatigue in a representative number of the most widely used wire ropes.

### Proper Sheave and Drum Sizes

Construction	Suggested D/d* ratio	Minimum D/d* ratio
6 x 7	72	42
19 x 7 or 18 x 7 Rotation Resistant	51	34
6 x 19 Seale	51	34
6 x 27 H flattened strand	45	30
6 x 31 V flattened strand	45	30
6 x 21 filler wire	45	30
6 x 25 filler wire	39	26
6 x 31 Warrington Seale	39	26
6 x 36 Warrington Seale	35	23
8 x 19 Seale	41	27
8 x 25 filler wire	32	21
6 x 41 Warrington Seale	32	21
6 x 42 filler	21	14

\*D = tread diameter of sheave    d = nominal diameter of rope

## Wire Rope Strength Design Factor

The rope strength design factor is the ratio of the rated strength of the rope to its operating stress. If a particular rope has a rated strength of 100,000 lbs. and is working under an operating stress of 20,000 lbs., it has a rope strength design factor of 5. It is operating at one-fifth or 20% of its rated strength.

Many codes refer to this factor as the "Safety Factor" which is a misleading term, since this ratio obviously does not include the many facets of an operation which must be considered in determining safety.

Wire rope is an expendable item — a replacement part of a machine or installation. For economic and other reasons, some installations require ropes to operate at high stresses (low rope strength design factors). On some installations where high risk is involved, high rope strength design factors must be maintained. However, operating and safety codes exist for most applications and these codes give specific factors for usage. When a machine is working and large dynamic loadings (shock loadings) are imparted to the rope, the rope strength design factor will be reduced which could result in overstressing of the rope. Reduced rope strength design factors frequently result in reduced service life of wire rope.

### O.S.H.A. (A.N.S.I.) Removal Criteria 5. A.N.S.I. Safety Codes, Standards and Requirements —

rope must be removed from service when diameter loss or wire breakage occurs as follows:

#### Diameter loss

Original Diameter (in.)	Loss (in.)
$\frac{5}{16}$ & smaller	$\frac{1}{64}$
$\frac{3}{8}$ — $\frac{1}{2}$	$\frac{1}{32}$
$\frac{9}{16}$ — $\frac{3}{4}$	$\frac{3}{64}$
$\frac{7}{8}$ — $1\frac{1}{8}$	$\frac{1}{16}$
$1\frac{1}{4}$ — $1\frac{1}{2}$	$\frac{3}{32}$

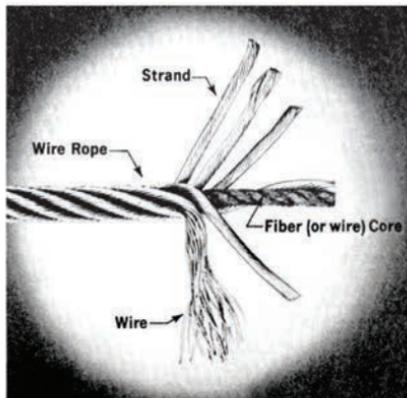
#### Number of wire breaks

A.N.S.I. NO.	Equipment	Number broken wires in running ropes		Number broken wires in standing ropes	
		in one rope lay	in one strand	in one rope lay	at end connection
B30.2	Overhead & Gantry Cranes	12	4	Not specified	Not specified
B30.4	Portal, Tower & Pillar Cranes	6	3	3	2
B30.5	Crawler, Locomotive & Truck Cranes	6	3	3	2
B30.6	Derricks	6	3	3	2
B30.7	Base Mounted Drum Hoists	6	3	3	2
B30.8	Floating Cranes & Derricks	6	3	3	2
A10.4	Personnel Hoists	6*	3	2*	2
A10.5	Material Hoists	6*	Not specified	Not specified	Not specified

\*Also remove for 1 valley break. OSHA requires monthly record keeping of wire rope condition.

Note: Current industry recommendations and OSHA Standards are based upon the use of steel sheaves. The manufacturer of plastic or synthetic sheaves or liners should be consulted for their recommendations on the safe application of their product, and possible revision in rope inspection criteria when used with their product.

## Wire Rope Information



### Understand what the “lays” of wire rope mean

“Lay” of a wire rope is simply a description of the way wires and strands are placed during construction. Right lay and left lay refer to the direction of strands. Right lay means that the strands pass from left to right across the rope. Left lay means just the opposite; strands pass from right to left.

Regular lay and lang lay describe the way wires are placed within each strand. Regular lay means that wires in the strands are laid opposite in direction to the lay of the strands. Lang lay means that wires are laid in the same direction as the lay of the strands.

