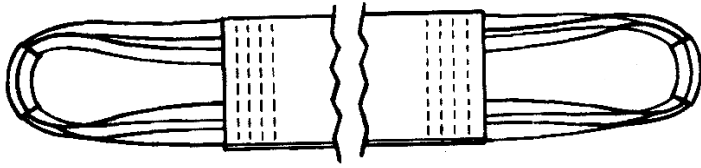
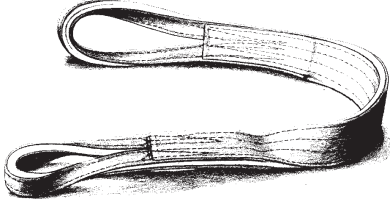


# SLING CHARACTERISTICS



**FOR INFORMATION ON:**  
 Sling Angle Loading • Effects of Chemicals  
 Safe Use • Inspection

SEE FOLLOWING PAGES

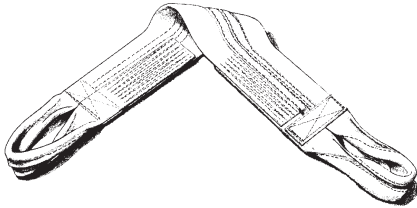


## RATED CAPACITY

The term "Rated Capacity," as used in this catalog represents the ratio of the minimum breaking strength divided by a safety factor of five. The rated capacities in our catalog apply to a new and unused sling, in a straight pull, under ideal sling conditions, and ideal test conditions. **NOTE: DO NOT UNDER ANY CIRCUMSTANCES EXCEED RATED CAPACITY.**

## ELONGATION

Web slings will stretch when loaded, and this stretch is measured as a percent of the sling length with no load. LIFCO Nylon Slings stretch about seven percent at their rated capacity, and our polyester slings stretch about one-half that much at their rated capacity. The elongation may vary with web and sling construction. Sling will recoil and cause injury or death if released under load.



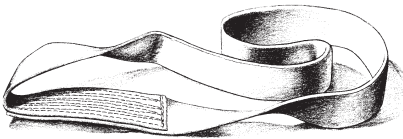
## TEMPERATURE

Synthetic web slings should not be used where they will be exposed to temperatures over 180° F.

## TYPES OF SLING WEBBING

**NYLON**—Slings made of nylon web are by far the most popular and best suited slings for general usage. Nylon is the strongest material available for web sling usage and it has elastic properties that are desirable in many instances. Nylon slings are not affected by grease or oil and have good chemical resistance. (See Chemical Information Chart on page 22). Their stretch at rated capacity is approximately 7 percent, and their temperature limit is 180° F.

**POLYESTER**—Slings made of polyester should be used when acid conditions exist, or a minimum of stretch is desired. Their stretch at rated capacity is approximately 1/2 that of nylon slings and they are good in most chemical environments except concentrated sulphuric acid, aldehydes, and ethers. Polyester web also has a temperature limit of 180° F.



## TREATMENT FOR ABRASION RESISTANCE

All slings are treated with yellow latex for abrasion resistance unless otherwise specified. Wear Pads should be used to prevent abrasion and cutting.

# HOW TO ORDER



(MEASURED PULL TO PULL WHEN FLAT)



(MEASURED PULL TO PULL WHEN FLAT)

### PLEASE SPECIFY:

1. Quantity
2. Code Number
3. Sling Length Pull to Pull
4. Sling Type Number
5. Nylon or Polyester Material
6. Note If Untreated Material Is Desired

### EXAMPLE:

2 ea. **EE** 1 - **904** X **12 FT.** **TYPE 4** **NYLON SLING**  
 Sling Configuration    Number of Plies    Strength of Web    Width of Web    Length of Sling    Sling Type    Web Material

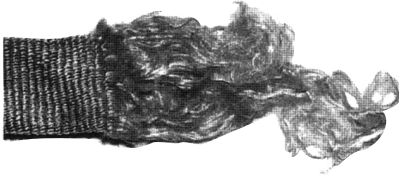
# IDENTIFYING WEAR AND ABUSE and SLING CARE

These are some of the most common types of web sling damage caused by abuse and misuse. When you see any of these problems during your regular inspection, stop. Replace the sling immediately because the damage is done. Never attempt to mend the sling yourself and, more so, never attempt to lift with these slings.

