

**NORTHWEST INDUSTRIAL
SUPPLY, INC.**

Northwest Industrial Supply, Inc.

Competent Synthetic Sling User

Presented by:

Michael Gelskey

Chief Executive Officer

Lift-It® Manufacturing Co., Inc.

**February 18, 2015 - Billings, MT
February 19, Missoula, MT**

Four Ingredients to Successful Rigging

- STAY OUT OF THE KILL ZONE.
- Do not exceed the Work Load Limit of the Sling.
- Do not use a bad sling or allow damage during use.
- You Must control the load.

ALL FOUR INGREDIENTS MUST BE PRESENT, SIMULTANEOUSLY
OR
You Relinquish Control of Your Own Destiny.





Tensile to Tag



Minimum Tensile Strength	X	Manufacturing Efficiency	=	Residual Strength
15000	X	.80	=	12000 lbs.

Residual Strength	÷	Design Factor	=	Vertical Work Load Limit
12000	÷	5	=	2400



Choker	1900	(Vertical x .80)
Vertical	2400	(Residual / 5)
Basket	4800	(Vertical x 2)

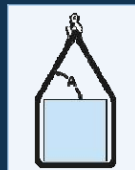
Sling-To-Load Angle

The Sling-to-Load Angle has a dramatic effect on sling Work Load Limits.

Slings with adequate capacity for the load's "scale" weight have catastrophically failed because the Sling-to-Load Angle and increased tension were not taken into account.

This principle applies in a number of conditions, including when one sling is used to lift at an angle and when a basket hitch or multi-leg bridle sling is used.

AS THE SLING TO LOAD ANGLE DECREASES, THE TENSION ON THE SLING LEG(S) INCREASES .



SLING-TO-LOAD ANGLE

The horizontal angle formed between the sling leg and the "top" of the load.



Increased tension is magnified by any change from vertical to horizontal lifting.

Sling Angle –Reduced Work Load Method

For years sling users have used angles to determine sling adequacy.

- 1) Calculate the Sling to Load Angle.
- 2) Determine the corresponding Loss Factor.
- 3) Multiply the Work Load Limit (per leg) by the Loss Factor to determine the reduced Work Load Limit (per leg).

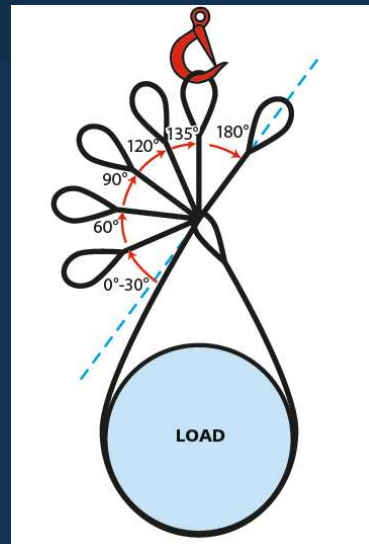
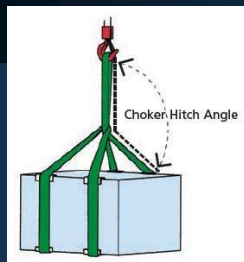
The result is the reduced Work Load Limit.

Sling angles less than 30° should not be used, unless approved by a qualified person.

LOSS FACTOR CHART			
Angle "A" Degrees	Loss Factor	Angle "A" Degrees	Loss Factor
90	1.000	55	.8192
85	.9962	50	.7660
80	.9848	45	.7071
75	.9659	40	.6428
70	.9397	35	.5736
65	.9063	30	.5000
60	.8660	25	.4226

SLING CAPACITY DECREASES AS THE SLING -TO-LOAD ANGLE DECREASES.				
SLING-TO-LOAD ANGLE (DEGREES)	90°	60°	45°	30°
WORK LOAD LIMIT X LOSS FACTOR	10,000 Lbs. x 1.000	10,000 Lbs. x .8660	10,000 Lbs. x .7071	10,000 Lbs. x .5000
REDUCED WORK LOAD LIMIT	10,000 Lbs.	8660 Lbs.	7071 Lbs.	5000 Lbs.

Choker Hitch Angle

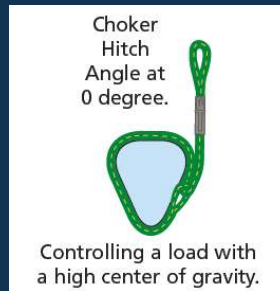
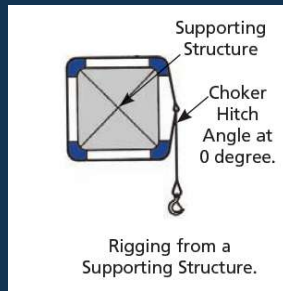


CHOKER HITCH ANGLE REDUCTION CHART

Choker Hitch Angle (Degrees)	Reduction Factor
120 –180	1.00
105 –120	.82
90 –105	.71
60 –90	.58
0 -60	.50

Choker Hitch Angle – 0 Degrees

Two examples of slings used at 0 degree Choker Hitch Angle.



Sling Configuration Exercise – TUFXKS2000



Capacity _____



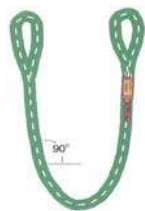
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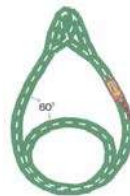
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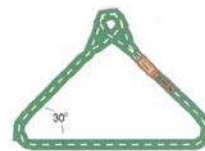
Capacity _____



Capacity _____



Capacity _____



Capacity _____



Lifting Slings

ENDLESS	EYE & EYE		REVERSED EYE		CARGO		CHOKER HARDWARE
	FLAT	HALF TWIST	STD.	FLAT	WIDE BODY	ATTACHED EYE	
EN TYPE 5	EE TYPE 3	EE TYPE 4	RE TYPE 6	RE TYPE 7	WBC	AEC	ACH/SCH TYPE 1

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Spatial Relationships

Bunching Reduces Sling Efficiency!