Most of the wire rope used is right lay, regular lay. This specification has the widest range of applications and meets the requirements of most equipment. In fact, other lay specifications are considered exceptions and must be requested when ordering.

### Here are some exceptions

Lang lay is recommended for many excavating, construction, and mining applications, including draglines, hoist lines, dredgelines and other similar lines. Here’s why. Lang lay ropes are more flexible than regular lay ropes. They also have greater wearing surface per wire than regular lay ropes.

Where properly recommended, installed and used, lang lay ropes can be used to greater advantage than regular lay ropes. However, lang lay ropes are more susceptible to the abuses of bending over small diameter sheaves, pinching in undersize sheave grooves, crushing when winding on drums, and failing due to excessive rotation. Left lay rope has greatest usage in oil fields on rod and tubing lines, blast hole rigs, and spudders where rotation of right lay rope would loosen couplings. The rotation of a left lay rope tightens a standard coupling.

A wire rope is a piece of flexible, multi-wired, stranded machinery made of many precision parts.

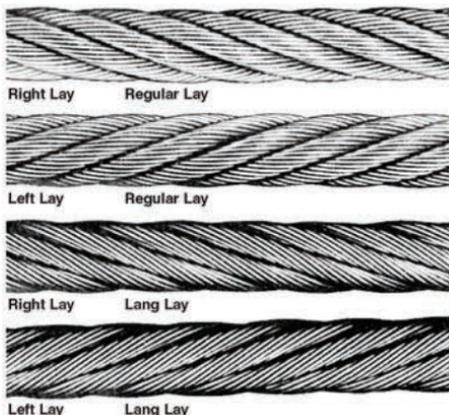
Usually a wire rope consists of a core member, around which a number of multi-wired strands are “laid” or helically bent. There are two general types of cores for wire rope—fiber cores and wire cores. The fiber core may be made from natural or synthetic fibers. The wire core can be an independent Wire Core (IWRC), a Strand Core (SC).

The purpose of the core is to provide support and maintain the position of the outer strands during operation.

Any number of multi-wired strands may be laid around the core. The most popular arrangement is six strands around the core, as this combination gives the best balance.

The number of wires per strand may vary from 3 to 91, with the majority of wire ropes falling into the 7-wire, 19-wire, or 36-wire strand categories.

### Length of service depends on how you treat your wire ropes.



## Basic Lift Engineering

### Every Lift Uses 1 of 3 Basic Hitches

**STRAIGHT OR VERTICAL**, attachment, is simply using a sling to connect a lifting hook to a load. Full rated lifting capacity of the sling may be utilized, but must not be exceeded. Whenever a single sling is used in this manner, a tagline should be used to prevent load rotation which may cause damage to the sling.

When two or more slings are attached to the same lifting hook in straight, or vertical, manner, the total hitch becomes, in effect, a lifting bridle, and the load is distributed among the individual slings.

**CHOKER** hitches reduce lifting capability of a sling, since this method of rigging affects ability of the wire rope components to adjust during the lift. A choker is used when the load will not be seriously damaged by the sling body—or the sling damaged by the load, and when the lift requires the sling to snug up against the load.

The diameter of the bend where the sling contacts the load should keep the point of choke against the sling **BODY**—never against a splice or the base of the eye. When a choke is used, the sling rated capacity must be adjusted downward to compensate for loss of capability.

A choker hitch should be pulled tight before a lift is made—**NOT PULLED DOWN DURING THE LIFT**. It is also dangerous to use only one choker hitch to lift a load which might shift or slide out of the choke.

**BASKET** hitches distribute a load between the two legs of a sling—within limitations described below. Capacity of a sling used in a basket is affected by the bend, or curvature, where the sling body comes in contact with the load—just as any sling is affected and limited by bending action, as over a sheave.



### Calculating the Load on Each Leg of a Sling

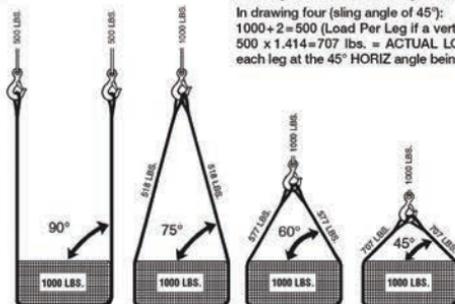
As the horizontal angle between the legs of a sling decreases, the load on each leg increases. The effect is the same whether a single sling is used as a basket, or two slings are used with each in a straight pull, as with a 2-legged bridle.

Anytime pull is exerted at an angle on a leg—or legs—of a sling, the load per leg can be determined by using the data in the table at right. Proceed as follows to calculate this load—and determine the rated capacity required of the sling, or slings, needed for a lift.