Whether a sling is damaged from improper use or normal wear, the same rule applies in all cases: always cut the sling eyes and discard the sling right away when you see the damage. Only with proper working slings can you take a load off your mind.

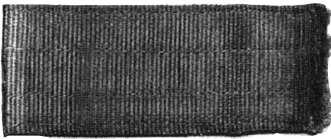
## TENSILE BREAK

The distinguishing sign of a tensile break is a frayed appearance close to the point of failure or damage. This usually happens when a sling is loaded beyond its existing strength. The photo shows an example of a sling pulled to destruction on a testing machine. You can avoid tensile breaks by never overloading your sling.



## CUT

You can easily see a cut in your sling when you see a clean break in the webbing structure or fibers. This usually results when a sling contacts a sharp object or unprotected edge of a load. This can happen anywhere on the sling body or eyes. Many slings feature Red Guard warning yarns to alert you of serious cuts. One way you can avoid cuts from contacting sharp corners is to use wear pads on the sling to protect the fabric. See page 20 for details.



## CUT AND TENSILE DAMAGE

A good example is the photo shown here. It shows what can happen when you use a sling that's already been cut by a sharp object along one edge of the sling body. The cut dramatically reduces lifting capacity, and continued use will ultimately lead to sling failure, usually at a load far below the sling's rated capacity. The solution, obviously, is to never use a sling after it's been cut.



## ABRASION DAMAGE

Anytime you see frayed fibers on the surface exposing the "picks," or cross fibers, of the webbing that hold the load-bearing (lengthwise) fibers in place, it's abrasion damage. The most common abrasion damage occurs either when the sling slips while in contact with a load during a lift or when the sling is pulled from under a load. When you see the Red Guard warning yarns exposed, it's your signal that serious damage—and loss of lifting capacity—has occurred. We recommend that slings with any damage to load-bearing fibers be discarded. Wear pads are one way to avoid this damage.

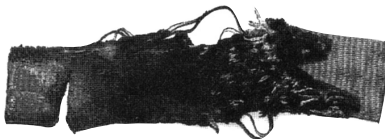
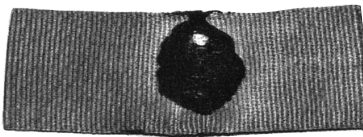


## ACID DAMAGE

It's true nylon and polyester webbing are stable when exposed to many common chemicals, but they should never be exposed to any strong acids or corrosive liquids whenever possible. The same is true for metal fittings on slings.

*Example 1 (top photo).* This is what happens when sulfuric acid, like car battery acid is heated to the boiling point and dropped on nylon webbing. The charring on the surface fibers deteriorates the sling and will continue to get worse, severely affecting the webbing strength.

*Example 2 (bottom photo).* This is what happens when nylon webbing is immersed in sulfuric acid at room temperature for three weeks, resulting in major damage. Note the fibers are softened and swollen, and the entire fabric is grossly distorted, virtually destroying the webbing. You can help prevent this damage by never storing slings in areas where they may be exposed to acid or acid fumes, which are as destructive as liquid.



## WHY PROPER CLEANING AND STORAGE IS VITAL

All it takes is a little ordinary dirt, grit and grime to reduce the overall strength and life of your sling. It's very easy for these contaminants to penetrate between fibers anytime the webbing bends, pulls tight against loads, or stretches and relaxes during loading and unloading. Once in place, they grind against the fibers, reducing their strength and useful life.

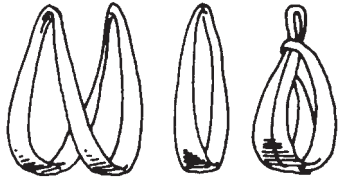
That's why it's a good idea to properly store your slings when they're out of service and to clean them when they become soiled. When slings are clean, they're not only easier to inspect, they're also stronger and more durable.

There are many procedures you can use to clean your slings, depending on how soiled they are. For every day dirt and grime, you can clean with soap or detergent and water for good results.

Whatever cleaning method you use, always hang your washed slings in a dry, sheltered place. Always keep slings from prolonged contact with direct sunlight during drying and storage because ultraviolet rays can degrade synthetic fibers. Nylon or polyester slings that have been dyed any color but white will fade somewhat due to washing, but this in no way affects the strength of the webbing.