Synthetic Lifting Slings

BASKET HARDWARE	BRIDLE SLINGS SINGLE & MULTI-LEG	SPECIAL PURPOSE SLINGS	ROUND SLINGS	TWIN-PATH® SLINGS
ABH/SBH TYPE 2	SLB / MLB	DS / HH / CG	RS	TP / TUF TPXKS / TUFXKS

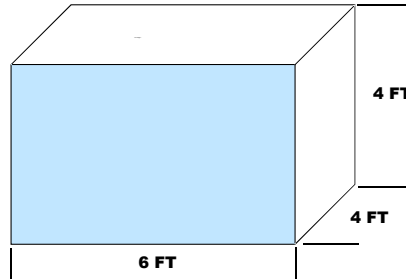
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Material(s) Weight Tables

Aluminum	165	Coal	56	Glass	162	Paper	60
Asphalt	81	Concrete	150	Iron Casting	470	Rubber	94
Brass	524	Crushed Rock	95	Lead	708	Sand -Dry	105
Brick	120	Diesel	52	Lumber Fir	32	Sand -Wet	120
Bronze	534	Earth -Dry	75	Lumber Oak	62	Steel	490
Cement Loose	94	Earth -Wet	100	Lumber RR Ties	50	Water	63
Cement Set	183	Gasoline	45	Oil, Motor	58	Zinc	437



How To Determine Load Weight



Coal: 56 LBS. Per Cubic Foot

Width x Height x Length = Volume

4 ft. x 4 ft. x 6 ft. = 96 Cubic Feet

96 CFT. x 56 Lbs. /CFT = 5376 Lbs.

Coal Hopper: 1 inch Steel @ 40 LBS. Per Square Foot

ENDS: $4 \times 4 = 16 \text{ FT} \times 2 = 32 \text{ Square Feet}$

BOTTOM & SIDES: $4 \times 6 = 24 \text{ FT} \times 3 = 72 \text{ Square Feet}$

TOTAL = 104 Square Feet

104 Square Ft. Steel x 40 Lbs. / SQFT = 4160 LBS. Steel

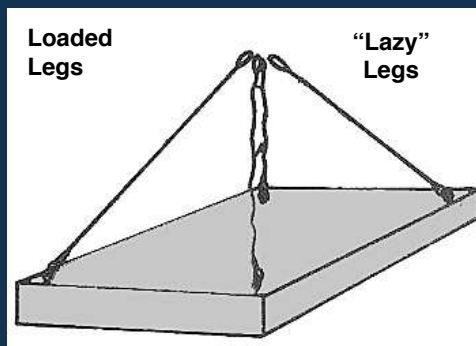
Coal (5376) + Hopper (4160) = 9536 Lbs. Total Weight

Leg Loading and Total Lifting Capacity

Total lifting capacity IS NOT number of legs multiplied by the single leg WLL.

It is possible that two legs will carry a majority of the load, while the other two balance.

The load is carried and balanced, diagonally.



Sling to Corner Relationship

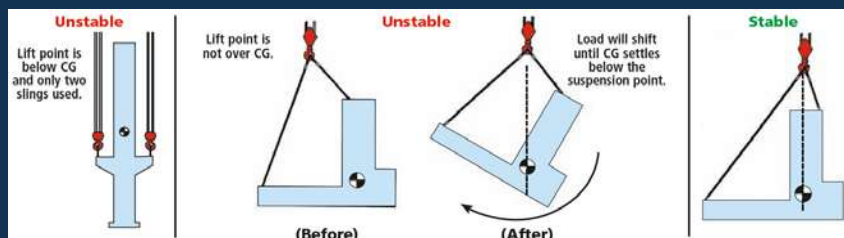


Center of Gravity (CG)

For the best control, attach the slings above the CG.

When this is not possible, you must always keep the CG contained with three or more legs. A load with a high CG can rotate in some sling hitch configurations.

When taking all these conditions into consideration, the load can be lifted safely with the assurance of controlling the load.





Calculating Center of Gravity –A to B

Weigh both ends. Measure the distance between attachment points.

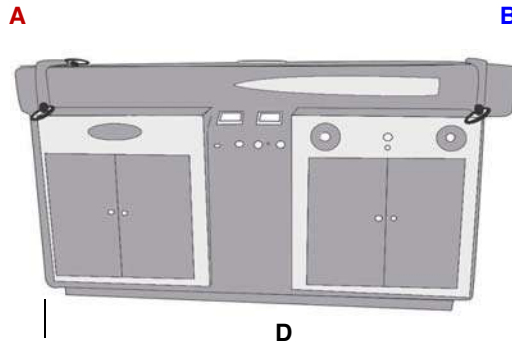
VERT "A" = 5000 LBS.

VERT "B" = 15,000 LBS.