1. First, divide the total load to be lifted by the number of legs to be used. This provides the load per leg if the lift were being made with all legs lifting vertically.
2. Determine the angle.
3. Then **MULTIPLY** the load per leg (as computed in No. 1 above) by the Load Factor for the leg angle being used (from the table at right) – to compute the **ACTUAL LOAD** on each leg for this lift and angle. **THE ACTUAL LOAD MUST NOT EXCEED THE RATED SLING CAPACITY.**

Thus, in drawing three (sling angle at 60°):  
 $1000 \div 2 = 500$  (Load Per Leg if a vertical lift)  
 $500 \times 1.154 = 577$  lbs. = **ACTUAL LOAD** on each leg at the 60° **HORIZ** angle being used.

In drawing four (sling angle of 45°):  
 $1000 \div 2 = 500$  (Load Per Leg if a vertical lift)  
 $500 \times 1.414 = 707$  lbs. = **ACTUAL LOAD** on each leg at the 45° **HORIZ** angle being used.



LEG ANGLE (Degrees)	LOAD FACTOR
90°	1.000
85°	1.003
80°	1.015
75°	1.035
70°	1.064
65°	1.103
60°	1.154
55°	1.220
50°	1.305
45°	1.414

## Lift Engineering

### Effect of Angles

Various sling manufacturers refer in their specification tables to leg angles of slings during lifts — since these angles have a direct relationship to lifting capability of a sling. Regardless of how the sling angle may be stated, or the method used to compute stress in a sling leg, the sling is the same. Capacity does not change—but stresses on sling legs change with rigging angles.

Much misunderstanding results because the carrying capacity of a sling leg is reduced by the rigging angle. What happens is that the operator is lifting the load straight up (vertical) while the legs are pulled at an angle, thereby causing a disadvantage.

For quick figuring in the shop, a 60-degree leg angle causes a loss in lifting capacity of 15%...a 45-degree angle reduces capacity by 30%...and a 30-degree angle, 50%. This rule of thumb is not 100% accurate, but is easy to remember and slightly on the safe side.

It is always good practice, within limits, to keep the sling leg angle as large as possible. The length and width of the load sling length, and available headroom are determining factors in this sling angle.

It is neither economical nor good practice to exceed a 45-degree sling leg angle.

Angles less than 45 degrees increase tension significantly in the sling legs, they also create a much greater "in-pull" on the ends of the load. This produces eccentrically loaded column effect, as an engineer would describe it — meaning simply that long, slender objects have a tendency to buckle. Angles less than 45 degrees indicate some thought should be given to the use of a lifting beam or other device in connection with the lift.

Studying typical sling charts readily reveals that lifting capacities on slings are misleading unless the sling angle is stated. The same sling that will handle 10 tons at an 85-degree leg angle will only handle 5 tons if this angle is decreased to 30 degrees.

### Good Sling Practice

Regardless what type of sling may be employed, there are accepted good working rules which will help increase useful sling life, as well as improve safety. These include:

1. Use the proper sling for the lift. Whether Twin-Path® Sling, Web, Chain, or Wire Rope, the proper sling is the one with the best combination of work and handling feature of the proper length and rated capacity for the situation.

2. Start and stop slowly. Crane hooks should be raised slowly until the sling becomes taut and the load is suspended. Lifting or lowering speed should be increased or decreased gradually. Sudden starts or stops place heavier loads on a sling — comparable to jamming the brakes on a speeding automobile. A rule of thumb: Shock loads can double the stress on a sling — or more.
3. If possible, set the load on blocks. Pulling a sling from under a load causes abrasion and "curling" — making the sling harder to handle on the next lift while reducing strength through loss of material.
4. Slings rigged on edges or corners can cut. Use CornerMax® Pads or Sleeves for engineered cut protection.
5. Store in a dry room. Moisture is a natural enemy of wire rope — as are acid fumes and other caustic gases.
6. Avoid handling hot material or objects in direct contact with the sling. Strength goes down as temperature goes up!
7. Dropping casting, tools or heavy objects on slings, or running over them with trucks, can cause damage. Always hang slings when not in use.
8. Use hooks properly. "Point loading" reduces hook capacity. Pull should be straight in the line of lift.

### SELECTING A SLING

The following is presented as a guide only to help in selection of a sling for a lift.

1. Determine the Load: The weight of the load must be known. This is always the starting point.
2. Decide the Hitch: Shape and bulk of the load must be accommodated as well as weight. Determine whether a straight attachment at some point on the load, a choker around the load, or some form of basket hitch will best control the load during the lift.
3. Adequacy of Lifting Device: The lifting device must have adequate capacity for making the lift, and provide any maneuverability required once the load is hoisted.
4. Room to Lift: Make certain the lifting device has sufficient headroom to raise the load to the height required. Headroom will affect the length of sling.
5. Length of Sling: By applying your decision on the type of hitch to knowledge of the headroom offered by the lifting device, the length of sling can be calculated.
6. Use Rated Capacity Chart: Always double check that the sling type and capacity you choose, when rigged at the angle determined by the length of the sling, or the specific type of hitch, will handle the load.

