



SYNTHETIC RIGGING

WEBLOK™ ASSEMBLIES

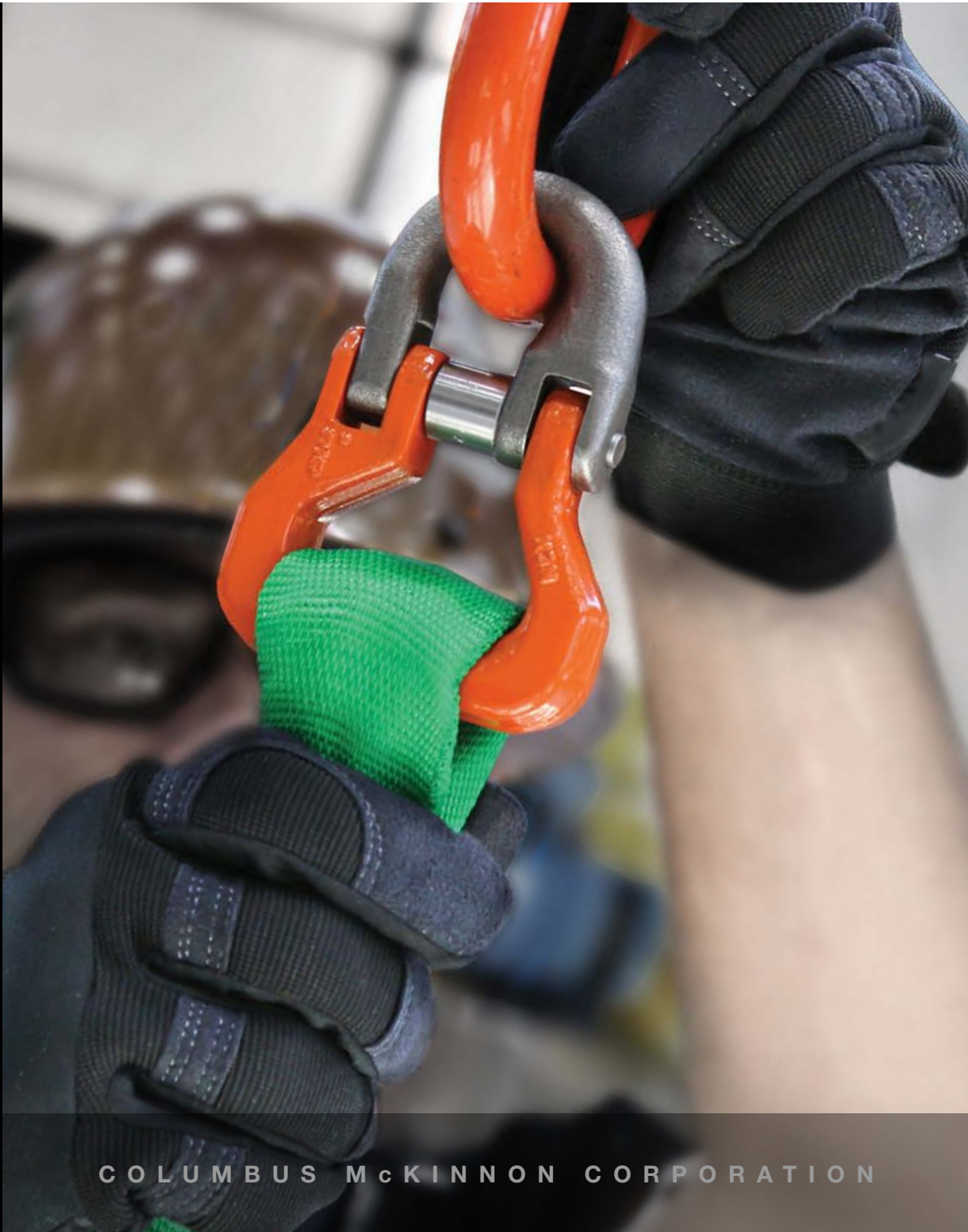
QUICK CONNECT™ HOOKS

FLAT-EYE RIGGING HOOKS

WEB SLING SHACKLES

MASTER LINKS

SUB-ASSEMBLIES



Columbus McKinnon Corporation has a rich tradition, spanning more than 140 years, of providing quality motion control products and services to meet the needs of users in a variety of industries around the globe. Professional riggers, maintenance workers, plant engineers and safety specialists rely on the CM line of rigging products to lift, pull and secure loads in a variety of applications. We continue to innovate and expand our rigging portfolio to meet industry needs and give customers the products they need for their unique and challenging applications.



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Contact Columbus McKinnon Corporation

800.888.0985 716.689.5400



WEBLOK™ ASSEMBLY

**WORKING LOAD LIMIT: UP TO 75,000 LBS.
AVAILABLE IN 6 SIZES FROM 3/8" TO 1-1/4"**

When working with synthetic slings, CM Weblok assemblies allow for quick, easy and safe sling attachment. CM Webloks are available in two designs. Synthetic-to-attachment Webloks combine our industry-leading CM Hammerlok® coupling link with a CM synthetic sling attachment. Synthetic-to-synthetic Webloks feature two synthetic sling attachments. CM Webloks are available with either single or double load pin retention, depending on your application.

BENEFITS & FEATURES

VERSATILE & EASY TO USE

For use with round slings, web slings and high-performance synthetics. Simply connect a sling to the synthetic sling attachment of the Weblok and a master link or other rigging attachment to the Hammerlok portion to efficiently and safely lift your load. For synthetic-to-synthetic Webloks, simply attach a sling to both ends.

MADE OF DURABLE FORGED ALLOY STEEL

Forged rigging products are better than cast rigging products. When compared, forged parts feature greater ductility, better fatigue life, higher tensile strength and have a finer grain structure. This combination of enhanced features allows for lighter, better performing products with a lower risk of internal defects.

5:1 DESIGN FACTOR

100% PROOF TESTED



DURABLE ORANGE POWDER COATED FINISH

Synthetic sling attachment portions of the CM Weblok feature the widely recognized CM orange powder coated finish, providing an extra-smooth surface for synthetic attachments.

MEETS ASTM A952 & WSTDA-RS1 STANDARDS

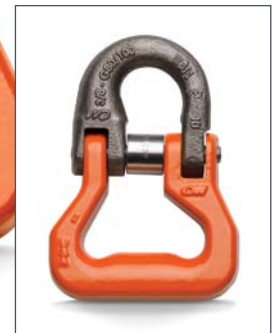
Buy with confidence knowing your product is safe to operate and meets industry-recognized overhead lifting standards.

INDUSTRY-LEADING SAFETY

Available with either single or double retention. Webloks with double retention feature a load pin retention system that incorporates a bolt head and lock nut to prevent the load pin from backing out during extreme use – delivering the highest level of safety on the market. For less severe applications, single-retention Webloks use the same retention system as CM's legendary Hammerlok.



