

# Product Information Report

## Synthetic Slings



### Overview

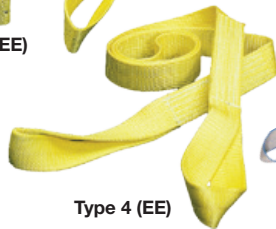
Synthetic slings are an easy, efficient way to move material and equipment around the worksite and are better than chain slings because they will not mar the surface of the item they are supporting.

Even though they weigh less than chain slings, when used properly, synthetic slings can still support heavy loads of up to 400,000 lbs.

Proper selection, use, and inspection of a sling are all very important factors for the safety of everyone in the vicinity of use.

**Overloading, improper use, or using a damaged sling can cause death or serious injury.**

### Types of Slings



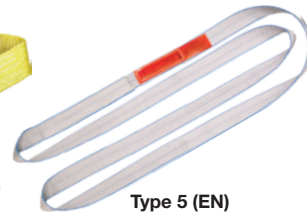
**Type 1 (TC)** – Have a web-trap triangle and choker fitting on opposite ends. Typically used in a choker hitch but can also be used in vertical and basket hitches.

**Type 3 (EE)** – Flat eye slings are very popular and can be used in all three types of hitches. They are easier to remove from under the load than Types 1 and 4. Unless Type 4 is requested, Type 3 will be supplied as the standard EE sling.

**Type 4 (EE)** – Twisted eye slings are similar to Type 3 except the eyes are turned 90° to form a better choker hitch. The eyes of a Type 4 nest better on the crane hook.

**Type 5 (EN)** – Endless slings are versatile and the most economically priced. They can be used in all three types of hitches and can be rotated to minimize wear. The sling legs can be spread for improved load balance.

**Roundslings** – Can be used in all three types of hitches. They have a higher strength-to-weight ratio than Types 1, 3, 4 and 5.



Endless Roundsling



### LiftAll® Web Sling Comparison

Style	Use	Material	Identification	Features
Tuff-Edge®	Rugged	Polyester	<ul style="list-style-type: none"> <li>• Blue edge</li> <li>• Blue center stripe</li> <li>• Silver surface</li> </ul>	<ul style="list-style-type: none"> <li>• Daily use under good-to-rugged lifting conditions</li> <li>• 2x edge cut resistance</li> </ul>
Webmaster 1600®	Daily	Polyester	<ul style="list-style-type: none"> <li>• Blue center stripe</li> </ul>	<ul style="list-style-type: none"> <li>• Daily use under good-to-moderate lifting conditions</li> <li>• Polyester stretches less for better load control, reduced abrasion</li> </ul>
		Nylon	<ul style="list-style-type: none"> <li>• No center stripe</li> </ul>	<ul style="list-style-type: none"> <li>• Daily use under good-to-moderate lifting conditions</li> <li>• Nylon stretches more to help avoid shock loading</li> </ul>
Webmaster 1200®	Occasional	Polyester	<ul style="list-style-type: none"> <li>• Blue center stripe</li> <li>• Black yarn on one edge</li> </ul>	<ul style="list-style-type: none"> <li>• Less frequent use under good lifting conditions</li> <li>• Polyester stretches less for better load control, reduced abrasion</li> </ul>
		Nylon	<ul style="list-style-type: none"> <li>• No center stripe</li> <li>• Black yarn on one edge</li> </ul>	<ul style="list-style-type: none"> <li>• Less frequent use under good lifting conditions</li> <li>• Nylon stretches more to help avoid shock loading</li> </ul>

## Typical Applications

- Construction sites
- Manufacturing plants
- Lumber industry
- Shipyards
- Warehouses
- Steel mills