Attaching the sling and completing the lift should be an orderly procedure without "surprises" when these steps have been followed. Two further precautions should be noted, however.

First, plan to protect both load and sling from damage at sharp corners, etc. CornerMax® and Synthetic Armor™ Wear Pads should be provided at the lift site. A protective pad should be used anytime a sling passes around a sharp corner.

Last — by no means unimportant by being last — every sling should be visually examined from end to end BEFORE EVERY LIFT. It must be kept always in mind that the manufacturer's Rated Capacity applies only to a new sling in "unused" condition. A sling should be carefully examined to determine that it is in as nearly new condition as practicable before each lift.

There are specific standards on the use and care of slings in industries such as shipping and construction, and these provide some guidance for sling inspectors. Consensus standards published as ASME B30.9 are particularly helpful.

ASME Standard B30.9 specifies that a wire rope sling should be removed from service any time any of the following conditions are detected:

- (1) Ten randomly distributed broken wires in one rope lay, or five broken wires in one strand in one rope lay.
- (2) Kinking, crushing, bird caging or any other damage resulting in distortion of the wire rope structure.
- (3) Evidence of heat damage.
- (4) End attachments that are cracked, deformed, or worn.
- (5) Hooks that have been opened more than 5% of the normal throat opening measured at the narrowest point, or twisted more than 10 degrees from the plane of the unbenched hook.
- (6) Corrosion of the rope or end attachments.

It is apparent from the foregoing that inspection of a wire rope sling to meet these removal criteria requires more than a casual understanding of wire rope design and manufacture, and the responsibility for daily inspections must be in the hands of trained personnel.

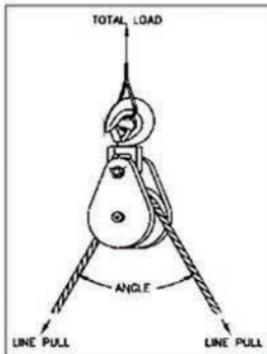
Most of the foregoing applies equally to any type of sling and careful inspection by a trained inspector is necessary for safe sling use. If you require training for any type of sling inspection, SLINGMAX will provide you with the opportunity. Call us for information regarding all of our educational courses in slings.

## Load on Blocks

The Working Load Limit (WLL) for Crosby Group blocks indicates the maximum load that should be exerted on the block and its connecting fitting.

This total load value may be different from the weight being lifted or pulled by a hoisting or hauling system. It is necessary to determine the total load being imposed on each block in the system to properly determine the rated capacity block to be used.

A single sheave block used to change load line direction can be subjected to total loads greatly different from the weight being lifted or pulled. The total load value varies with the angle between the incoming and departing lines to the block.



The following chart indicates the factor to be multiplied by the line pull to obtain the total load on the block.

Angle Factor Multipliers			
Angle	Factor	Angle	Factor
0°	2.00	100°	1.29
10°	1.99	110°	1.15
20°	1.97	120°	1.00
30°	1.93	130°	.84
40°	1.87	135°	.76
45°	1.84	140°	.68
50°	1.81	150°	.52
60°	1.73	160°	.35
70°	1.64	170°	.17
80°	1.53	180°	.00
90°	1.41	—	—

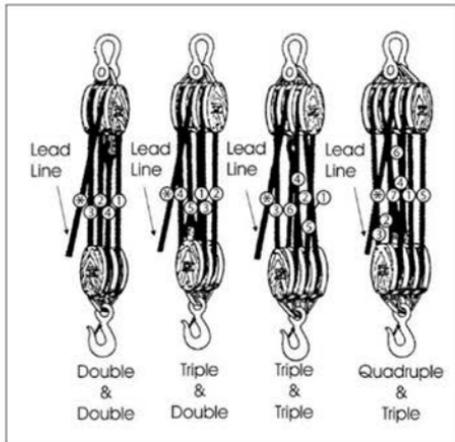
## The Reeving of Tackle Blocks

In reeving of tackle blocks, there are many methods. The method discussed below is referred to as "Right Angle" reeving. Please consult your rigging manual for other methods of reeving.

### RIGHT ANGLE REEVING

In reeving a pair of tackle blocks, one of which has more than two sheaves, the hoisting rope should lead from one of the center sheaves of the upper block to prevent toppling and avoid injury to the rope. The two blocks should be placed so that the sheaves in the upper block are at right angles to those in the lower one, as shown in the following illustrations.