SYNTHETIC TO ATTACHMENT
WITH DOUBLE RETENTION



SYNTHETIC TO ATTACHMENT
WITH SINGLE RETENTION



SYNTHETIC TO SYNTHETIC
WITH SINGLE RETENTION

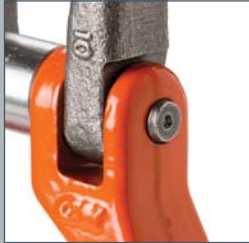


SYNTHETIC TO SYNTHETIC
WITH DOUBLE RETENTION

OPTIONAL UNIQUE DOUBLE LOAD PIN RETENTION

SAFETY IS A TOP PRIORITY

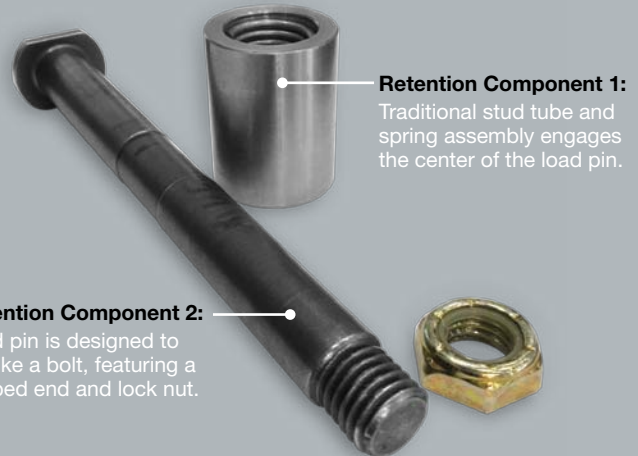
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SINGLE RETENTION



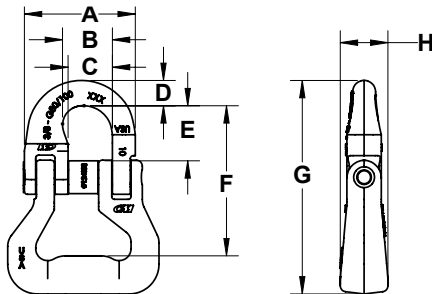
DOUBLE RETENTION



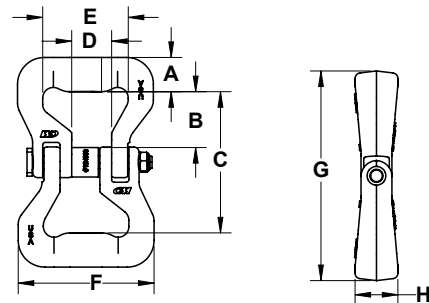
Retention Component 1:
Traditional stud tube and spring assembly engages the center of the load pin.

Retention Component 2:
Load pin is designed to act like a bolt, featuring a capped end and lock nut.

SYNTHETIC TO ATTACHMENT



SYNTHETIC TO SYNTHETIC



SPECIFICATIONS

Size (in.)	Working Load Limit (lbs.)		Product Code		Double Retention Load Pin Kit	Dimensions (in.)								Weight (lbs.)
	Design Factor		Single Retention	Double Retention		A	B	C	D	E	F	G	H	
	5:1	4:1												
Synthetic to Attachment														
3/8	6,250	7,850	867010-2	867010-4	R867010-4	2.33	1.05	0.93	0.53	1.16	3.15	4.48	1.00	1.49
5/8	12,500	15,650	867020-2	867020-4	R867020-4	3.57	1.55	1.35	0.88	1.74	4.32	6.19	1.25	3.96
3/4	18,750	23,450	867025-2	867025-4	R867025-4	4.31	1.78	1.55	1.04	2.02	5.47	7.61	1.38	6.62
7/8	30,000	37,500	867030-2	867030-4	R867030-4	5.00	2.25	1.92	1.05	1.83	5.15	7.60	1.75	8.96
1	40,000	50,000	N/A	867035-4	R867035-4	5.86	2.74	2.37	1.25	2.31	6.57	9.67	2.25	16.18
1-1/4	60,000	75,000	N/A	867040-4	R867040-4	7.04	3.00	2.70	1.53	2.63	7.41	10.92	2.31	25.35
Synthetic to Synthetic														
3/8	5,000	N/A	877010-2	877010-4	R867010-4	0.80	1.31	3.30	0.93	2.00	3.18	4.90	1.00	2.03
5/8	10,000	N/A	877020-2	877020-4	R867020-4	0.99	1.52	4.10	1.38	2.75	4.13	6.08	1.25	4.56
3/4	15,000	N/A	877025-2	877025-4	R867025-4	1.10	2.13	5.58	1.55	2.75	4.48	7.78	1.38	6.96
7/8	25,000	N/A	877030-2	877030-4	R867030-4	1.41	2.00	5.32	1.92	3.75	6.00	8.14	1.75	11.00
1	40,000	N/A	N/A	877035-4	R867035-4	1.85	2.89	7.15	2.37	4.74	7.45	10.84	2.25	22.79
1-1/4	60,000	N/A	N/A	877040-4	R867040-4	1.98	3.22	8.00	2.70	5.75	8.88	11.96	2.31	33.30





QUICK CONNECT HOOK™

**WORKING LOAD LIMIT: UP TO 13,200 LBS.
WEB SLING EYE WIDTHS UP TO 3"**

Ideal for use with synthetic slings, CM Quick Connect Hooks are the quickest and easiest way to add hooks to any synthetic sling by eliminating the need for additional hardware or assembly tools. Designed with a large bearing surface, these hooks prevent the sling from bunching, allowing the sling to be used at full capacity. And, for easy selection, Quick Connect Hooks are color coded to match common industry synthetic sling capacities.

BENEFITS & FEATURES

QUICK & EFFICIENT ATTACHMENT

Hook design allows for quick and efficient rigging without the need for additional tools or hardware. Simply open the latch, slide in the sling, close the latch and put the sling into position – it's that easy.

LONGER SLING LIFE

Smooth, flat bearing surface prevents abrasive synthetic sling damage. Hook design also protects the sling, eliminating wear caused by sharp load edges and the need for additional edge protection.

LOW SLING WEIGHT AND COST

By eliminating the need for additional hardware or oversized components to prevent bunching, the weight savings synthetic slings provide will be maintained. Quick Connect Hooks allow for quick sling-to-load connection without relying on a choker or basket hitch, thus eliminating the need for longer, more expensive slings.

EASY SELECTION

Hooks are color coded to match common synthetic sling capacities. Working load limits are also forged into the hook for easy reference. (NOTE: Always refer to the synthetic sling tag and Quick Connect Hook for working load limit of the assembly.)

SECURE SLING ATTACHMENT

Hook eye is designed with a recessed area to ensure the sling stays in place. Sling will not come out of the eye unless purposely removed.

STRONG & DURABLE

Forged for optimum strength and durability. Each hook is individually proof tested to 2x the working load limit.

STANDARD HOOK LATCHES

Uses same latches as standard CM Clevlok® sling hooks.

I-BEAM DESIGN REDUCES OVERALL SLING WEIGHT

EMBOSSED FOR WORLDWIDE USE



WLL: 2,600 LBS.