## 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

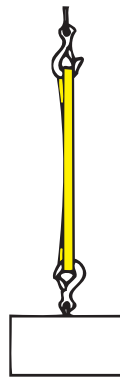
### Load

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

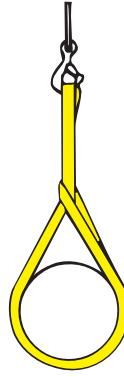
### Rigging

- 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

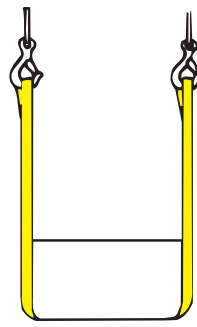
## Three Types of Hitches



Vertical

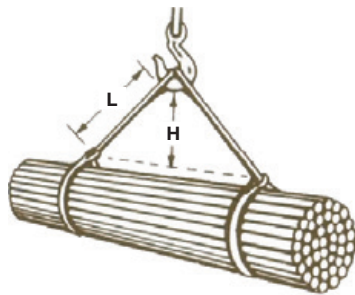


Choker



Basket

### Effect of Angle of Lift On a Sling's Rated Capacity



Using slings at an angle can be 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 best 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.

### Calculating Reduced Capacity

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

- Calculate the Reduction Factor [RF]. (Table 1)
  - Using the angle from horizontal, read across the angle chart to the corresponding number of the Reduction Factor column.

**-OR-**

- Divide the sling height\* [H] by sling length\* [L].

- 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.

#### Example:

Vertical Choker Rating of each sling = 6,000 lbs.

Measured Length (L) = 6 ft.

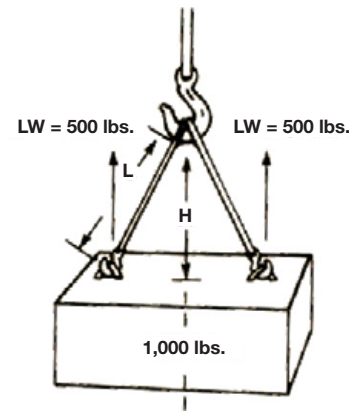
Measured Height (H) = 4 ft.

Reduction Factor (RF) = 4 (H) ÷ 6 (L) = 0.667

Reduced sling rating in this configuration = 0.667 (RF) x 6,000 lbs. = 4,000 lbs. of lifting capacity per sling

**Table 1 – Effect of Angle**

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



### Increasing Tension

What capacity sling do I need?

- Determine the weight that the sling will be lifting [LW].
- Calculate the Tension Factor [TF]. (Table 1)
  - Using the angle from horizontal, read across the angle chart to the corresponding number of the Tension Factor column.

**-OR-**

- Divide sling length\* [L] by sling height\* [H].

- 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.

#### Example:

Load weight = 1,000 lbs.

Rigging - 2 slings in vertical hitch

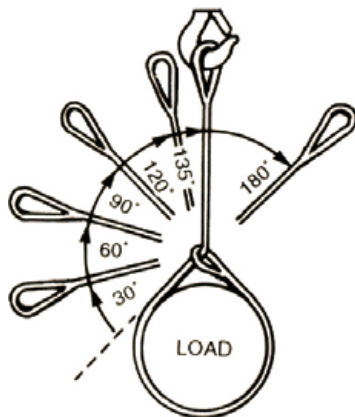
Lifting Weight (LW) per sling = 500 lbs.

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



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.

#### Example:

If you have a pull angle of 90° and a sling with a choker rating of 1,250 lbs., you would need to multiply 1,250 lbs. by the factor of 0.87 (see table at right).

Therefore: 1,250 lbs. x 0.87 = 1,087 lbs. max. choker capacity.

Sling capacity decreases as choke angle decreases.

**Synthetic Slings**

Angle of Choke		Reduction Factor
> or =	<	
120	180	1.00
105	120	0.82
90	105	0.71
60	90	0.58
0	60	0.50

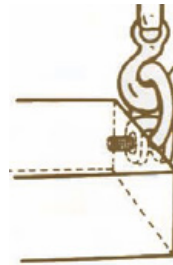
**Safe Operating Practices**



- Inspect slings prior to each use and do not use if damaged



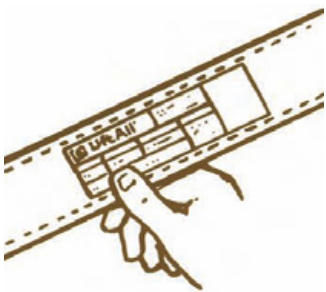
- Loads must be rigged to prevent slippage



