SAFETY IN LIFTING

Safety Video Available

"Safety In Lifting", a 22 minute video is available from *Lift-All*. It covers all types of slings: Web, Roundslings, Wire Rope, Chain and Wire Mesh. The Video suggests the best type of sling for common lifting applications, shows safe lifting procedures (in accordance with OSHA and ASME B30.9 guidelines), the proper inspection, care and maintenance of the various sling types, and more. Your in-plant training and safety program may be just a bit easier with some help from *Lift-All.*

Safety Seminar

Lift-All representatives are available to present a "Safety in Lifting" seminar at your location, improving your employees knowledge of slings in general and answering specific questions about your applications.

For details about the Video and/or "Safety in Lifting" Seminars call: *Lift-All* at 1-800-909-1964.

INSPECTION SERVICES

Sling Inspection Services

OSHA and ASME B30.9 regulations require that all chain slings receive a thorough inspection at least once per year by a competent person. You now have the opportunity to have a thorough, documented inspection performed by a factory trained *Lift-All* representative. Chain, wire rope, web, roundslings and mesh all can be inspected in one survey by a representative from the only company that makes them all … *Lift-All.*
Call 1-800-909-1964.

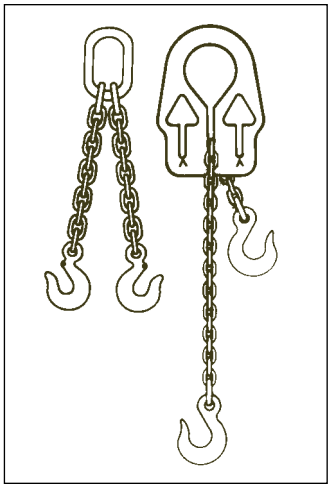
SLING SELECTION

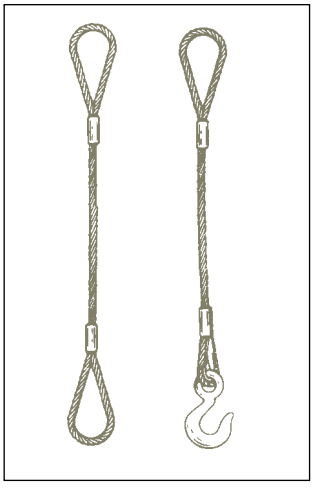
Which Type of Sling Should I Choose?

General Use of Different Types of Slings

Chain Slings - Alloy chain slings combine superior strength, ease of handling and durability. The combination of heavy loads, elevated working temperatures and severe lift conditions usually dictate that an alloy chain sling be used. Typical chain sling applications are found in steel mills, foundries, and heavy machining operations requiring repetitive lifts.

Wire Rope Slings - The most common and lowest cost per ton of lift of all slings. Used in the construction industry and other industries where heavy loads and rugged conditions exist.

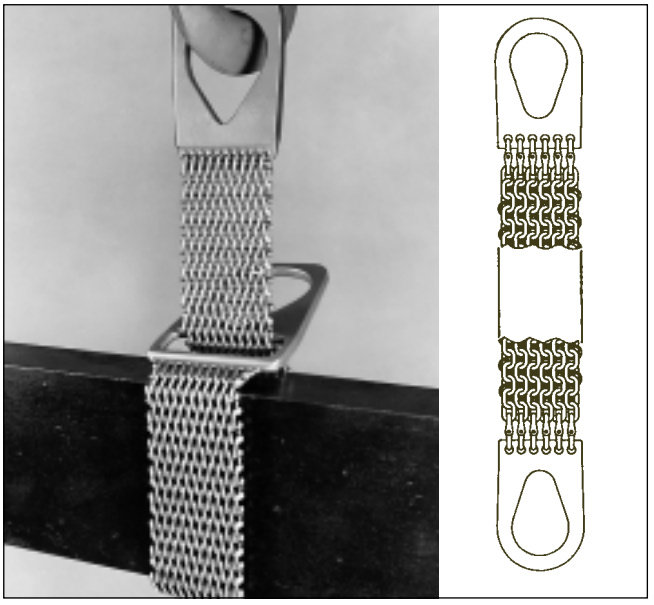




Help

Mesh Slings: Wire and Chain - These slings excel in lifting objects that are hot or have sharp edges, such as bar stock or plate steel. Mesh slings greatly enhance load balancing due to their wide load bearing surface. Machine shops and steel warehouses typically have good applications for mesh slings.