Both nylon and polyester webbing have an extremely low water absorption rate, making them flexible, light and easy to handle even after prolonged soaking in water. Both show excellent resistance to mold, mildew and fungus, although dirt that accumulates on slings may support their growth, and that's why regular cleaning is very important.

# HOW TO MATCH A SLING TO THE JOB—SAFETY CHECKLIST



## 1. DETERMINE RATED CAPACITY

Needed to safely lift your load. Match sling and type hitch on rated capacity chart to equal or exceed your load.

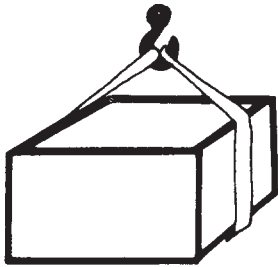
## USE WEAR PADS TO PROTECT SLINGS FROM CUTTING

See Pages 8 & 9



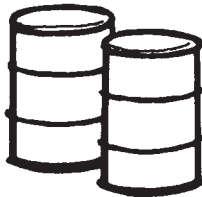
## 6. DON'T PULL SLING FROM UNDER LOAD

The full weight of load on sling can damage sling and reduce performance.



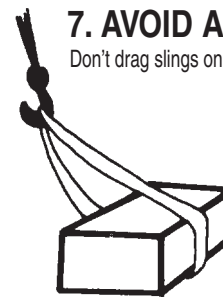
## 2. CHECK SLING-TO-LOAD ANGLE

Rated capacities are stated at two sling-to-load angles. 30° for a Choker Hitch and 90° for a Basket Hitch.



## 4. DANGER! ACIDS AND CAUSTICS!

Don't use nylon sling around acids. Don't use polyester around caustics. Don't use any sling in temperatures over 180°.



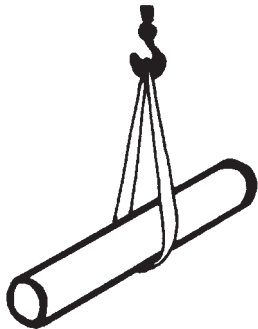
## 7. AVOID ABRASIVE SURFACES

Don't drag slings on flooring or over equipment.



## 8. DON'T KNOT A SLING

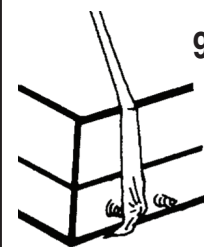
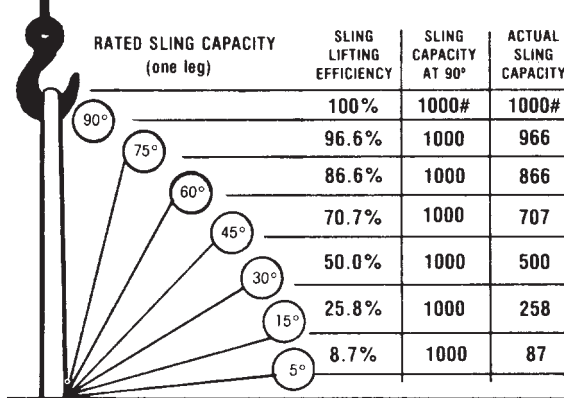
Slings should never be joined by 'knots'. Tying knots seriously weakens sling life and capacity.



## 3. BALANCE IS IMPORTANT

Use more than one sling if necessary for balance. Avoid load slippage. There's safety in sling numbers.

## 5. SLING LOAD



## 9. PROTECT LOAD AND SLINGS WITH GUARDS

Watch for corners, edges and protrusions.

## CHEMICAL INFORMATION CHART

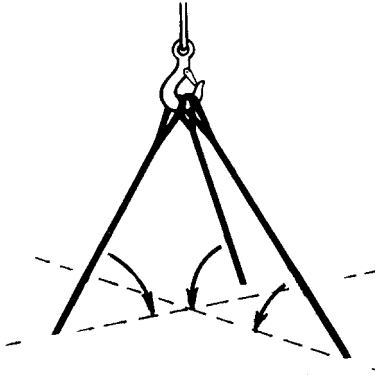
	Acids	Alcohols	Aldehydes	Strong Alkalis	Bleaching Agents	Dry Cleaning Solvents	Ethers	Halo-genated Hydro-Carbons	Hydro-Carbons	Ketones	Oils Crude	Oils Lubricating	Soap & Detergents	Water & Sea-water	Weak Alkalis
POLYESTER	*	OK	NO	**	OK	OK	NO	OK	OK	OK	OK	OK	OK	OK	OK
NYLON	NO	OK	OK	OK	NO	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

\*Disintegrated by concentrated sulfuric acid

\*\*Degraded by strong alkalis at elevated temperatures

## CALCULATING THE LOAD ON EACH LEG OF A SLING

As the included angle between the legs of a sling increases, 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.