Start reeving with the becket or dead end of the rope. **Use a shackle block as the upper one of a pair and a hook block as the lower one as seen to the right.** Sheaves in a set of blocks revolve at different rates of speed. Those nearest the lead line revolve at the highest rate of speed and wear out more rapidly. All sheaves should be kept well lubricated when in operation to reduce friction and wear.



 <b>CAUTION</b>	
<ul style="list-style-type: none"> <li>• Exercise care when block is standing in vertical position, as the potential for tipping exists. Potential causes of tipping are unstable work area, boom movement and the reeving process.</li> <li>• If work area is unstable, lay block flat on side plate.</li> </ul>	

## Sheave Size & Wire Rope Strength

### Strength Efficiency

Bending wire rope reduces its strength. To account for the effect of bend radius on wire rope strength when selecting a sheave, use the table to the right:

#### Example:

To determine the strength efficiency of 1/2" diameter wire rope using a 10" diameter sheave:

$$\text{Ratio A} = \frac{10'' \text{ (sheave diameter)}}{1/2'' \text{ (wire rope diameter)}} = 20$$

Refer to ratio A of 20 in the table then check the column under the heading "Strength Efficiency Compared to Catalog Strength in %"...91% strength efficiency as compared to the catalog strength of wire rope

Ratio A	Strength Efficiency Compared to Catalog Strength in %
40	95
30	93
20	91
15	89
10	86
8	83
6	79
4	75
2	65
1	50

$$\text{Ratio A} = \frac{\text{Sheave Diameter}}{\text{Rope Diameter}}$$

### Fatigue Life

Repeated bending and straightening of wire rope causes a cyclic change of stress called "fatiguing." Bend radius affects wire rope fatigue life. A comparison of the relative effect of sheave diameter on wire rope fatigue life can be determined as shown below:

Ratio B	Relative Fatigue Bending Life
30	10.0
25	6.6
20	3.8
18	2.9
16	2.1
14	1.5
12	1.1

$$\text{Ratio B} = \frac{\text{Sheave Diameter}}{\text{Rope Diameter}}$$

$$\text{Relative Fatigue Bending Life} = \frac{\text{Relative Fatigue Bending Life (Sheave \#1)}}{\text{Relative Fatigue Bending Life (Sheave \#2)}}$$

#### Example

To determine the extension of fatigue life for a 3/4" wire rope using a 22.5" diameter sheave versus a 12" diameter sheave:

$$\text{Ratio B} = \frac{22.5'' \text{ (sheave diameter)}}{3/4'' \text{ (wire rope diameter)}} = 30$$

$$\text{Ratio B} = \frac{12'' \text{ (sheave diameter)}}{3/4'' \text{ (wire rope diameter)}} = 16$$

The relative fatigue bending life for a ratio B of 16 is 2.1 (see above Table) and ratio B of 30 is 10.

$$\text{Relative Fatigue Bending Life} = \frac{10}{2.1} = 4.7$$

Therefore, we expect extension of fatigue life using a 22.5" diameter sheave to be 4.7 times greater than that of a 12" diameter sheave.

## How to Determine Overhauling Weights

To determine the weight of the block or overhaul ball that is required to free fall the block, the following information is needed: size of wire rope, number of line parts, type of sheave bearing, length of crane boom, and drum friction (use 25kg, unless other information is available).

Wire Rope Size (in.)	Factor A – Wire Rope Weight lbs. per ft., 6 x 19 IWRC
3/8	.26
7/16	.35
1/2	.46
9/16	.59
5/8	.72
3/4	1.04
7/8	1.42
1	1.85
1-1/8	2.34
1-1/4	2.89

Number of Line Parts	Factor B – Overhaul Factors	
	Roller Bearing Sheaves	Bronze Bushed Sheaves
1	1.03	1.05
2	2.07	2.15
3	3.15	3.28
4	4.25	4.48
5	5.38	5.72
6	6.54	7.03
7	7.73	8.39
8	8.94	9.80
9	10.20	11.30
10	11.50	12.80

The Formula is:

**Required Block Weight = [(Boom Length x Factor A) + Drum Friction] x Factor B**

**Example:**

To determine the required block or overhaul weight using 5 parts of 7/8" diameter wire rope, a 50 ft. boom and rollerbearing sheaves:

$$\text{Required Block Weight} = [(50 \text{ ft.} \times 1.42) + 50 \text{ lbs.}] \times 5.38 = 651 \text{ lbs.}$$

## How to Figure Line Parts

Sheaves in a system of blocks rotate at different rates of speed, and have different loads. When raising and lowering, the line tension is not equal throughout the system. To help figure the number of parts of line to be used for a given load, or the line pull required for a given load, (for example, use Reeving Diagram on page 118. Only numbered lines shall be used in the calculation). The following ratio table is provided with examples of how to use it. The ratios are applicable for blocks as shown on page 118 and also independent sheave systems that line is reeved through.