Synthetic Slings - Both Web Slings and Roundslings are used where loads must be protected from damage. The lift weight and flexibility of synthetic slings reduce fatigue and strain on riggers. *Tuflex* Roundslings, with their color coded capacities, and ease of use and inspection, are rapidly gaining in popularity.



Why *Lift-All*?

Lift-All Promotes User Safety

- Safety Seminars and Sling Inspections are available to all sling users.
- *Lift-All* quality assurance procedures produce consistently superior products.
- Warning, inspection and operating practices information is supplied with every order.
- By manufacturing all types of slings, *Lift-All* will, without prejudice, recommend the best sling for the application.
- Traceability of all slings through serial numbers.

Lift-All Saves You Time

- *Lift-All* is the only source that can manufacture all of your sling needs.
- Our engineering staff can design the slings or lifting devices needed for special lifting applications.
- Local manufacturing and warehousing from six U.S. and one Canadian locations assures prompt delivery.
- *Lift-All* trained distributors are well qualified to assist the user in sling selection and application decisions.

Lift-All Saves You Money

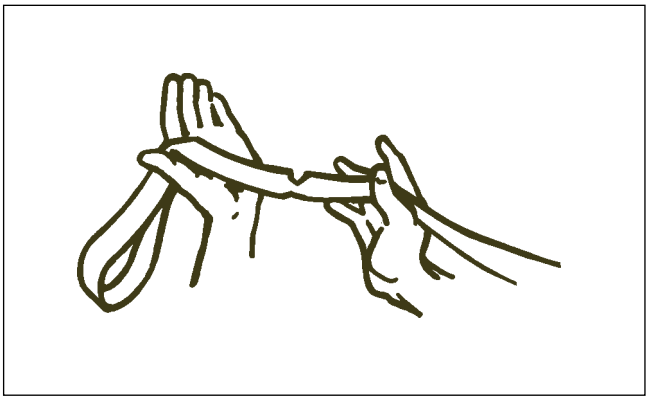
- Our combination of uncompromising product quality, service and technology makes *Lift-All* your best choice in long term value.

GENERAL OSHA AND MANUFACTURER REQUIREMENTS FOR ALL SLINGS

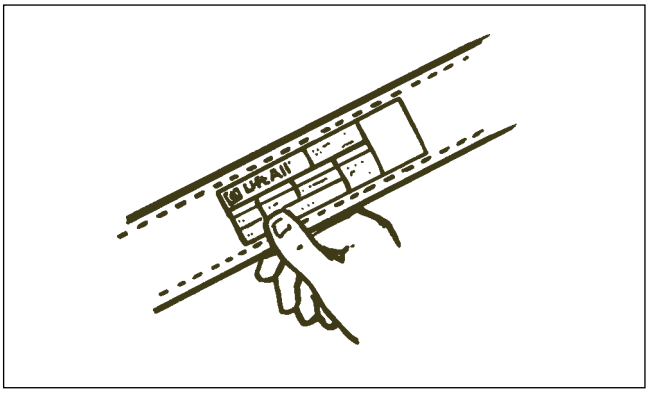
⚠ WARNING Read Definition on page 3

Safe Operating Practices

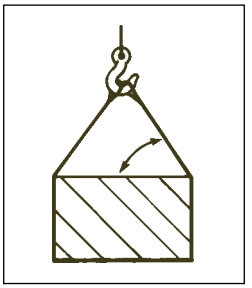
- Inspect slings prior to each use and do not use if damaged. (See specific sling type for inspection criteria.)