"D" = 20FT

$$\text{Center of Gravity (From point "A")} = \frac{\text{VERT "B"}}{(\text{VERT "B"} + \text{VERT "A"})} \times \text{D}$$

$$\text{CG (From point "A")} = \frac{\quad}{\quad} \times 20 =$$



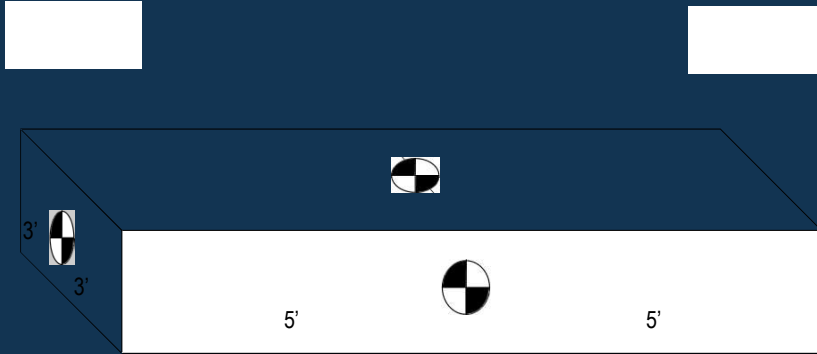
Leg Loading

1 Leg	Loads	1 Leg
2 Legs	Loads	2 Legs
3 Legs	Loads	3 Legs*
4 Legs	Loads	2 Legs*

- * If the Legs are:
- 1) Equidistant from each other
 - 2) Equidistant from the CG
 - 3) All Legs are exact length

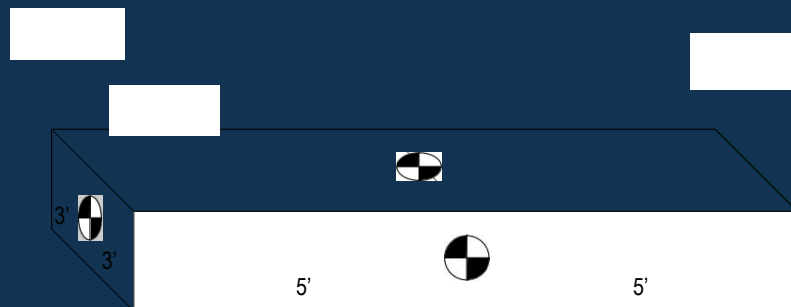
Load Weight Distribution

What is the distribution of weight per lift point, in percentages?



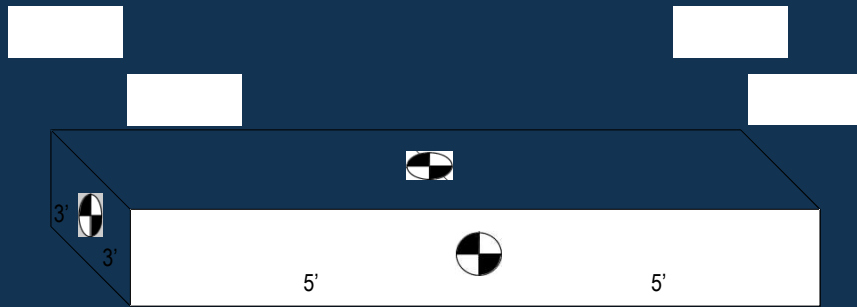
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Load Weight Distribution

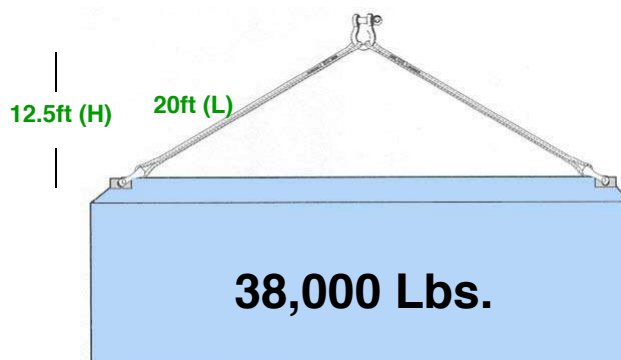
What is the distribution of weight per lift point, in percentages?



Share of the Load

$$\times \text{LAF } (L \div H) \quad 20 \div 12.5 = \underline{\hspace{2cm}}$$

Sling Tension



Roundslings Specifications



ENDLESS CONFIGURATION

STOCK NUMBER	RS30	RS50	RS60	RS90	RS120	RS150	RS180	RS240
COLOR CODE	PURPLE	BLACK	GREEN	YELLOW	TAN	RED	WHITE	BLUE
CHOKER (WLL - LBS.)	2,120	3,200	4,240	6,720	8,500	10,560	13,400	17,000
VERTICAL (WLL - LBS.)	2,650	4,000	5,300	8,400	10,600	13,200	16,800	21,200
BASKET (WLL - LBS.) AT 90°	5,300	8,000	10,600	16,800	21,200	26,400	33,600	42,400
BASKET (WLL - LBS.) AT 60°	4,500	6,900	9,100	14,500	18,300	22,800	29,000	36,700
BASKET (WLL - LBS.) AT 45°	3,600	5,600	7,400	11,800	14,900	18,600	23,750	29,900
MINIMUM LENGTH	18"	18"	18"	3 Ft.	3 Ft.	3 Ft.	3 Ft.	3 Ft.
MINIMUM CONNECTION DIA. CHOKER or VERTICAL (Inches)	.50	.50	.62	.75	.87	1.00	1.00	1.38
MINIMUM CONNECTION DIAMETER BASKET (Inches)	.62	.62	.88	1.00	1.25	1.38	1.62	1.75
WEIGHT-LBS PER FOOT (BEARING to BEARING) (Inches)	.21	.30	.32	.45	.55	.60	.75	.90
BODY DIAMETER (RELAXED) (Inches)	1.04	1.11	1.11	1.27	1.32	1.43	1.59	1.75
THICKNESS WHEN LOADED (Inches)	.20	.25	.25	.30	.38	.38	.40	.50
WIDTH WHEN LOADED (Inches)	2.00	2.00	2.00	2.75	3.00	3.00	3.00	4.00