Ratio A Bronze Bushed Sheaves	Ratio B Anti-Friction Bearing Sheaves	Number of Line Parts
.96	.98	1
1.87	1.94	2
2.75	2.88	3
3.59	3.81	4
4.39	4.71	5
5.16	5.60	6
5.90	6.47	7
6.60	7.32	8
7.27	8.16	9
7.91	8.98	10
8.52	9.79	11
9.11	10.60	12
9.68	11.40	13
10.20	12.10	14
10.70	12.90	15
11.20	13.60	16
11.70	14.30	17
12.20	15.00	18
12.60	15.70	19
13.00	16.40	20

**Ratio A or B =  $\frac{\text{Total Load to be Lifted}}{\text{Single Line Pull (lbs.)}}$**

After calculating Ratio A or B, consult table to determine number of parts of line

**Examples:**

To find the number of parts of line needed when weight of load and single line pull are known, and using Bronze Bushed Sheaves.

$$\text{Ratio A} = \frac{72,180 \text{ lbs. (load to be lifted)}}{8000 \text{ lbs. (single line pull)}} = 9.02 \quad (\text{Ratio A})$$

In table to the left refer to ratio 9.02 or next highest number, then check column under heading "Number of Line Parts" = 12 parts of line to be used for this load. To find the single line pull needed when weight of load and number of parts of line are known, and using Anti-Friction Bearing Sheaves.

$$\text{Single Line Pull} = \frac{68,000 \text{ lbs. (load to be lifted)}}{7.32 \text{ (Ratio B of 8-part line)}} = 9,290 \text{ lbs.}$$

9,290 lbs. single line pull required to lift this load on 8 parts of line

## Definition of Terms

**Abrasion:** The mechanical wearing of surface resulting from friction contact with materials or objects.

**Bunching:** Squeezing of a synthetic sling in narrow hardware or in a narrow lifting point.

**Breaking Strength, Minimum (MBS):** The minimum permissible breaking force (lb or kg) at which a sling may fail. It is determined by multiplying the desired working load by the designated design factor.

**Design Factor (DF):** A multiplier used to determine the minimum breaking strength for a sling. The desired working load limit (WLL) is multiplied by the design factor, and the minimum breaking strength is the result. Design factor is determined by local regulation, industry standards, and professional risk assessment. In general, 5:1 is used in North American, 7:1 in Europe and Australia, and 6:1 in Japan. Other design factors may be used in certain industries or for engineered lifts.

**Double Basket Hitch:** This is a basket hitch with the middle pulled up over the lifting hook between each eye (end) of the sling to form two basket hitches. It has the same rating as two basket hitches (with the same angle). This hitch should not be used at angles less than 60 degrees to the horizontal

**Double Choker Hitch:** This hitch has double the single choker hitch capacity when the body of the sling passes through the eyes and back to the hook.

**External Warning Indicator (EWI):** A type of visual overload indicator that can be installed on Slingmax Round-slings.

**Length:** The distance between bearing points of the sling. Also known as working length.

**Proof Load Test:** A non-destructive load test usually to twice the rated capacity of the sling.

**Qualified Person:** A person who, by possession of a recognized degree or certificate of a professional standing in an applicable field, or who, by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

**Safe Working Load (SWL):** See Working Load Limit (WLL).

**Safety Factor:** A measurement no longer used in the USA to describe the design factor of a sling.

**Side Loading:** A load applied at an angle to the vertical plane of a crane boom or the lifting axis of rigging hardware

**Sling Loading:** The total tension load applied to a sling during a lifting application

**Synthetic Fiber:** Man-made material used for the cover, core, and the stitching thread of Twin-Path® sling products and CornerMax® protections

**Vertical Rated Capacity (VRC):** The maximum rated capacity for a sling in a straight hitch or vertical configuration.

**Working Load Limit (WLL):** The maximum weight that a piece of rigging equipment should carry. Rated capacity, load rating, Safe Working Load (SWL) and Working Load Limit are frequently used interchangeably. Break strength divided by design factor equals Working Load Limit

## Summary of Common Conversions

### FACTORS

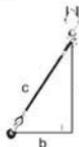
If you know:	Multiply by:	To find:
inches	25.4	millimeters (mm)
inches	2.54	centimeters (cm)
feet	0.30	meters (m)
yards	0.9144	meters (m)
miles	1.61	kilometers (km)
millimeters	.0394	inches
centimeters	.39	inches
meters	3.28	feet
meters	1.09	yards
kilometers	.62	miles
metric tons	1.102	U.S. tons
U.S. tons	.9072	metric tons
kilograms	2.204	pounds
pounds	.453	kilograms
metric tons	2204.62	pounds
metric tons	1000.0	kilograms
Fahrenheit (temp.)	5/9 (after subtracting 32)	Celsius (temp.)
Celsius (temp.)	9/5 (then add 32)	Fahrenheit (temp.)