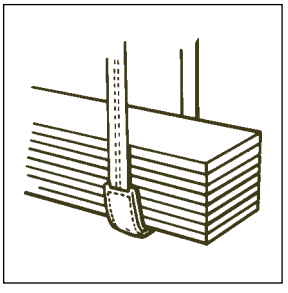


- Slings shall not be loaded in excess of their rated capacities. Rated capacities (Working Load Limits) must be shown by markings or tags attached to all slings.



- Angle of lift must be considered in all lifts. See page 10.

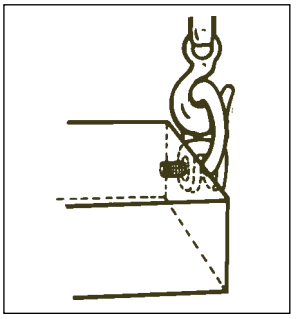




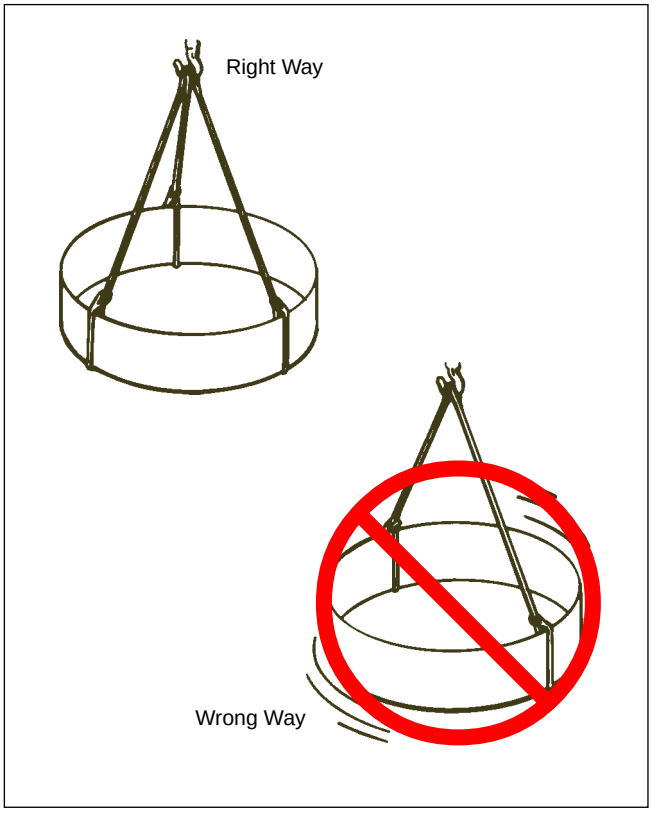
- Slings shall be padded or protected from the sharp edges of their loads.

- Slings shall be securely attached to their loads

- Loads must be rigged to prevent slippage.



- Lift must be stable with respect to the center of gravity - balanced.