STOCK NUMBER	RS360DC	RS400DC	RS600DC	RS800DC	RS1000DC
COLOR CODE	GRAY	GRAY	GRAY	GRAY	GRAY
CHOKER (WLL - LBS.)	24,800	32,000	43,000	52,800	72,000
VERTICAL (WLL - LBS.)	31,000	40,000	53,000	66,000	90,000
BASKET (WLL - LBS.) AT 90°	62,000	80,000	106,000	132,000	180,000
BASKET (WLL - LBS.) AT 60°	53,600	69,280	91,796	114,312	155,880
BASKET (WLL - LBS.) AT 45°	43,800	56,568	74,942	93,324	127,260
MINIMUM LENGTH	3 Ft.	4 Ft.	4 Ft.	4 Ft.	6 Ft.
MINIMUM CONNECTION DIA. CHOKER or VERTICAL (Inches)	1.62	2.25	2.40	2.40	3.00
MINIMUM CONNECTION DIAMETER BASKET (Inches)	2.00	2.38	2.75	3.00	3.50
WEIGHT-LBS PER FOOT (BEARING to BEARING) (Inches)	1.50	2.00	2.85	3.60	4.60
BODY DIAMETER (RELAXED) (Inches)	2.39	2.55	3.03	3.50	3.82
THICKNESS WHEN LOADED (Inches)	.50	.75	.80	1.00	1.10
WIDTH WHEN LOADED (Inches)	4.25	5.00	5.25	6.00	8.00

⚠ WARNING

Polyester is adversely affected by aldehydes, ethers, concentrated sulfuric acid and alkalis at elevated temperatures. Nylon is adversely affected by acids and bleaching agents. RS360 and larger capacity roundslings feature a bulked nylon cover and polyester load yarns. In active chemical environments, where exposure could be deleterious to one or both yarn types, the sling user or competent person must make a hazard assessment.

Always refer to the sling tag for sling capacities and do not rely on color codification to determine sling strength.

Rodney A. Guy
May 26, 1960 – March 20, 1992



Factors to Avoid

- Never Under, On, Near, Next to or in the “Bight”.
- Shock Loading and Side Loading.
- Dropping and Dragging.
- Pulling Out From Under The Load.
- Don’t Place Body Parts Between the Load and the Sling.
- Be Alert for Snagging.
- Plan Your Work and Work Your Plan.



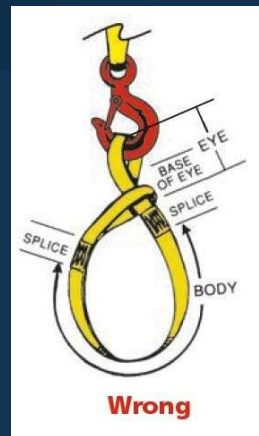
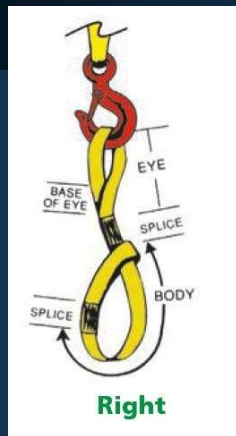
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Under

On

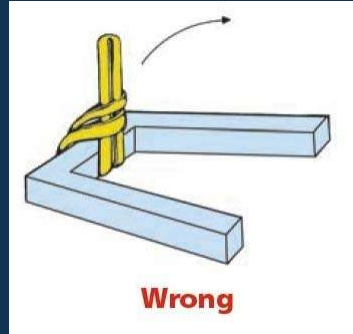
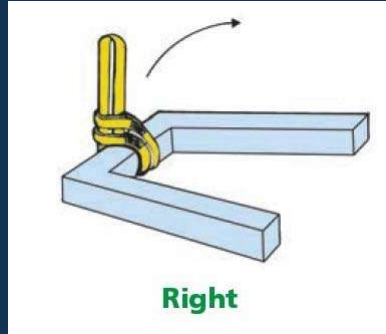
Near

Proper Choking



The sling should be of sufficient length so that the choke action is on the sling body. Never on the sling splice, fittings, tag, eye or at the base of the sling eye or fitting.

When Turning Loads,
Always Use Choker Hitches.
Eyes face away from the turn.



Turning Loads

Hardware Considerations

OPENINGS MUST SEAT PROPERLY



The 75% Rule

4.75 Ton
2.00" O.A. Width
 $2.00 \times .75 = 1.5 \text{ in}$



8.5 Ton
2.50" O.A. Width
 $2.50 \times .75 = 1.88 \text{ in}$



9.5 Ton
2.75" O.A. Width
 $2.75 \times .75 = 2.06 \text{ in}$



Sling Protection

- Edge Need Not Be “Razor” Sharp to Damage the Sling.
- The Protection Must be of Sufficient Strength, Thickness and Construction.
- Cut Protection is different from Abrasion Protection.
- Engineered Sling Protection.
- Gloves & Cardboard Are Not Engineered Protection.
- Mandated for All Synthetic Slings in ASME B30.9
- Test Lift and Evaluation by the “QP”

CORNERMAX® PADS

To be effective, conventional forms of sling protection must be of sufficient strength, thickness and construction. Traditional sling protection has always relied on these attributes to prevent damage to the sling because of direct contact with damaging load edges, corners or surfaces.