### DECIMAL /METRIC EQUIVALENT TABLE

FRACTION (IN.)	DECIMAL (IN.)	METRIC (MM.)
1/16	.0625	1.588
<b>1/8</b>	<b>.1250</b>	<b>3.175</b>
3/16	.1875	4.762
<b>1/4</b>	<b>.2500</b>	<b>6.350</b>
5/16	.3125	7.938
<b>3/8</b>	<b>.3750</b>	<b>9.525</b>
7/16	.4375	11.112
<b>1/2</b>	<b>.5000</b>	<b>12.700</b>
9/16	.5625	14.288
<b>5/8</b>	<b>.6250</b>	<b>15.875</b>
11/16	.6875	17.462
<b>3/4</b>	<b>.7500</b>	<b>19.050</b>
13/16	.8125	20.638
<b>7/8</b>	<b>.8750</b>	<b>22.225</b>
15/16	.9375	23.812
<b>1</b>	<b>1.0000</b>	<b>25.400</b>

## Lift-Engineering

### Finding the Hypotenuse

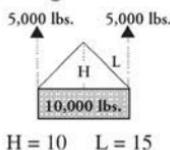


To find c (hypotenuse)

$$\text{Given: } a^2 + b^2 = c^2$$

$$\text{Example: } 4^2 + 3^2 = c^2; 16 + 9 = c^2; \sqrt{25} = 5$$

### Load Angle Factors

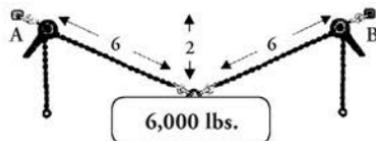


$$\frac{L}{H} = \text{LAF (Load Angle Factor)} \quad \text{Example: } \frac{15}{10} = 1.5 \text{ (LAF)}$$

$$\text{Tension in L} = \frac{L}{H} \times \text{L's share of the load}$$

$$\text{Tension in L} = \frac{15}{10} \times 5,000; 1.5 \times 5,000 \text{ Ten.} = 7,500 \text{ lbs.}$$

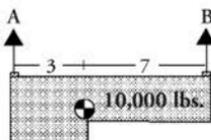
### Tension in Overhead Hoists



$$\text{Ten. in A} = \frac{6}{2} \times 3,000 \quad \text{Ten. in A} = 9,000 \text{ lbs.}$$

(As load moves tension changes)

### Off-set Center of Gravity (Share of the Load)



Inverse Proportion To Distance

Lift Point A

$$7 + 3 = 10, \frac{7}{10} = .70$$

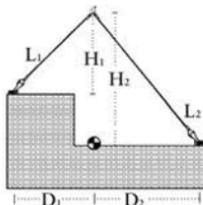
$$.70 \times 10,000 = 7,000 \text{ lbs.}$$

Lift Point B

$$7 + 3 = 10, \frac{3}{10} = .30$$

$$.30 \times 10,000 = 3,000 \text{ lbs.}$$

### Off-level Lift Points



$$TL_1 = \frac{W \times D_2 \times L_1}{(D_2 \times H_1) + (D_1 \times H_2)}$$

$$TL_2 = \frac{W \times D_1 \times L_2}{(D_2 \times H_1) + (D_1 \times H_2)}$$

#### LEGEND

W = Load Weight
L <sub>1</sub> = Length Leg 1
L <sub>2</sub> = Length Leg 2
H <sub>1</sub> = Vertical Height 1
H <sub>2</sub> = Vertical Height 2
D <sub>1</sub> = Horizontal Distance 1
D <sub>2</sub> = Horizontal Distance 2