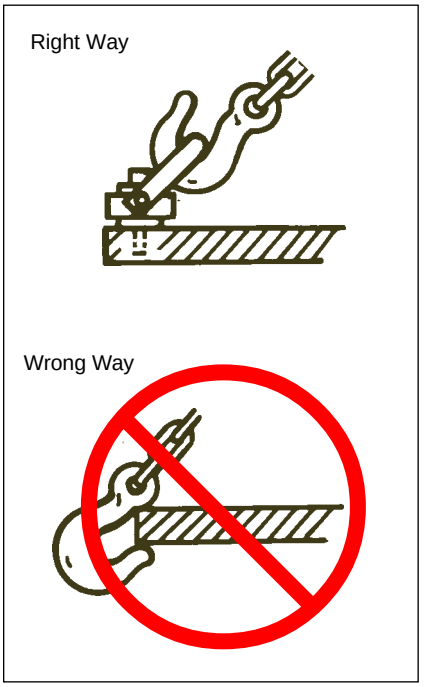


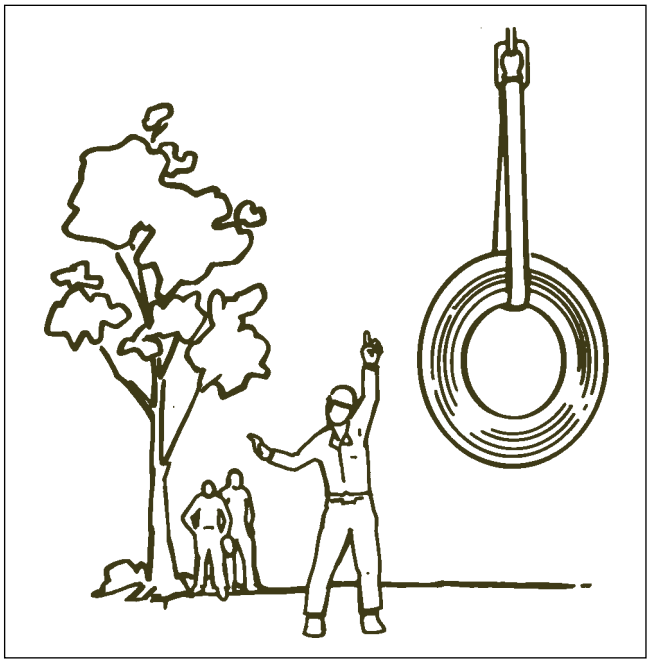
Help

GENERAL OSHA AND MANUFACTURER REQUIREMENTS FOR ALL SLINGS

⚠ WARNING Read Definition on page 3

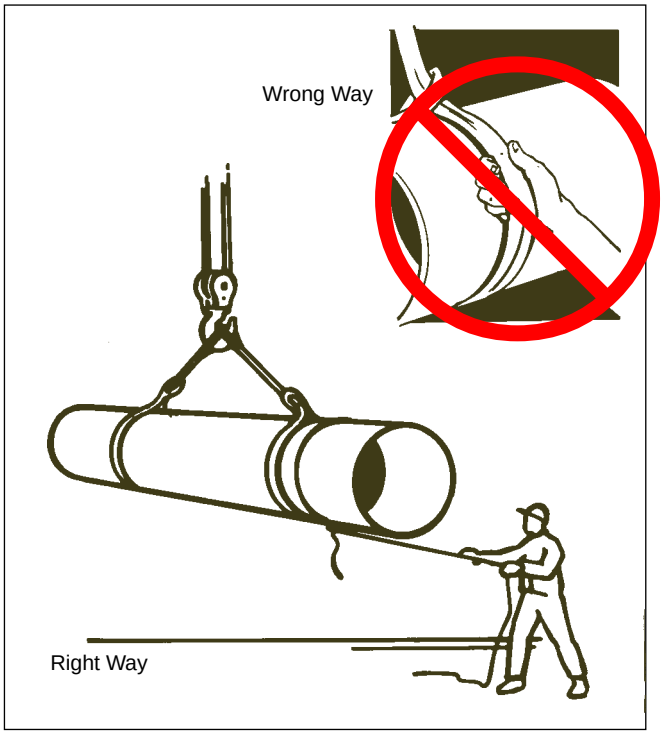
- Do not point load hooks - center load in base of hook.

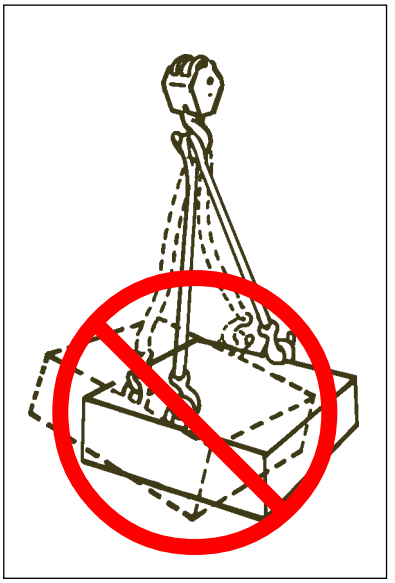




- Suspended loads shall be kept clear of all obstructions.
- All persons shall be kept clear of loads to be lifted, and suspended load.

- Hands and fingers shall not be placed between the sling and load while the sling is being tightened around the load. After lifting, the load should not be pushed or guided by employees hands directly on the load. Ropes or "tag lines" should be attached for this purpose.