Patented CornerMax® Pads are truly remarkable because of the tunnel or “no touch zone” that is formed between the load corner and the CornerMax® Pad. The no touch zone greatly reduces the possibility of cutting. “Cut proof” sling protection does not exist. Note that the sides of the load must completely support CornerMax® Pads in order to create and maintain “the tunnel”. CornerMax® Pad ratings are only valid if the 90 degree, CORNERED load fully engages the internal walls of the protector. US Patent No. 7,744,138.

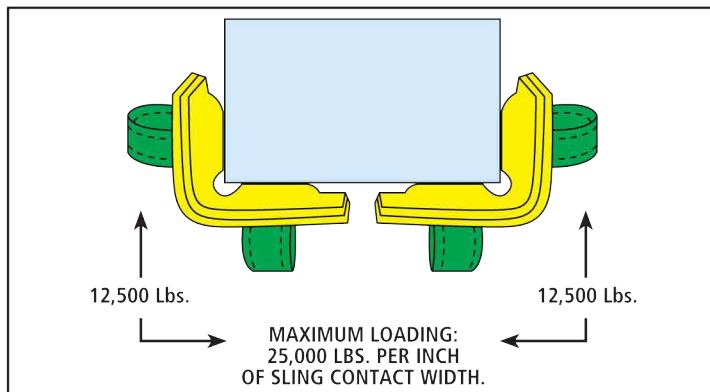


A TUNNEL or “NO TOUCH ZONE” IS FORMED BETWEEN THE PAD AND LOAD CORNER.

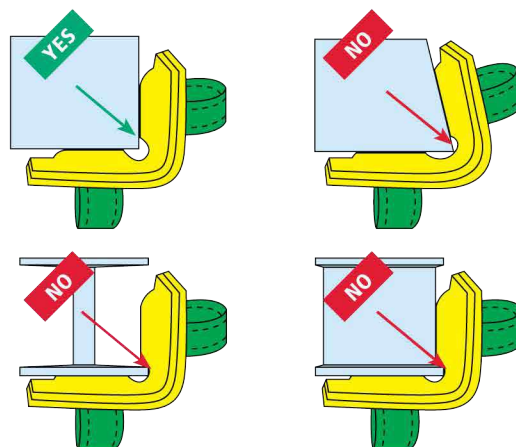
CORNERMAX® PAD STOCK NUMBER	OVERALL WIDTH (Inches)	ROD WIDTH * (Inches)	SLING WIDTH (Inches)	UNIT WEIGHT (Lbs.)
CM-4	4	2	1 to 2 in.	1.10
CM-5	5	3	3 in.	1.35
CM-6	6	4	4 in.	1.65
CM-8	8	6	Up to 5 in.	2.10
CM-8	8	6	Up to 6 in.	2.10
CM-10	10	8	Up to 8 in.	2.70
CM-12	12	10	Up to 10 in.	3.35
CM-14	15	12	Up to 12 in.	5.50
CM-16	17	14	Up to 14 in.	6.50

* Use Rod Width for determining maximum loading. DO NOT use Pad Width.

Please Note: CornerMax® Pads are 10.25 inches in length, unless otherwise specified.



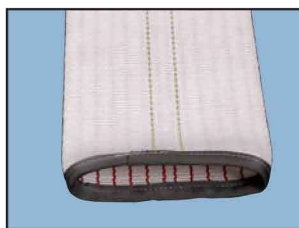
WARNING DO NOT EXCEED 25,000 LBS. PER INCH OF SLING CONTACT WIDTH. CORNERMAX® PADS ARE FOR USE ON 90 DEGREE CORNERED LOADS.



CORNERMAX® SLEEVES

CornerMax® Sleeves are an ideal solution to protect slings from cutting when it is not practical to use protection that is based upon full, 90°, corner contact. CornerMax® Sleeves conform to the curvature of the load and are manufactured from “high tech” fibers. CornerMax® Sleeves have been tested in independent laboratory and field applications and have proven to be extremely cut resistant.

WARNING DO NOT EXCEED 25,000 LBS. PER INCH OF SLING CONTACT WIDTH.



Narrower and Wider Sleeves are available

CORNERMAX® SLEEVE STOCK NUMBER	INTERNAL SLEEVE WIDTH
CMSDF-10	10 In.
CMSDF-8	8 In.
CMSDF-6	6 In.
CMSDF-4	4.5 In.
CMSDF-2*	2.5 In.

*DO NOT EXCEED 12,500 Lbs. per inch of sling contact width



Increase productivity and decrease discharge time with Lift-It® Coil Handler Slings. 10 Times lighter than steel sling alternatives, Coil Handler Slings are easy to pull and “fish” through coils and are non-damaging and repairable.

Stock No. CHTUFXKS 4000 x 13 Ft. Basket at 90 Deg.- 80,000 Lbs. Sleeve Length- 8 Ft.

WARNING Inspect the sling and sleeve before each use.

Do Not Use if Red Yarn is Visible in CornerMax® Sleeve.

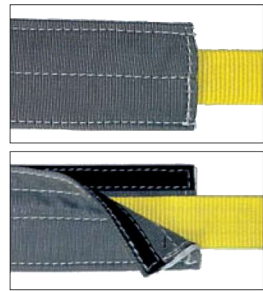
CornerMax® Sleeve must always cover coil edge.

Damaged or misused sling protection can result in sling failure. Inspect sling protection before each use and remove if damaged. Be sure the Sling Protection is the correct type and size to protect the sling. Prevent sling protection and slings from slipping or sliding across load edges. DEATH or INJURY can occur from improper use, maintenance and/or inspection.