LEG ANGLE	LOAD FACTOR (Degrees)
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
40	1.555
35	1.743
30	2.000

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 left. 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 between the legs of the sling and the horizontal.
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 left) - to compute the ACTUAL LOAD on each leg for this lift and angle. THE ACTUAL LOAD MUST NOT EXCEED THE RATED SLING CAPACITY.

(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° included angle being used.

(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° horizontal angle being used.

## SAFETY GUIDELINES FOR WEB SLING USE

1. Inspect slings for damage before each use.
2. Slings shall not be exposed to temperatures in excess of the manufacturer's recommendation. (Normally 180°F)
3. A sling shall be used that is long enough to provide the maximum practical angle between the sling leg and the horizontal.
4. Slings shall not be shortened with knots, bolts, or similar methods.
5. Twisting and/or kinking the legs of a sling is prohibited.
6. A sling shall not be loaded in excess of its rated capacity.
7. The load shall be centered in the base (bowl) of the hook to prevent point loading.
8. Slings used in a basket hitch shall have the load balanced to prevent slippage.
9. A sling shall be padded or protected from edges, corners or protrusions.
10. Hands or fingers shall not be placed between the sling and its load.
11. Each sling shall be securely hitched to its load.
12. The load shall be kept free to move before lifting and shall be kept clear of all obstructions.
13. Shock loading shall be avoided as sling may recoil and cause injury or death.
14. All personnel must stand clear of a suspended load.
15. Don't pull sling from under load, the full weight of the load can damage the sling and reduce performance.
16. Nylon slings shall not be used where acid conditions exist.
17. Polyester slings shall not be used where caustic conditions exist.
18. Polyester and nylon slings shall not be used at temperatures in excess of 180 degrees F.
19. Aluminum fittings shall not be used where caustic conditions exist.
20. Damaged slings should be replaced not repaired.
21. Avoid abrasive surfaces, don't drag slings on flooring or over equipment.
22. If the red core markers of the webbing can be seen, the sling should be removed from service.
23. Prolonged exposure to ultra-violet light will degrade webbing and weaken sling.
24. Use Common Sense: If a sling looks damaged or its rated capacities not known, don't use it.
25. Slings may recoil if load is unexpectedly released. The recoil may cause injury or death.

## REMOVAL CRITERIA

Cited below are removal criteria established by the Occupational Safety and Health Administration and the American National Standard Institute Safety Standard.

**1. OSHA 1910.184:** Criteria for Removal From Service. Synthetic web slings shall be immediately removed from service if any of the following conditions are present: (a) acid or caustic burns; (b) melting or charring of any part of the sling surface; (c) snags, punctures, tears or cuts; (d) broken or worn stitches; (e) distortion of fittings.

**2. ANSI B30.9-9-5.6.2.** Possible Defects. A sling shall be removed from service if any defects, such as the following, are visible: (a) acid or caustic burns; (b) melting or charring of any part of the sling surface; (c) snags, punctures, tears or cuts; (d) broken or worn stitches; (e) wear or elongation exceeding the amount recommended by manufacturer; (f) distortion of fittings; (g) other apparent defects which cause doubt as to the strength of the sling should be referred to the manufacturer for

determination.

To these we recommend adding the following reasons for removal from service: (a) Distortion of the sling identification tag which renders any portion of it illegible. Riggers must be able to read this vital information easily and quickly; (b) Loading a sling beyond its rated capacity. Anytime a sling has been loaded beyond the tag stated capacity—purposely or inadvertently—its future usefulness is suspect.

While most of the foregoing standards are quite specific regarding some removal criteria, a certain amount of judgment is involved in others. The issue of wear to the sling body, the selvage edge of webbing, and to sling eyes creates the greatest amount of contention. We recommend that any exposure of the RED GUARD warning yarns is sufficient cause to remove a sling from service and destroy it.

NOTE: We do not repair or recommend the repair of used slings or tie-down straps. Hardware can be reused if properly inspected and tested.