COLOR CODED TO MATCH COMMON SYNTHETIC SLING CAPACITIES



WLL: 5,300 LBS.



WLL: 8,400 LBS.

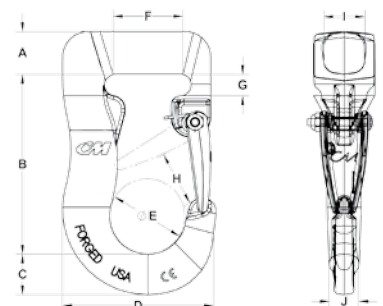


WLL: 13,200 LBS.



SPECIFICATIONS

Color	Working Load Limit (lbs.)	Product Code	Latch Kit	Dimensions (in.)										Weight (lbs.)
				A	B	C	D	E	F	G	H	I	J	
Purple	2,600	M85030	4X85030	0.770	3.530	0.794	2.884	1.500	1.500	0.418	0.938	0.813	0.580	1.450
Green	5,300	M85060	4X85060	1.034	4.589	1.040	3.751	1.625	1.875	0.553	1.200	1.188	0.865	3.735
Yellow	8,400	M85090	4X455329	1.208	5.410	1.172	4.325	1.875	2.375	0.640	1.500	1.250	1.043	5.835
Red	13,200	M85120	4X455329	1.384	6.141	1.392	5.026	2.125	2.625	0.744	1.750	1.438	1.200	8.282





FLAT EYE RIGGING HOOK

WORKING LOAD LIMIT: UP TO 5 TONS
WEB SLING EYE WIDTHS UP TO 3"

Designed specifically for use with synthetic slings, CM Flat Eye Rigging Hooks provide a wide, smooth, load-bearing surface that won't damage synthetic material, promoting longer sling life. The flat eye opening eliminates bunching and pinching of the synthetic sling, ensuring the sling can be used at full capacity.

BENEFITS & FEATURES

HIGH SLING STRENGTH

Flat eye eliminates bunching, providing significantly higher synthetic sling strength as compared to standard round eye-type fittings. Eye width exceeds WSTDA recommended radii to further ensure maximum ultimate synthetic strength is achieved.

LONGER SLING LIFE

Smooth, flat bearing surface prevents abrasive synthetic sling damage.

STRONG & DURABLE

Made of quenched and tempered alloy steel for strength and durability.

VERSATILE USE

Can be used with either web or round slings. (Note: For round slings, ensure working load limits are compatible.)

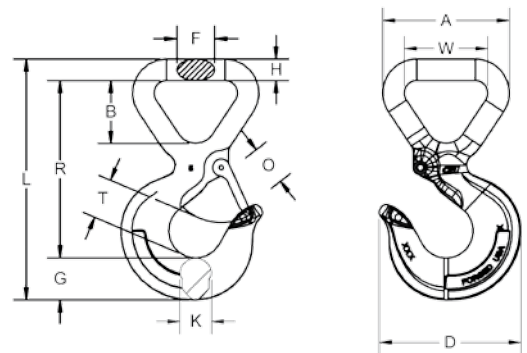
AVAILABLE WITH AND WITHOUT LATCHES

Uses same latches as other standard CM rigging hooks.

5:1 DESIGN FACTOR

CE COMPLIANT

MEETS OR EXCEEDS ASME B30.10 STANDARDS



SPECIFICATIONS

Working Load Limit (tons)	Product Code			Dimensions (in.)											Weight (lbs.)	
	With Latch	Without Latch	Latch Kit	A	B	D	F	G	K	L	O	R	T	W	without Latch	with Latch
1-1/2	M8503	M8403	4X1303	2.38	1.20	3.37	0.75	0.94	0.71	5.36	0.97	3.98	0.97	1.50	1.16	1.25
3	M8505	M8405	4X1305	3.79	1.88	4.25	1.13	1.26	0.94	7.21	1.21	5.31	1.21	2.50	2.82	3.00
5	M8507	M8407	4X1307	5.53	2.84	5.11	1.63	1.44	1.38	9.27	1.47	7.06	1.47	4.00	5.50	5.90





CARBON WEB SLING SHACKLE

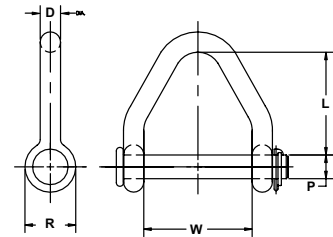
WORKING LOAD LIMIT: 8,000 TO 23,500 LBS.

BENEFITS & FEATURES

- Designed to connect synthetic web and round slings to eye bolts and other lifting hardware
- Design factor 4:1
- Web sling shackles can be used on web slings from 2 to 6 inches in width
- Shackle body: carbon steel, heat treated
- Shackle pin: alloy steel, heat treated
- Finish: hot dip galvanized
- Zinc-plated linchpin comes standard. Cotter or hairpin available on special order.
- Do not point load. The load should be evenly distributed over the entire pin to achieve full working load limit.



Product Code	Pin Number	Linch Pin Number	Working Load Limit (lbs.)	Dimensions (in.)					Weight (lbs.)
				P	D	L	W	R	
M702	2X702	65930	8,000	0.75	0.63	2.25	2.00	1.63	1.70
M703	2X703	65930	13,000	0.88	0.75	3.25	3.00	1.88	2.86
M704	2X704	65930	11,000	0.88	0.75	3.75	4.00	1.88	3.15
M705	2X705	65934	18,000	1.00	0.88	4.25	5.00	2.13	4.75
M706	2X706	65934	18,000	1.13	1.00	4.75	6.00	2.38	6.75
M706H	2X706H	65934	23,500	1.25	1.13	4.75	6.00	2.63	9.80



ALLOY WEB SLING SHACKLE



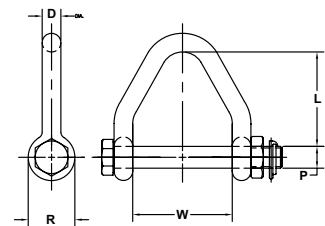
WORKING LOAD LIMIT: 13,500 TO 22,500 LBS.

BENEFITS & FEATURES

- Designed to connect synthetic web and round slings to eye bolts and other lifting hardware
- Design factor 6:1
- Web sling shackles can be used on web slings from 3 to 6 inches in width
- Utilize a bolt and nut with linchpin to secure the assembly in place
- All shackles are galvanized for longer life
- Marked with working load limit (WLL) and size
- Do not point load. The load should be evenly distributed over the entire pin to achieve full working load limit.



Product Code	Pin Number	Linch Pin Number	Working Load Limit (lbs.)	Dimensions (in.)					Weight (lbs.)
				P	D	L	W	R	
M703A	2X8703A	65930	13,500	0.88	0.75	3.25	3.00	1.88	3.01
M704A	2X8704A	65930	14,500	0.88	0.75	3.75	4.00	1.88	3.16
M705A	2X8705A	65934	19,000	1.00	1.00	4.25	5.00	2.38	6.04
M706A	2X8706A	65934	22,500	1.13	1.13	4.75	6.00	2.63	9.02



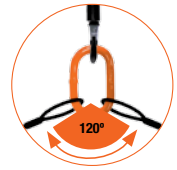
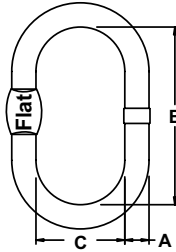


MASTER LINK WITH & WITHOUT FLATS

WORKING LOAD LIMIT: 3,360 TO 142,440 LBS.