FELT SLEEVES - ABRASION PROTECTION

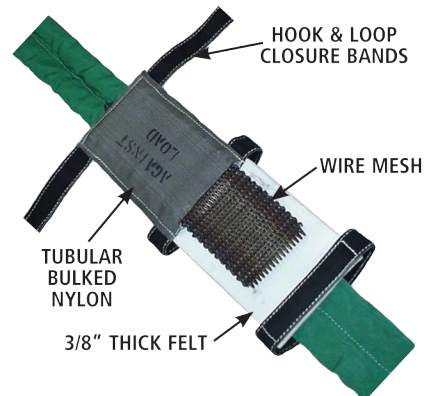
Lift-It® Felt Sleeves blend two wear protection materials: Polyester Felt covered by Bulkied Nylon. Felt Sleeves provide protection from abrasion damage caused by contact with rough surfaces. Felt Sleeves can be made to fit any sling and are available in long lengths which can be cut into suitable sizes at the job site. Double or triple thickness Felt Sleeves are also available, depending upon the severity of the application. Quick Felt Sleeves are available with hook and loop tape, making installation and removal, quick and easy.



Always Specify:
Sleeve Length
See page 52 for ordering information.

MESH GUARD®

Lift-It® Mesh Guard® features a unique combination of Sling Protection materials. A layer of felt buffers the sling while carbon steel wire mesh covers the load edge. Hook and loop closure bands make attachment and removal quick and easy.



MESH GUARD® STOCK NUMBER	SLING WIDTH (Inches)	MESH GUARD® OVERALL WIDTH (Inches)	PROTECTION RATING (Lbs.)	WEIGHT (Lbs./Ft.)
MG-3	2	5	20,000	2.00
MG-4	3	6	20,000	2.50
MG-6	4 - 5	8	40,000	4.00
MG-8	6	10	40,000	5.25
MG-10	8	12	60,000	6.50
MG-12	10	14	60,000	8.00

WARNING Mesh Guard® is for use on 90 degree cornered loads. Sling must not be allowed to run off the edge of the wire mesh.

MAGNETIC CORNER PROTECTORS

MCP STOCK NUMBER	STYLE	SLING WIDTH (Inches)	UNIT WEIGHT (Lbs.)	CORNER PROTECTOR O.A.L. (Inches)
MCP-6	Regular	UP TO 4	1.25	6-1/2
MCP-9	Regular	UP TO 7	1.65	9-1/2
MCP-12	Regular	UP TO 10	2.00	12-1/4
MCP-18	Regular	UP TO 16	3.00	18-1/4
MCP-9HD	Heavy Duty	UP TO 7	6.75	9-1/2
MCP-12HD	Heavy Duty	UP TO 10	8.75	12-1/4
MCP-18HD	Heavy Duty	UP TO 16	13.00	18-1/4
MCP-SL-6	Slotted-Regular	UP TO 4	2.00	6-1/2
MCP-SL-9	Slotted-Regular	UP TO 7	2.75	9-1/2
MCP-SL-12	Slotted-Regular	UP TO 10	4.25	12-1/4
MCP-SL-18	Slotted-Regular	UP TO 16	5.50	18-1/4
MCP-SL-6HD	Slotted-Hvy. Duty	UP TO 4	5.50	6-1/2
MCP-SL-9HD	Slotted-Hvy. Duty	UP TO 7	8.00	9-1/2
MCP-SL-12HD	Slotted-Hvy. Duty	UP TO 10	11.00	12-1/4
MCP-SL-18HD	Slotted-Hvy. Duty	UP TO 16	16.50	18-1/4
MCP-CURVE*	Curved			

* You must specify inside diameter of coil and sling width

Magnetic Corner Protectors are fabricated from a durable synthetic material that protects synthetic and wire rope slings from damage. Magnetic Corner Protectors are for use on 90 degree, "cornered" loads and keep the sling from contacting load edges.

WARNING Magnetic Corner Protector ratings are valid if the 90 degree, CORNERED load fully engages the internal walls of the protector.

Magnetic Corner Protectors are "protection rated" at 12,500 Lbs. per inch of sling contact width. Heavy Duty Magnetic Protectors provide a larger contact diameter, but are not rated higher than Regular Magnetic Corner Protectors. Magnetic Corner Protectors can be used at temperatures from -20°F/-29°C to 220°F/104°C.

Slotted Magnetic Corner Protectors are available. Please specify flange thickness and width.

Curved Magnetic Corner Protectors are custom made to fit the exact curvature of your load. Spacer Protectors are necessary in applications where slings are not perpendicular (sling-to-load angles less than 90 degrees).

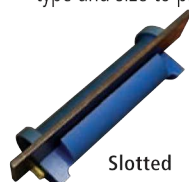
WARNING Magnets are designed to keep Magnetic Corner Protectors from falling from metallic loads and are not intended to prevent the protector or sling from sliding. Slings and protectors should be vertical or perpendicular to the load. The farther from vertical slings and protectors are, the more likely the protectors and slings will slide to become vertical, resulting in load instability and uncontrolled load descent. Keep magnets clean and free of debris. Damaged or misused sling protection can result in sling failure. Inspect sling protection before each use and remove if damaged. Be sure sling protection is the correct type and size to protect the sling.