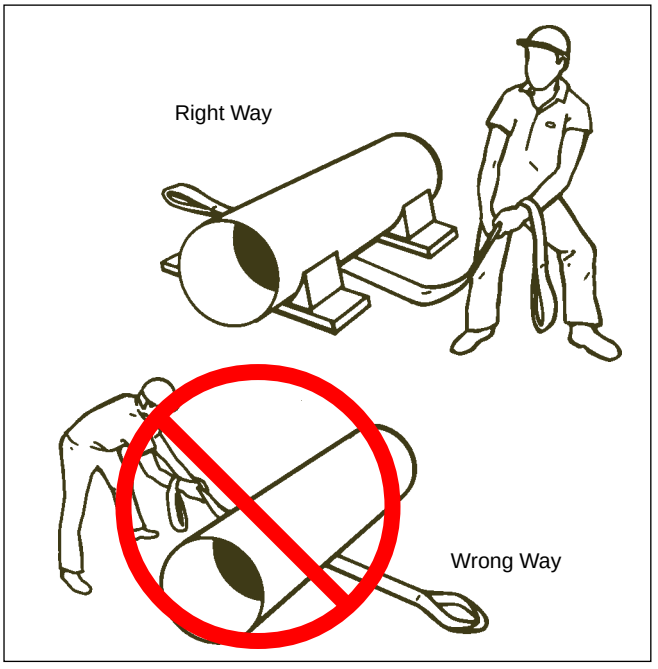


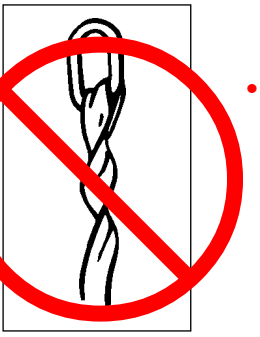
- Do not shock load. Jerking the load could overload the sling and cause it to fail.

GENERAL OSHA AND MANUFACTURER REQUIREMENTS FOR ALL SLINGS

⚠ WARNING Read Definition on page 3

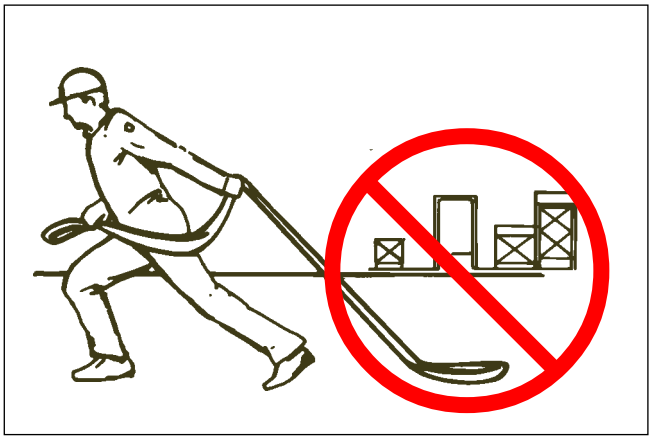
- A sling shall not be pulled from under a load when the load is resting on the sling. Before a load is lifted, a place should be prepared where it is to be put down. Lumber can be used to allow space to remove the sling and prevent shifting of the load.



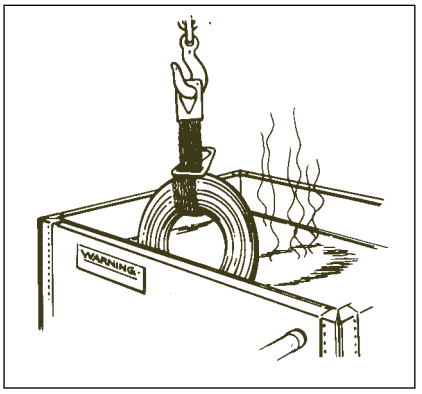


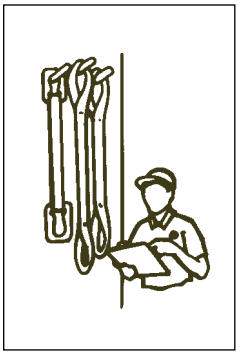
- Sling legs shall not be kinked or twisted.