BENEFITS & FEATURES

- Designed to accept HA800 chain, wire rope and synthetic attachments
- Use with mechanical and welded assemblies
- Sizes up to 1-1/4" available with flats to accommodate Omega link
- 100% proof tested
- 6:1 design factor
- Extra wide body makes these links ideal for wire rope applications and use with Omegaloks. Master link with flat allows for easy installation of these attachments.



Can be used with included angles up to 120°

Trade Size (in.)	Working Load Limit with Wire Rope & Synthetics (lbs.)	Product Code	Nominal Dimensions (in.)			Flat Dimensions (in.)		Weight (lbs.)	Sling Type and Size (in.)	
			Material Diameter A	Inside Length B	Inside Width C	Width	Thickness		Single	Double
7/16	3,360	ML040 ML040NF	0.44	4.13	2.29	0.94 -	0.28 -	0.50	7/32 & 9/32	7/32
1/2	4,600	ML050 ML050NF	0.56	4.84	2.69	0.94 -	0.28 -	1.02	-	7/32
5/8	7,200	ML063 ML063NF	0.63	5.29	2.98	1.22 -	2.81 -	1.34	3/8	9/32
3/4	11,360	ML075 ML075NF	0.75	6.61	3.72	1.41 -	0.40 -	2.36	1/2	3/8
7/8	13,840	ML087 ML087NF	0.88	7.35	4.14	1.56 -	0.44 -	3.60	-	-
1	21,200	ML100 ML100NF	1.00	7.53	4.30	1.56 -	0.53 -	5.20	5/8	1/2
1-1/4	29,920	ML125 ML125NF	1.25	9.26	5.29	1.56 -	0.68 -	9.60	3/4 & 7/8	5/8
1-1/2	42,400	ML150	1.50	11.03	6.30	-	-	16.20	1	3/4
1-3/4	57,720	ML175	1.75	12.86	7.35	-	-	25.10	-	7/8
2	75,360	ML200	2.00	14.70	8.40	-	-	41.00	1-1/4	1
2-1/4	95,360	ML225	2.25	16.54	9.45	-	-	58.00	-	-
2-1/2	117,720	ML250	2.50	18.38	10.50	-	-	74.90	-	1-1/4
2-3/4	142,440	ML275	2.75	20.21	11.55	-	-	99.80	-	-

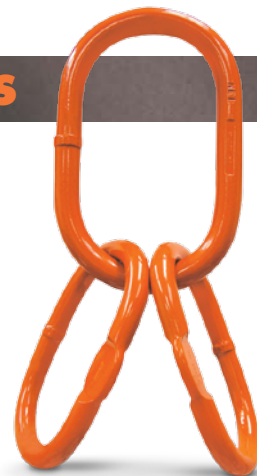
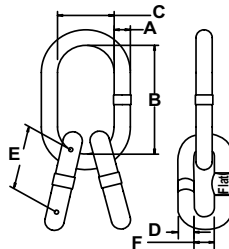
NOTE: Master link with flats are available through 1-1/4" only. Part numbers with "NF" are for master links WITHOUT flats.

WIDE BODY SUB-ASSEMBLY WITH FLATS

WORKING LOAD LIMIT: 4,600 TO 142,400 LBS.

BENEFITS & FEATURES

- Designed to accept Herc-Alloy 800® chain, wire rope and synthetic attachments
- Durable orange powder coated finish
- 100% proof tested
- May be used for mechanical and welded sling assemblies
- Extra wide body is ideal for wire rope applications
- Sizes up to 1-1/4" intermediate links available with flats to accommodate Omega links
- 6:1 design factor



Can be used with included angles up to 120°

Trade Size (in.)	Working Load Limit with Wire Rope & Synthetics (lbs.)	Complete Assembly Product Code	Master Link Nominal Dimensions (in.)			Intermediate Link Nominal Dimensions (in.)			Weight (lbs.)	Sling Type and Size (in.)			
			Product Code	Material Diameter A	Inside Length B	Inside Width C	Product Code	Material Diameter D		Inside Length E	Inside Width F	Triple	Quad
1/2	4,600	SA050	ML050	0.56	4.84	2.69	ML040	0.44	4.13	2.29	1.8	-	-
5/8	7,200	SA063	ML063	0.63	5.29	2.98	ML050	0.56	4.84	2.69	2.9	7/32	7/32
3/4	11,200	SA075	ML075	0.75	6.61	3.72	ML063	0.63	5.29	2.98	5.5	9/32	9/32
7/8	13,840	SA087	ML087	0.88	7.35	4.14	ML063	0.63	5.29	2.98	6.3	-	-
1	21,200	SA100	ML100	1.00	7.53	4.30	ML075	0.75	6.61	3.72	10.2	3/8	3/8
1-1/4	29,920	SA125	ML125	1.25	9.26	5.29	ML100	1.00	7.53	4.30	20.0	1/2	1/2
1-1/2	42,400	SA150	ML150	1.50	11.03	6.30	ML100	1.00	7.53	4.30	26.6	-	-
1-3/4	57,720	SA175	ML175	1.75	12.86	7.35	ML125	1.25	9.26	5.29	44.3	5/8	5/8
2	75,360	SA200	ML200	2.00	14.70	8.40	ML150	1.50	11.03	6.30	73.4	3/4	3/4
2-1/4	95,360	SA225	ML225	2.25	16.54	9.45	ML175	1.75	12.86	7.35	108.2	7/8	7/8
2-1/2	117,720	SA250	ML250	2.50	18.38	10.50	ML200	2.00	14.70	8.40	156.9	1	1
2-3/4	142,400	SA275	ML275	2.75	20.21	11.55	ML200	2.00	14.70	8.40	181.0	-	-

NOTE: Master link with flats are available through 1-1/4" only

SYNTHETIC SLING OVERVIEW

Synthetic slings are a combination of synthetic straps, hooks, rings or other attachments used primarily for overhead lifting applications. Slings are generally used in conjunction with a crane or some type of lifting device and allow riggers to create a custom configuration to lift a load depending on the needs of the unique application.

STANDARD TYPES OF SYNTHETIC SLINGS

Standard sling configurations consist of synthetic straps that are affixed on one end to a master link or ring with some type of attachment, typically a hook, attached to the opposite end. When choosing a synthetic sling, there are six different types to choose from:

TYPE I: TC SLING

Triangle fitted on one end and a slotted triangle choker fitting on the other end.

Hitches: vertical, basket or choker hitch.



TYPE II: TT SLING

Triangle fitted on both ends.

Hitches: vertical, basket only.