Heavy Duty



Regular



Slotted



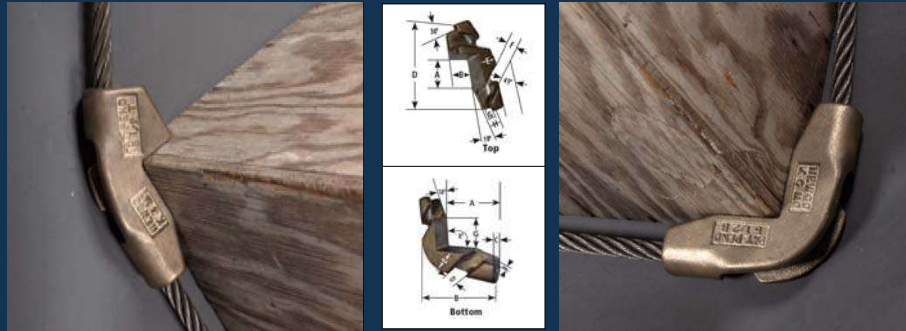
Curved



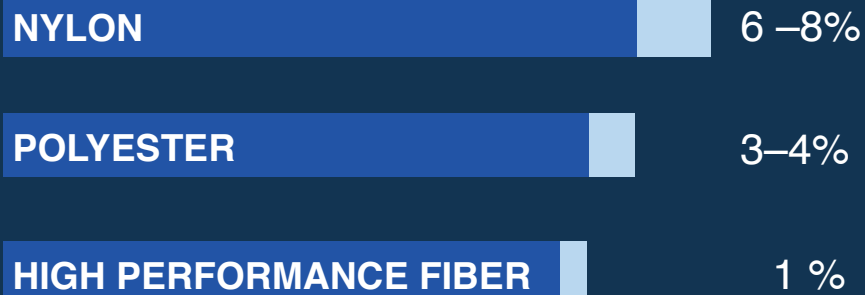
Retainer Strap

Wire Rope Saddle Protectors

Wire Rope Saddle Protectors were developed to protect slings and loads. Bottom and Top Wire Rope Saddle Protectors are manufactured from lightweight manganese bronze and are easily positioned.



Elongation of Synthetics At Work Load Limit



Required Proof Testing

- All Slings with previously used or welded fittings.
- All Wire Mesh Slings
- All Repaired Slings to Twice the WLL
- All Chain Slings as a Finished Assembly.
 - If individual components have not been proof tested.
- All Twin-Path[®] Slings: Required by the Patent Holder

Nylon Vs. Polyester

Material Type	Elongation	UV	Chemical	Strength When Wet
Nylon	6 –8%	40–60% Loss 1-3 Years	Resistant to weak acids Decomposed by strong mineral acids. Resistant to alkalis and organic solvents. Soluble in phenols and formic acid.	85%
Polyester	3 –4%	30% Loss 1 Year	Resistant to mineral acids. Decomposed by strong sulfuric acids and strong alkalis at high temperature. Resistant to organic solvents, soluble in phenols.	100%

Temperature Considerations

O.S.H.A—Guidance on Safe Slings Usage

Do not allow nylon and polyester slings to be used in contact with objects or at temperatures in excess of 194 degrees F (90 degrees C), or below minus 40 degrees F (minus 40 degrees C).

ASMEB30.9

Section: 9-5.8: EFFECTS OF ENVIRONMENT

9-5.8.1 Nylon and Polyester slings shall not be used in contact with objects or at temperatures in excess of 194°F (90°C) or below -40°F (-40°C).

RESULTS and CONCLUSIONS

- All synthetic products are degraded by exposure to sources of UV Light.
- Nylon materials lose at a slower, initial rate when compared to Polyester.
- Nylon degradation continues to occur as a function of time.
- The loss of strength for nylon slings can be 40 to 60% after exposure for periods ranging from 12 to 36 months.
- Polyester web slings lost strength at a greater, initial rate, when compared to nylon slings.
- Loss in strength for polyester slings was approximately 30% after 12 months exposure.
- Polyester sling strength loss seemed to subside and level off after the initial 12 month period.

Care and Storage

COOL

• Prevents damage from exposure to excessive temperatures.

Dry

• Prevents the growth of damaging bacteria and mold.

Dark

• Prevents the deleterious effects of prolonged exposure to sources of ultraviolet light.

Free of Environmental and Mechanical Damage

• Ventilated and not exposed to heat sources or sunlight.

Sling Inspection Systems

- Specific Inspection Procedure to Detect Damage and Abuse.
- Three Levels of Inspection
 - Initial
 - Frequent
 - Periodic
- All Levels MUST be applied.
- Slings Removed From Service That Are Not Capable of Repair Shall Be Destroyed.

Sling Inspection –InitialLevel

- WSTDA & ASME:
 - Inspection by Designated Person
 - Correct Application and Compliance
- No Damage During Transit
- Order Received Correctly
- Sling Tags Match Printed, Mfg. Specifications
- Record Keeping NOTRequired

Sling Inspection –FrequentLevel

- DOL-OSHA:
 - Before Each Shift or Day
 - Sling, Attachments and Fittings
 - By A Competent Person Designated by the Employer
 - Proper Sling for Hitch, Load and Environment
 - Any Condition Considered Hazardous –Sling Removal
- Manufacturer Recommendation: Before Each Use
- Manufacturer Recommendation Trumps DOL-OSHA!
- Recordkeeping Not Required

Sling Inspection –PeriodicLevel

- Designated Personnel at Regular Intervals
- Frequency –Severity –Comparison of Similar Slings
- ASME Guidelines
 - Normal Service: Yearly
 - Severe Service: Monthly or Quarterly
 - Special Service: As Recommended by a Qualified Person
- Documentation That the Most Recent Periodic Inspection Was Performed
- Documentation that TheInspectionOccurred
- Inspection Records Documenting the Condition of Individual SyntheticSling are not Required.