- Slings shall not be dragged on floor.



- Temperature and chemical environment must be considered (see specific sling types for data).





- Slings shall be stored in cool, dark, dry areas, preferably on racks.

- Slings shall not be shortened with knots, bolts, or makeshift devices.

INSPECTION

⚠ WARNING Read Definition on page 3

Daily Inspection

Each day before using, the sling, all fastenings and attachments shall be inspected for damage or defects by a competent person designated by the employer. Additional inspections shall be performed prior to each use where severe conditions warrant. Damaged or defective slings shall be immediately removed from service.

Periodic Inspection

OSHA specifies that alloy steel chain slings shall have a thorough periodic inspection by a competent person at least once every 12 months. *Lift-All* recommends that all slings have a thorough inspection by a competent person at least once every 12 months. These inspections must be recorded and maintained for each individual sling. See the following pages for specific inspection recommendations: Web Slings: 15, *Tuflex* Roundslings: 37, Wire Rope Slings: 53, Lift *Alloy* Chain Slings: 74, Roughneck Mesh Slings: 88 & 90, Lifting Beams and Custom Devices: 96. The warning sheets that accompany each order must be read and understood by all sling users. See sling abuse illustrations in their respective section of this catalog.

In some instances, it is possible to repair slings, proof test and return them to service. Damaged components and sections of chain or wire mesh can be replaced. Hooks, links and other components that are in good condition can be salvaged from a damaged web or round sling, rewebbed, proof tested by *Lift-All* and returned to service.

Repair

Lift-All strongly advises that damaged slings be repaired only by the manufacturer.

PHYSICAL FACTORS

⚠ WARNING Read Definition on page 3

Physical Factors Affecting Strength of Slings

Your care in the use and handling, will prolong sling life significantly. The following physical factors should be considered when using any of the slings in this catalog:

1. Cutting of synthetic slings, Nicking or Gouging of steel slings. Probably the number one cause of sling failure. Usually caused by a sharp or small diameter load edge against the sling. It can be prevented with proper padding.
2. Improper Loading - Shock Loading, unbalanced loading, over loading and inadequate consideration for the effect of angle factors can adversely affect safety. Make sure the load weight is within the rated capacity of the sling(s) being used for both type of hitch and angle of lift. See "Effect of Angle of Lift" diagrams on page 10.
3. Temperature - Avoid loads and environments where temperatures exceed the limits of the slings being used. All slings can be damaged by excessive heat. See Web Slings page 14, *Tuflex* Roundslings page 37, Wire Rope Slings page 53, Roughneck Mesh Slings page 88 & 90, *Lift-Alloy* Chain Slings page 76.
4. Punctures & Abrasions seriously degrade sling strength. Rough load surfaces and dragging slings on the ground will damage all slings, steel or synthetic. Use proper padding between slings and rough loads. Never drag slings on ground or concrete floors.
5. Foreign Matter - Material such as metal chips and heavy grit can damage web slings, both internally and externally. Both synthetic and steel slings can be damaged by weld spatter and heat from a welding torch. Avoid contact with foreign matter whenever possible.
6. Ultraviolet Light - Nylon and polyester web slings are adversely affected by prolonged exposure to UV light, i.e. sunlight or arc welding. Inspect and remove if slings appear bleached and stiff. Store slings properly when not in use (see No. 7 below).
7. Improper Storage - Even in storage, synthetic and steel slings can degrade if not kept in clean, dry conditions. *Lift-All* recommends hanging slings on a rack. Web sling should be stored in a dark area to avoid unnecessary sunlight/UV degradation.
8. Chemical Environment - Slings exposed to certain chemicals or the vapors of these chemicals can lose some or all of their strength. When using slings in a chemical environment, contact *Lift-All* to assure sling compatibility. See the following pages for specific information: Web Slings: 14, *Tuflex* Roundslings: 37, Wire Rope Slings: 53, *Lift-Alloy* Chain Slings: 76, Roughneck Mesh Slings: 88 &90.