TYPE III: EE SLING

Flat loop eye on each end, loop eye opening on the same plane as sling body. Also called flat eye, eye and eye, or double eye sling.



TYPE IV: EE SLING

Both loop eyes formed as Type III, except the loop eyes are turned to form a loop eye that is at a right angle to the plane of the sling body. Also called twisted eye sling.



TYPE V: EN SLING

Endless web sling, referred to as a grommet. Sling is a continuous loop formed by joining ends of the webbing together with a load-bearing splice.



TYPE VI: RE SLING

Reverse eye web sling is formed by using multiple widths of webbing held edge to edge. A wear pad is attached on one or both sides of the web sling body and on one or both sides of the loop eyes to form a loop eye at each end at a right angle to the plane of the web sling body.



SYNTHETIC SLING INSPECTION

Per ASME B30.9 and OSHA 1910.184 you are required to perform sling inspections, including frequent and periodic inspections. In addition to these required inspections, upon receipt, all new, altered, modified or repaired slings shall be inspected to ensure compliance with the applicable ASME / OSHA standards and regulations.

FREQUENT VS. PERIODIC INSPECTIONS

FREQUENT INSPECTION:

Visual inspection for damage shall be performed each day or shift the sling is used. Slings found with damage per ASME B30.9 or OSHA 1910.184 shall immediately be removed from service. Slings shall not be returned to service until approved by a qualified person. Records do not need to be kept for frequent inspections.

PERIODIC INSPECTION:

Complete inspection of the sling shall be performed during periodic inspections. Inspection shall be conducted on the entire length of the sling, including splices and fittings. Slings found with damage per ASME B30.9 and OSHA 1910.184 shall be removed from service immediately. Slings shall not be returned to service until approved by a qualified person.

A thorough (periodic) inspection of slings, including rigging hardware, shall be performed by a competent person designated by the employer and shall include a thorough inspection for:

- Wear
- Deformation (twist)
- Increase in length (stretch)
- Sharp transverse nicks and gouges
- Abrasion (dragging or pulling out from under loads)
- Corrosion (pitting)
- Heat damage (burn, weld spatter)

Note: These are general guidelines for inspection. Depending on the environment the sling is used in, additional inspection may be required. Some criteria may only apply to rigging hardware.

**The frequency of periodic inspections shall not exceed one year.
Frequency of inspection should be based on:**

- Frequency of sling use
- Severity of service conditions
- Nature of load handling activities
- Experience gained on the service life of slings used in similar circumstances

Slings used for normal service should be inspected once per year. Slings used for severe service should be inspected monthly to quarterly. Slings used for special service should be inspected as recommended by a qualified person.

Source: American Society of Mechanical Engineers ASME B30.9 and Occupational Safety and Health Administration OSHA 1910.184

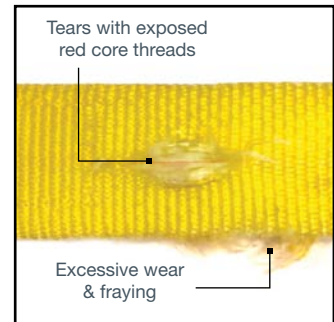
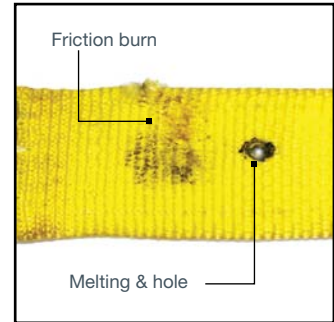
REMOVAL FROM SERVICE CRITERIA

Per ASME standards, there are certain criteria under which synthetic slings and rigging hardware should be removed from service. It is important to follow these service criteria to prevent serious harm, bodily injury or death.

SYNTHETIC WEBBING SLINGS REMOVAL FROM SERVICE CRITERIA

Per ASME B30.9-5.9.5, synthetic webbing slings shall be removed from service if any of these conditions exist.

1. Missing or illegible sling identification (Shall be marked with: name or trademark of manufacture, manufacturer's code or stock number, rated load for at least one hitch type and the angle upon which it is based, type of synthetic web material and number of legs, if more than one)
2. Acid or caustic burns
3. Melting or charring of any part of the sling
4. Holes, tears, cuts or snags
5. Broken or worn stitching in load-bearing splice
6. Excessive abrasive wear
7. Knots in any part of the sling
8. Discoloration and brittle or stiff areas on any part of the sling, which may mean chemical or UV sunlight damage
9. Fittings that are pitted, corroded, cracked, bent, twisted, gouged or broken. (Refer to the proper standard for full removal from service criteria: ASME B30.10 for hooks or ASME B30.26 for rigging hardware)
10. Any other conditions, including visible damage that cause doubt to the continued use of the sling

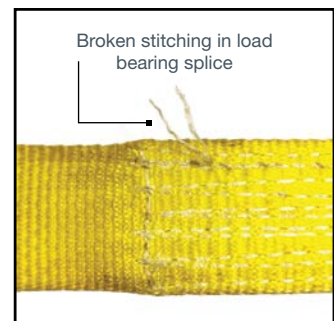
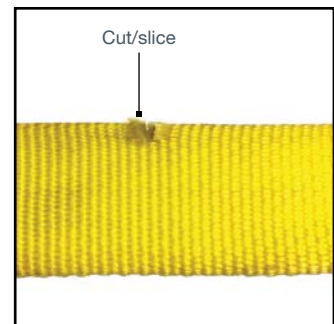


POLYESTER & HIGH-PERFORMANCE ROUND SLINGS REMOVAL FROM SERVICE CRITERIA

A round sling is any sling fabricated in an endless or continuous configuration. Polyester round slings have a double wall exterior cover and load-bearing polyester core yarns internally. High-performance round slings have a double wall exterior and a synthetic blend of load-bearing core yarns internally.

Whether categorized as polyester or high-performance, round slings must be inspected and follow specific removal from service criteria as set forth by ASME B30.9-6.9.5. These criteria include:

1. Missing or illegible sling identification (Shall be marked with: name or trademark of manufacture, manufacturers code or stock number, rated load for at least one hitch type and the angle upon which it is based, core material, cover material if different from core material and number of legs, if more than one)
2. Acid or caustic burns
3. Evidence of heat damage
4. Holes, tears, cuts, abrasive wear or snags that expose core yarns
5. Broken or damaged core yarns
6. Weld spatter that exposes core yarns
7. Knots in the round sling except for core yarns inside the cover
8. Fittings that are pitted, corroded, cracked, bent, twisted, gouged, or broken (Refer to the proper standard for full removal from service criteria: ASME B30.10 for hooks or ASME B30.26 for rigging hardware)
9. Any other conditions, including visible damage that cause doubt to the continued use of the sling



UNDERSTANDING & CALCULATING BEARING STRESS

Bearing stress is an important, but commonly overlooked, calculation to ensure safe sling use. This calculation will determine how much stress a sling is seeing in the working area of the shackle.

Per WSTDA, the recommended bearing stress value is 7,000 lbs./sq. in. or less. This calculation should be done any time a lift is being conducted with a synthetic strap and connecting hardware.