## Weights of Material

<b>Materials and Liquids – Pounds / cu. ft.</b>			
Aluminum	165	Granite	96
Asbestos	153	Iron Casting	450
Asphalt	81	Lead	710
Brass	524	Limestone	95
Brick, Soft	100	Lumber – Fir	32
Brick, Medium	115	Lumber – Oak	62
Brick, Hard	130	Lumber – RR Ties	50
Bronze	534	Marble	95
Coal	56	Oil, Motor	60
Concrete, Reinforced	150	Paper	58
Copper	556	Portland Cement, Loose	94
Crushed Rock	95	Portland Cement, Set	183
Diesel	52	River Sand	120
Dry Earth, Loose	75	Rubber	94
Dry Earth, Packed	95	Steel	490
Gasoline	45	Water, Fresh (8.42 lbs./gallon)	63
Glass	160	Zinc	437
<b>Materials – Pounds / sq. ft.</b>			
Steel Plate		Aluminum Plate	
1/8"	5	1/8"	1.75
1/4"	10	1/4"	3.50
1/2"	20	1/2"	7.00
3/4"	30	3/4"	10.50
1"	40	1"	14.00

## Formulas and Information

**H** = Height    **W** = Width    **L** = Length    **d** = diameter    **r** = radius (1/2 dia.)  
 $\pi = 3.14$  [area of a square or rectangle = HW]

[Vol of cube = HWL]    [Circumference of circle =  $\pi d$ ]    [area of a circle =  $\pi r^2$ ]

# MOBILE CRANE SIGNALS

ALWAYS STAND IN CLEAR VIEW OF YOUR CRANE OPERATOR

<p><b>HOIST</b></p> <p><b>HOIST:</b> With forearm vertical, forefinger pointing up, move hand in small horizontal circle.</p>	<p><b>LOWER</b></p> <p><b>LOWER: (Auxiliary Hoist)</b> With arms extended downward, forefinger pointing down, move hand in small horizontal circle.</p>	<p><b>USE MAIN HOIST</b></p> <p><b>USE MAIN HOIST:</b> Tap fist on head, then use regular signals.</p>	<p><b>USE WHIP LINE</b></p> <p><b>USE WHIP LINE: (Auxiliary Hoist)</b> Tap elbow with one hand, then use regular signals.</p>
<p><b>RAISE BOOM</b></p> <p><b>RAISE BOOM:</b> Arm extended, fingers close, thumb pointing upward.</p>	<p><b>LOWER BOOM</b></p> <p><b>LOWER BOOM:</b> Arm extended, fingers close, thumb pointing downward.</p>	<p><b>MOVE SLOWLY</b></p> <p><b>MOVE SLOWLY:</b> Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example)</p>	<p><b>RAISE THE BOOM AND LOWER THE LOAD</b></p> <p><b>RAISE THE BOOM AND LOWER THE LOAD:</b> With arm extended, thumb pointing up, flex fingers in and out as long as load movement is desired.</p>
<p><b>LOWER THE BOOM AND RAISE THE LOAD</b></p> <p><b>LOWER THE BOOM AND RAISE THE LOAD:</b> With arm extended, thumb pointing down, flex fingers in and out as long as load movement is desired.</p>	<p><b>SWING</b></p> <p><b>SWING:</b> Arm extended, point with finger in direction of swing of boom.</p>	<p><b>STOP</b></p> <p><b>STOP:</b> Arm extended, palm down, move arm back and forth horizontally.</p>	<p><b>EMERGENCY STOP</b></p> <p><b>EMERGENCY STOP:</b> Both arms extended, palms down, move arms back and forth horizontally.</p>
<p><b>TRAVEL</b></p> <p><b>TRAVEL:</b> Arm extended forward, hand open and slightly raised, making pushing motion in direction of travel.</p>	<p><b>DOG EVERYTHING</b></p> <p><b>DOG EVERYTHING:</b> Clasp hands in front of body.</p>	<p><b>TRAVEL (Both Tracks)</b></p> <p><b>TRAVEL (Both Tracks):</b> Use both fists in front of body, making a circular motion about each other, indicating direction of travel, forward or backward. (For land cranes only.)</p>	<p><b>TRAVEL (One Track)</b></p> <p><b>TRAVEL (One Track):</b> Lock the track on side indicated by raised fist. Travel opposite track in direction indicated by circular motion of other fist, rotate vertically in front of body. (For land cranes only.)</p>
<p><b>EXTEND BOOM</b></p> <p><b>EXTEND BOOM: (Telescoping Booms)</b> Both fists in front of body with thumbs pointing outward.</p>	<p><b>RETRACT BOOM</b></p> <p><b>RETRACT BOOM: (Telescoping Booms)</b> Both fists in front of body with thumbs pointing toward each other.</p>	<p><b>EXTEND BOOM</b></p> <p><b>EXTEND BOOM: (Telescoping Booms)</b> One hand signal. One fist in front of chest with thumb tapping chest.</p>	<p><b>RETRACT BOOM</b></p> <p><b>RETRACT BOOM: (Telescoping Booms)</b> One hand signal. One fist in front of chest, thumb pointing outward and heel of fist tapping chest.</p>

Notes:



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