Effect of Angle of Lift on a Sling's Rated Capacity

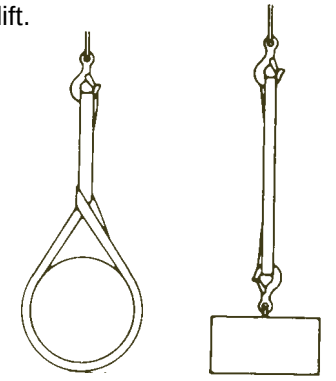
⚠ WARNING Read Definition on page 3

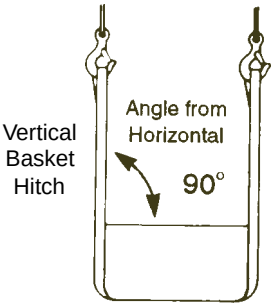
Using slings at an angle **can become deadly** if that angle is not taken into consideration when selecting the sling to be used. The tension on each leg of the sling is increased as the angle of lift, from horizontal, decreases. It is most desirable for a sling to have a larger angle of lift, approaching 90°. Lifts with angles of less than 30° from horizontal are not recommended. If you can measure the angle of lift or the length and height of the sling as rigged, you can determine the properly rated sling for your lift.

What would be the rating of each sling rigged at this angle?

1. Calculate the Reduction Factor [RF].
   a. Using the angle from horizontal, read across the Angle Chart to the corresponding number of the Reduction Factor column.
   - OR -
   b. Divide sling height* [H] by sling length* [L].
2. Reduction Factor [RF] x the sling's rated capacity for the type hitch that will be used = Sling's Reduced Rating.

* Measured from a common horizontal plane to the hoisting hook.



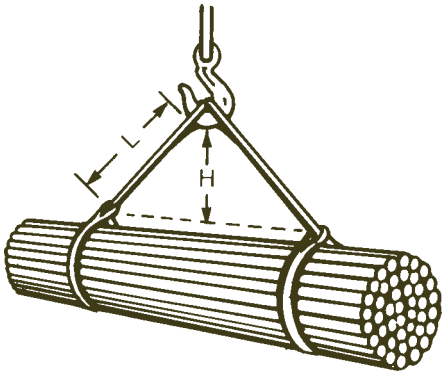


What capacity sling do I need?

1. Determine the weight that the sling will be lifting [LW].
2. Calculate the Tension Factor [TF].
   a. Using the angle from horizontal, read across the angle chart to the corresponding number of Tension Factor column.
   - OR -
   b. Divide sling length* [L] by sling height* [H].
3. Lifting Weight [LW] x the Tension Factor [TF] = Minimum Sling Rating for the type of hitch that will be used.

* Measured from a common horizontal plane to the hoisting hook.

Reduced Capacity



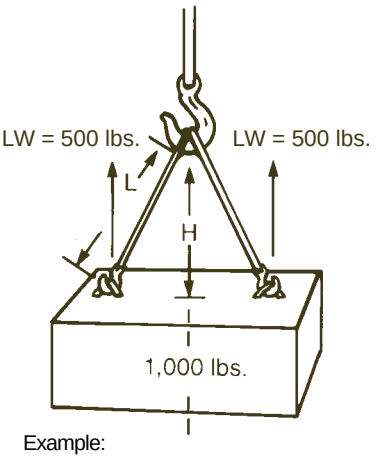
Example:
Vertical Choker rating of each sling = 6,000 lbs.
Measured Length (L) = 6 ft.
Measured Height (H) = 4 ft.
Reduction Factor (RF) = 4 (H) ÷ 6 (L) = .667
Reduced sling rating in this configuration = .667 (RF) x 6,000 lbs. = 4,000 lbs. of lifting capacity per sling

Effect of Angle Chart

Reduction Factor (RF)	Angle From Horizontal	Tension Factor (TF)
1.000	90°	1.000
0.996	85°	1.004
0.985	80°	1.015
0.966	75°	1.035
0.940	70°	1.064
0.906	65°	1.104
0.866	60°	1.155
0.819	55°	1.221
0.766	50°	1.305
0.707	45°	1.414
0.643	40°	1.555
0.574	35°	1.742
0.500	30°	2.000

Sling capacity decreases as the angle from horizontal decreases. Sling angles of less than 30° are not recommended.