To calculate bearing stress, follow the calculations below:

DETERMINE EFFECTIVE WIDTH:

This is the width the sling can use inside of a shackle.

Effective Width = Shackle Width (catalog width from the manufacturer) x .75

DETERMINE LOAD BEARING AREA:

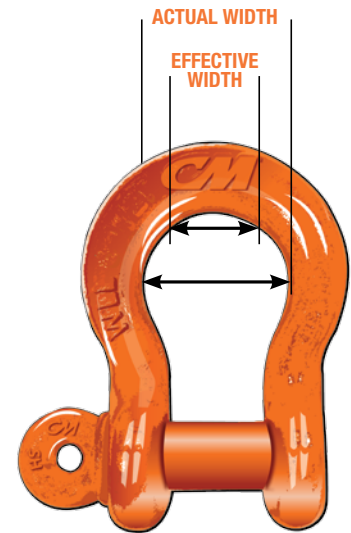
This is the area the sling is in contact with.

Load Bearing Area = Hardware Diameter x Effective Width

DETERMINE BEARING STRESS AT HARDWARE CONNECTION:

Should be 7,000 lbs./sq. in. or less to prevent damage to the sling.

Bearing Stress = Sling Load (IN POUNDS) ÷ Load Bearing Area



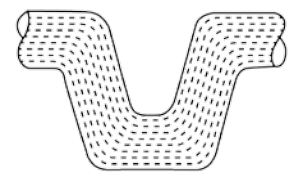
Source: WSTDA 4.7.1.1 – 4.7.1.3

FORGING VERSUS CASTING

Forging and casting are two very different manufacturing methods. When something is cast, the material is heated above its melting temperature and poured into a mold where it solidifies. When something is forged it is physically forced into shape while remaining in a solid state – although it is frequently heated.

Forged rigging attachments are generally better than cast. Forgings normally have less porosity, finer grain structure, higher tensile strength, better fatigue life and strength, and greater ductility than cast hardware. Why is this the case? When you melt metal to cast it, the grain size is free to expand. When it cools back to a solid, the grain structure is coarser and more random, decreasing its strength. Interior voids are also possible. The diagrams on the right illustrate the difference in grain flow between a forging and a casting.

For these reasons, CM utilizes a best-in-class forging process to ensure our rigging hardware is strong, durable and reliable.



FORGING

Uniform grain flow gives material higher strength



CASTING

Random grain flow with larger grain structure makes material weaker than forged products

HOOK INSPECTION & USE

INSPECTION:

1. Discard hooks that are worn more than 10% of the original dimension or are worn beyond a specific dimension or tolerance as provided in a wear allowance table, chart or diagram.
2. Discard hooks that have an increase in throat or slot opening more than 5% of the original opening (not to exceed 1/4 inch).
3. Discard hooks with any visibly apparent bend or twist from the plane of the unbent hook.
4. Replace load pins that are permanently distorted.
5. Hooks should not be subjected to bending, exposed to sharp objects or tip loaded.
6. Replacement load pins shall be obtained from the manufacturer of the hook.

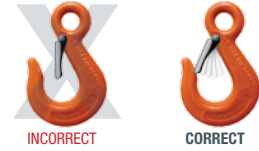
USE:

1. Care should be exercised during use, so the hook is not abused or damaged.
2. Hooks attached to chain should be selected to match the size and working load limit of the chain.
3. Do not exceed the working load limit or shock load the chain or attachments. Loads applied rapidly or dropped freely can result in serious overloading of the hook.
4. Use proper size chain in the throat of the grab hook.
5. Hooks should not be subjected to bending, exposed to sharp objects, tip loaded (unless specified by the manufacturer) or loaded in a manner inconsistent with its design.
6. Avoid exposure to corrosive mediums or high temperatures that could affect the thermal treatment and strength of the hook.
7. Hooks can be used from -40 degrees F to 400 degrees F without reduction of working load limit. Call the manufacturer if you exceed these temperatures.

Refer to American Society of Mechanical Engineers ASME B30.10 for a discussion of hooks, inspection procedures and operating practices.

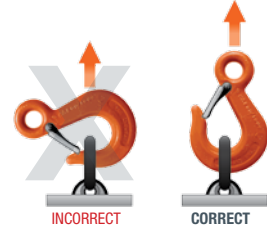
Always verify manufacturer's information prior to use.

HOOK LATCHES

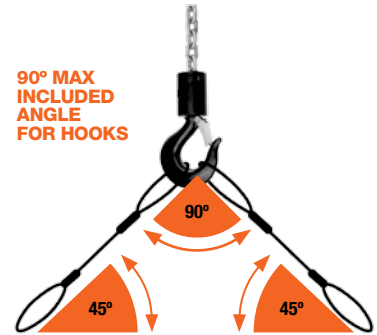


Hook latches (when required) must be in good working condition. If not, the hook should be removed from service.

NEVER TIP LOAD A HOOK



90° MAX INCLUDED ANGLE FOR HOOKS



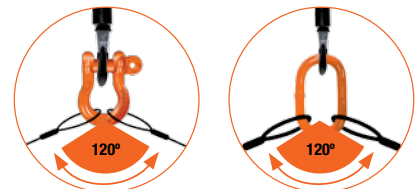
SELECTING THE RIGHT SIZE HOOK/SLING

Be sure the component is of adequate size and shape so that it can be properly seated in the saddle of hook or lifting device.



LOW HORIZONTAL ANGLES

Use a shackle or oblong master link when working with low horizontal angles. Both can be used with included angles up to 120°.



HOOK REMOVAL FROM SERVICE CRITERIA

All hooks, whether used in synthetic slings or for other purposes, should be removed from service if any of the following conditions are present:

1. Deformation: any visibly apparent bend or twist from the plane of the unbent hook
2. Throat opening: any distortion causing an increase in throat opening of 5%, not to exceed 1/4" (or as recommended by the manufacturer)
3. Inoperative latch: any latch that does not close the hook's throat opening
4. Wear: any wear exceeding 10% (or as recommended by the manufacturer) of the original section dimension of the hook or its load pin
5. Markings: manufacturer's logo or trademark must be identifiable

Source: American Society of Mechanical Engineers ASME B30.10.