Sling Inspection Techniques

- Normal: Daily or Before Each Shift
Unsure? You must do the inspection!
- Manufacturer Recommendation: Before Each Use.
- Thorough, Systematic and Non-Compromising.
- Synthetics are consumable, they wear out.
- Not Baseball –Strike One and You’re Out.
- Eyes and Hands.
- Do Not “Downgrade” Work Load because of Damage.
- Damaged Slings are Removed from Service and unfit for any use or application.

Web Sling Identification Requirements

ASME B30.9: Section 9-5.7 Sling Identification

- 9-5.7.1 Each sling shall be marked to show:
- a) name or trademark of manufacturer or repair entity if repairs were performed
 - b) manufacturer's code or stock number
 - c) rated load for at least one hitch type and the angle upon which it is based
 - d) type of synthetic web material
 - e) number of legs, if more than one
- 9-5.7.2 Initial Sling Identification
Sling identification shall be done by the sling manufacturer.
- 9-5.7.3 Maintenance of Sling Identification
Sling identification should be maintained by the user so as to be legible during the life of the sling.

Web Sling Removal From Service Criteria

ASME 9-5.9.4 REMOVAL FROM SERVICE CRITERIA

A synthetic webbing sling shall be removed from service if conditions such as the following are present:

- A) Missing or illegible sling identification.
- B) Acid or caustic burns
- C) Melting or charring of any part of the sling
- D) Holes, tears, cuts or snags
- E) Broken or worn stitching in the load bearing splices
- F) Excessive abrasive wear
- G) Knots in any part of the sling
- H) Discoloration and brittle or stiff areas on any part of the sling, which may mean chemical or ultraviolet/ sunlight damage.
- I) Fittings that are pitted, corroded, cracked, bent, twisted, gouged or broken
- J) For hooks, removal criteria as stated in ASME B30.10
- K) For rigging hardware, removal criteria as stated in ASME B30.26
- L) Other conditions, including visible damage, that cause doubt as to the continued use of the sling.

No such thing as "minor" damage!

CONTROL BREAK –26,050 LBS.



1/8 IN. CUT –22,150 LBS.



1/4 IN. CUT –18,090 LBS.



3/8 IN. CUT –15,480 LBS.



Roundsling Identification Requirements

ASME B30.9 Section 9–6.7 Sling Identification

- 9–6.7.1 Identification Requirements
Each sling shall be marked to show:
- name or trademark of manufacturer
 - manufacturer's 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
 - Number of legs, if more than one
- 9–6.7.2 Initial Sling Identification
Sling identification shall be done by the sling manufacturer.
- 9–6.7.3 Maintenance of Sling Identification
Sling identification should be maintained by the user so as to be legible during the life of the sling.
- 9–6.7.4 Replacement of Sling Identification
Replacement of the Sling identification shall be considered a repair as specified in paragraphs 9–6.9.5(a) and (b). Additional proof testing is not required.

WSTDA RS–1 Recommendation:
Slings will be marked internally to identify the manufacturer.

Roundsling Removal from Service Criteria

ASME 9-6.9.4 REMOVAL FROM SERVICE CRITERIA

A synthetic roundsling shall be removed from service if conditions such as the following are present:

Roundslings shall be removed from service if any of the following is visible:

- A) Missing or illegible sling identification tag, see section 9-6.7
- B) Acid or caustic burns
- C) Evidence of heat damage
- D) Holes, tears, cuts, abrasive wear, or snags that expose the core yarns
- E) Broken or damaged core yarns
- F) Weld splatter that exposes core yarns
- G) Knots in the roundsling, except for core yarns inside the cover
- H) Fittings that are pitted, corroded, cracked, bent, twisted, gouged or broken
- I) For hooks, removal criteria as stated in ASME B30.10
- J) For rigging hardware, removal criteria as stated in ASME B30.26
- K) Other conditions, including visible damage that may cause doubt as to the continued use of the sling

MANUFACTURER'S RECOMMENDATIONS:

- 1) Broken or worn stitching in the cover which exposes the core yarns;
- 2) Bunched or wadded yarn;
- 3) Empty or void areas throughout the sling, determined through touch inspection, that do not contain an even or uniform distribution of load carrying yarns.

Twin-Path Removal Criteria

Slings shall be inspected throughout their entire length for evidence of damage. Core integrity is determined by hand over hand inspection of the entire sling, combined with a thorough visual inspection.

Twin-Path Slings shall be removed from service if any of the following is visible:

- A) Missing or illegible work load limit tag.
- B) Brittle or stiff areas that may indicate chemical damage, acid or alkali burns.
- C) Melting, charring or weld spatter of any part of the sling.
- D) Holes, tears, cuts, embedded particles, abrasive wear, or snags that expose the load carrying yarns.
- E) Broken, cut or damaged load carrying yarns.
- F) Broken or worn stitching in the cover which expose the load carrying yarns.
- G) Fitting distortion: elongated, damaged, corroded or chemical degradation of fittings or component hardware.
- H) Slings that are knotted.
- I) Tattle tails - if one or both of the tattle tails is not visible or is chemically degraded.
- J) Fiber-Optic - Lack of fiber optic light transfer, in sling models with the fiber optic (FO) option.
- K) For slings equipped with Fast™ Inspection:
 - External Warning Indicator (EWI) is not visible
- L) For hooks, removal criteria as stated in ASME B30.10
- M) For applicable fittings, removal criteria as stated in ASME B30.26
- O) Other damage which causes any doubt as to the strength of the sling.

Slings removed from service that are not capable of repair shall be destroyed and rendered completely unfit for future use.