Increasing Tension



Example:
Load weight = 1,000 lbs.
Rigging - 2 slings in vertical hitch
Lifting Weight (LW) per sling = 500 lbs.
Measured Length (L) = 10 ft.
Measured Height (H) = 5 ft.
Tension Factor (TF) = 10 (L) ÷ 5 (H) = 2.0
Minimum Vertical Rated Capacity required for this lift = 500 (LW) x 2.0 (TF) = 1000 lbs. per sling

Help

Lift Evaluation and Operating Practices

⚠ WARNING Read Definition on page 3

Important Considerations - Before buying or using a sling, know as much as possible about the lift you will make to minimize the potential dangers to personnel, product and property. All of the following items should be evaluated.

Environment

- Crane and load foundation
- Obstruction in path of travel and for head height
- Power lines or other hazards
- Chemical conditions
- Temperature of load and surroundings
- Location of people - away from danger
- Inspect all equipment

Load

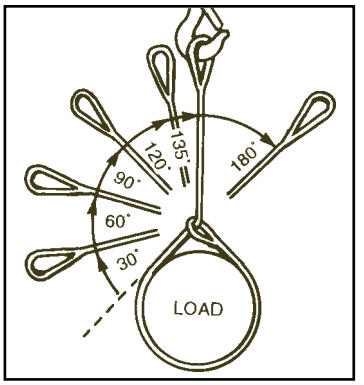
- Weight of load
- Center of gravity (drain liquids)
- Pick-up point integrity, including location and number
- Edges that may damage sling
- Abrasive areas that may damage sling
- Secure or remove loose parts
- Structural integrity (bending and crushing)

Rigging

- Type of sling required, including number of legs
- Type of hitch required
- Balance of load and stability, including flexing
- Prevention of load shift and movement against sling
- Angle of lift
- Tag line and spotter requirements
- Plan and procedures

See page 118 for our Lifting Application Worksheet.

Choker Hitch Angles



⚠ WARNING Read Definition on page 3

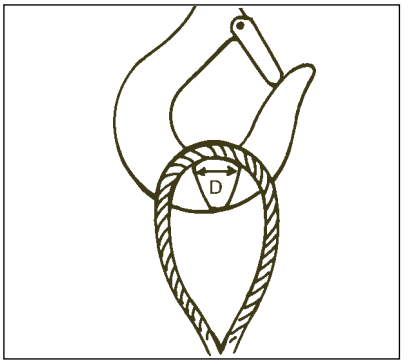
When lifting and turning a load using a choker hitch, it is not uncommon to bend the body of the sling around the choker loop and have a severe bend occur around the body at this point.

For choker angles of 120° or less, the choker rating must be reduced by multiplying the corresponding factor times the slings standard choker rating.

Angle of Choke	Factor
Over 120°	1.00
90° - 120°	.87
60° - 89°	.74
30° - 59°	.62
0° - 29°	.49

Sling capacity decreases as choke angle decreases.

Effect of Anchor Shackle Pin or Crane Hook on Sling Eye



⚠ WARNING Read Definition on page 3

Damage to slings can occur if the wrong size pin or hook is used. The width of the pin or hook should never exceed the natural inside width of the eye.

The eye dimension for each type and size of sling are shown in the capacity tables of this catalog. If your pin or hook is large, request an oversized eye for the sling.

Lift-All is dedicated to manufacturing and developing products for material handling that meet or exceed current industry and government requirements (OSHA and ASME B30.9). Ultimately, the life and strength of any sling depends on those who inspect, use and maintain it.

The ASME B30.9 Sling Safety Standard can be obtained from:
ASME Order Department
22 Law Drive Fairfield, NJ 07007-2300
Phone: 201-882-1167

Occupational Safety and Health Administration (OSHA) "Industrial Slings" Regulations are published by the Office of the Federal Register, National Archives and Records Administration - Part 29 1910.184.