Bent Hook



Deformed/Bent Hook



Corrosion/Pitting

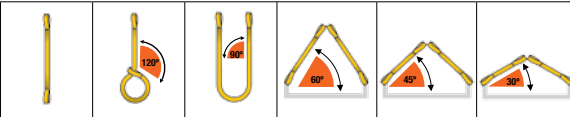


Inoperative Latch

SYNTHETIC WEB SLING WORKING LOAD LIMITS

SYNTHETIC WEB SLING (EYE & EYE) WORKING LOAD LIMITS

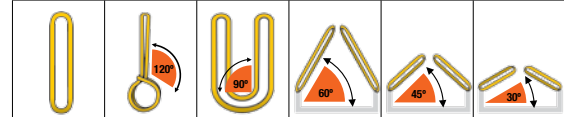
EE LIGHT DUTY (CLASS 5) (1-PLY & 2-PLY)



Synthetic Sling Size (in.)	Working Load Limit (lbs.)			Working Load Limit (lbs.)		
	Vertical	Choker	Vertical Basket 90°	Two Leg or Single Basket		
				60°	45°	30°
1-PLY, CLASS 5, EE LIGHT DUTY						
1	1,100	880	2,200	1,905	1,555	1,100
1-1/2	1,600	1,280	3,200	2,771	2,262	1,600
1-3/4	1,900	1,520	3,800	3,291	2,687	1,900
2	2,200	1,760	4,400	3,810	3,111	2,200
3	3,300	2,640	6,600	5,716	4,666	3,300
4	4,400	3,520	8,800	7,621	6,222	4,400
5	5,500	4,400	11,000	9,526	7,777	5,500
6	6,600	5,280	13,200	11,431	9,332	6,600
2-PLY, CLASS 5, EE LIGHT DUTY						
1	2,200	1,760	4,400	3,810	3,111	2,200
1-1/2	3,300	2,640	6,600	5,716	4,666	3,300
1-3/4	3,800	3,040	7,600	6,582	5,373	3,800
2	4,400	3,520	8,800	7,621	6,222	4,400
3	6,600	5,280	13,200	11,431	9,332	6,600
4	8,200	6,560	16,400	14,202	11,595	8,200
5	10,200	8,160	20,400	17,666	14,423	10,200
6	12,300	9,840	24,600	21,304	17,392	12,300

SYNTHETIC WEB SLING (ENDLESS) WORKING LOAD LIMITS

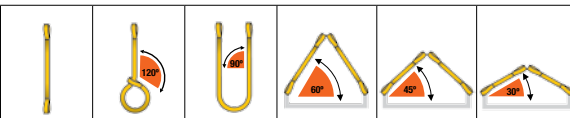
EN LIGHT DUTY (CLASS 5) (1-PLY & 2-PLY) (TYPE V)



Synthetic Sling Size (in.)	Working Load Limit (lbs.)			Working Load Limit (lbs.)		
	Endless Vertical	Choker	Vertical Basket 90°	Two Leg or Single Basket		
				60°	45°	30°
1-PLY, CLASS 5, EN LIGHT DUTY						
1	2,200	1,760	4,400	3,810	3,111	2,200
1-1/2	3,200	2,560	6,400	5,542	4,525	3,200
1-3/4	3,800	3,040	7,600	6,582	5,373	3,800
2	4,400	3,520	8,800	7,621	6,222	4,400
3	6,600	5,280	13,200	11,431	9,332	6,600
4	8,800	7,040	17,600	15,242	12,443	8,800
5	11,000	8,800	22,000	19,052	15,554	11,000
6	13,200	10,560	26,400	22,862	18,665	13,200
2-PLY, CLASS 5, EN LIGHT DUTY						
1	4,400	3,520	8,800	7,621	6,222	4,400
1-1/2	6,600	5,280	13,200	11,431	9,332	6,600
1-3/4	7,600	6,080	15,200	13,163	10,746	7,600
2	8,800	7,040	17,600	15,242	12,443	8,800
3	13,200	10,560	26,400	22,862	18,665	13,200
4	16,400	13,120	32,800	28,405	23,190	16,400
5	20,400	16,320	40,800	35,333	28,846	20,400
6	24,600	19,680	49,200	42,607	34,784	24,600

SYNTHETIC WEB SLING (EYE & EYE) WORKING LOAD LIMITS

EE HEAVY DUTY (CLASS 7) (1-PLY & 2-PLY)



Synthetic Sling Size (in.)	Working Load Limit (lbs.)			Working Load Limit (lbs.)		
	Vertical	Choker	Vertical Basket 90°	Two Leg or Single Basket		
				60°	45°	30°
1-PLY, CLASS 7, EE HEAVY DUTY						
1	1,600	1,280	3,200	2,771	2,262	1,600
1-1/2	2,300	1,840	4,600	3,984	3,252	2,300
1-3/4	2,700	2,160	5,400	4,676	3,818	2,700
2	3,100	2,480	6,200	5,369	4,383	3,100
3	4,700	3,760	9,400	8,140	6,646	4,700
4	6,200	4,960	12,400	10,738	8,767	6,200
5	7,800	6,240	15,600	13,510	11,029	7,800
6	9,300	7,440	18,600	16,108	13,150	9,300
8	11,800	9,440	23,600	20,438	16,685	11,800
10	14,700	11,760	29,400	25,460	20,786	14,700
12	17,600	14,080	35,200	30,483	24,886	17,600
2-PLY, CLASS 7, EE HEAVY DUTY						
1	3,100	2,480	6,200	5,369	4,383	3,100
1-1/2	4,700	3,760	9,400	8,140	6,646	4,700
1-3/4	5,400	4,320	10,800	9,353	7,636	5,400
2	6,200	4,960	12,400	10,738	8,767	6,200
3	8,800	7,040	17,600	15,242	12,443	8,800
4	11,000	8,800	22,000	19,052	15,554	11,000
5	13,700	10,960	27,400	23,728	19,372	13,700
6	16,500	13,200	33,000	28,578	23,331	16,500
8	22,700	18,160	45,400	39,316	32,098	22,700
10	28,400	22,720	56,800	49,189	40,158	28,400
12	34,100	27,280	68,200	59,061	48,217	34,100

SYNTHETIC WEB SLING (ENDLESS) WORKING LOAD LIMITS

EN HEAVY DUTY (CLASS 7) (2-PLY) (TYPE V)



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SYNTHETIC ROUNDSLING WORKING LOAD LIMITS

SYNTHETIC ROUNDSLING WORKING LOAD LIMITS

FOR VERTICAL & CHOKER HITCHES

Size	Working Load Limit (lbs.)		Minimum Diameter	
	Vertical	Choker	Decimals (in.)	Fractions (in.)
1	2,600	2,100	.5	1/2
2	5,300	4,200	.625	5/8
3	8,400	6,700	.75	3/4
4	10,600	8,500	.875	7/8
5	13,200	10,600	1	1
6	16,800	13,400	1.125	1-1/8
7	21,200	17,000	1.375	1-3/16
8	25,000	20,000	1.25	1-1/4
9	31,000	24,800	1.5	1-1/2
10	40,000	32,000	1.625	1-5/8
11	53,000	42,400	2	2
12	66,000	52,800	2.125	2-1/8
13	90,000	72,000	2.5	2-1/2



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Never choke into the eye of hooks, bows of shackles and shackle pins and/or other rigging hardware.

SYNTHETIC ROUNDSLING WORKING LOAD LIMITS

FOR BASKET HITCHES

Size	Working Load Limit (lbs.)				Minimum Diameter	
	90°	60°	45°	30°	Decimals (in.)	Fractions (in.)
1	5,200	4,500	3,700	2,600	.625	5/8
2	10,600	9,200	7,500	5,300	.875	7/8
3	16,800	14,500	11,900	8,400	1.0625	1-1/16
4	21,200	18,400	15,000	10,600	1.25	1-1/4
5	26,400	22,900	18,700	13,200	1.375	1-3/8
6	33,600	29,100	23,800	16,800	1.625	1-5/8
7	42,400	36,700	30,000	21,200	1.625	1-5/8
8	50,000	43,300	35,400	25,000	1.875	1-7/8
9	62,000	53,700	43,800	31,000	2	2
10	80,000	69,300	56,600	40,000	2.375	2-3/8
11	106,000	91,800	74,900	53,000	2.75	2-3/4
12	132,000	114,300	93,300	66,000	3	3
13	180,000	155,900	127,300	90,000	3.5	3-1/2

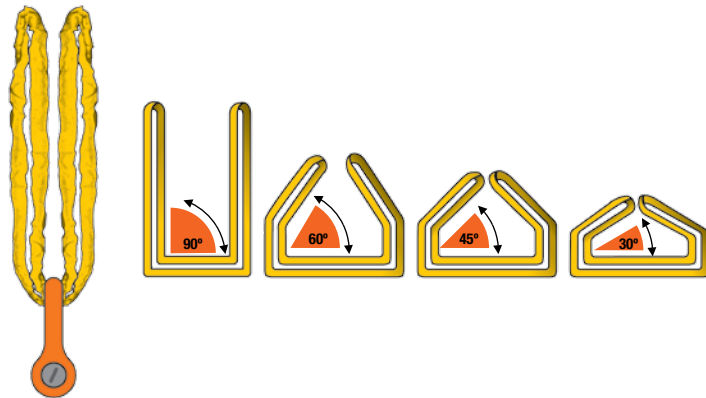


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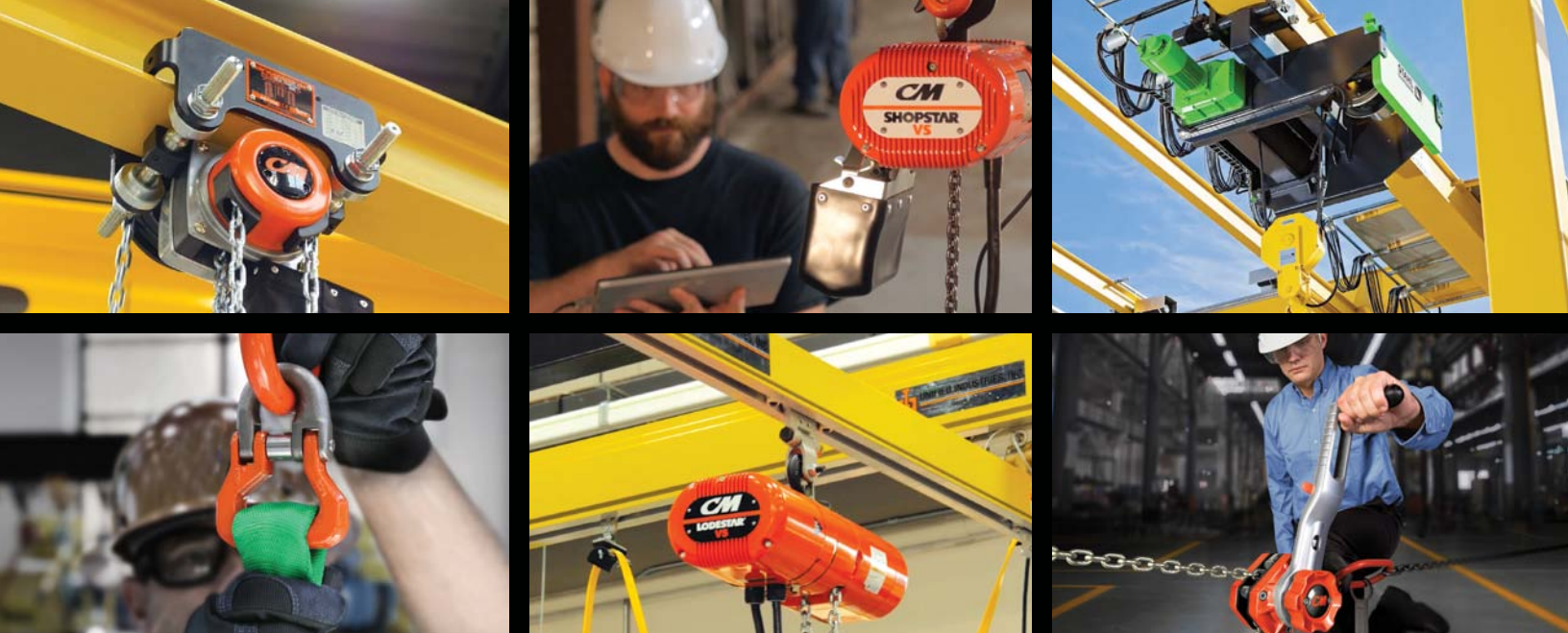
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Never choke into the eye of hooks, bows of shackles and shackle pins and/or other rigging hardware.

SYNTHETIC ROUNDSLING COLOR CHART

IDENTIFYING SLINGS BY COLOR

Industry norms only. Be sure to consult the sling tag and confirm manufacturer's sling working load limits prior to use.

Size	Color	Working Load Limit (lbs.)		
		Vertical	Choker	Basket 90°
1	Purple	2,600	2,100	5,200
2	Green	5,300	4,200	10,600
3	Yellow	8,400	6,700	16,800
4	Tan	10,600	8,500	21,200
5	Red	13,200	10,600	26,400
6	White	16,800	13,400	33,600
7	Blue	21,200	17,000	42,400



PARTNERS IN MOTION CONTROL.

Columbus McKinnon is focused on becoming the leading industrial technology company in safe and productive motion control. Together, with our network of value-add Channel Partners, we are uniquely positioned to offer solutions to solve our customer's high-value problems. From variable speed electric chain hoists featuring CM HI-Tech™, our exclusive performance interface platform, to the CM Tornado 360™ and its revolutionary Sidewinder™ lever handle, Columbus McKinnon is engineering motion control solutions for tomorrow's workforce.

BE SAFE. GET TRAINED.

Columbus McKinnon is committed to providing expert safety training on the proper use and inspection of rigging and overhead lifting equipment. Our company offers comprehensive programs at our national training centers as well as on-site at your facility. Courses include hoist and rigging safety and inspection; crane operation and safety; and load securement.

Columbus McKinnon's corporate headquarters in Getzville, New York, is home to our state-of-the-art **Niagara Training Center**. The 3,000-square-foot facility is dedicated to training Channel Partners and end users on the safe and proper use of hoist and rigging products. The Center offers a one-of-a-kind training experience on chain and rigging equipment with more than 75 manual and powered hoists, enclosed track systems and our 50-foot-wide crane system with 3-ton Yale Global King wire rope hoist.

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Win in the marketplace with CMCO University. This intense program is designed to give Channel Partners intimate product and application knowledge that they can use to advise their end-user customers during the product selection and sales processes.



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