- Slings shall be securely attached to their loads



- Angle of lift must be considered in all lifts



- 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

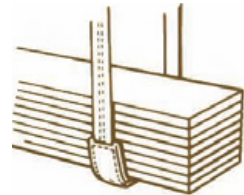


**RIGHT**



**WRONG**

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



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

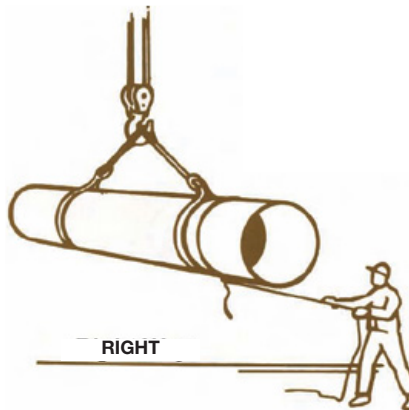


**RIGHT**



**WRONG**

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



**RIGHT**



**WRONG**

- Hands and fingers should 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.



**Safe Operating Practices  
(cont.)**



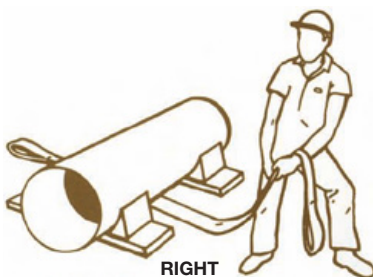
- Do not shock load. Jerking the load could overload the sling and cause it to fail



- Sling legs should not be kinked or twisted



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



**RIGHT**

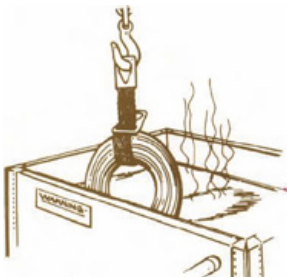


**WRONG**

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



- Slings should not be dragged on floor



- Temperature and chemical environment must be considered



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



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

## Inspection

### Daily Inspection

OSHA General Industry 29CFR 1910.184(d) and OSHA Construction 29CFR 1926.251(a)(6) Codes state:

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

### Repair

Damaged slings should be repaired by the manufacturer only.

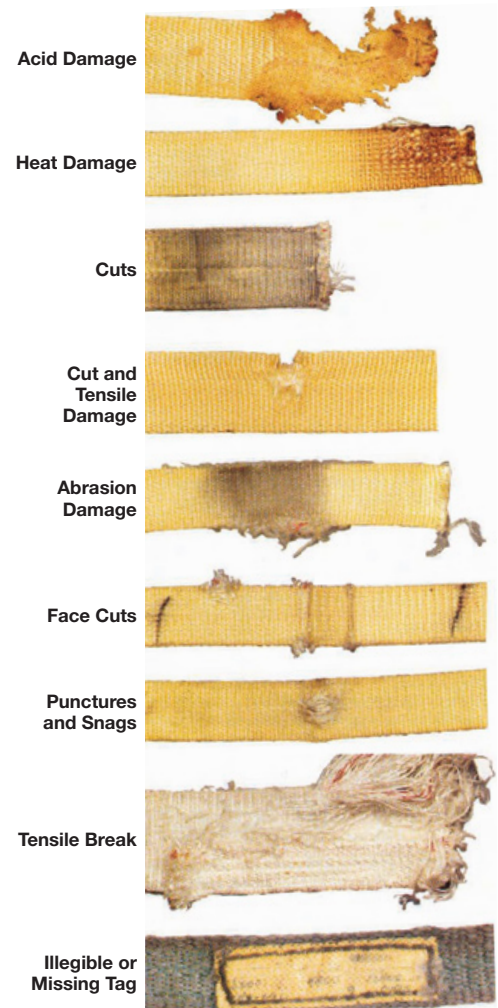
## Inspection Criteria

### Remove from service if any of the following is visible:

- Capacity tag is missing or illegible
- Red core warning yarns are visible
- Sling shows signs of melting, charring or chemical damage
- End fittings are excessively pitted, corroded, distorted, cracked or broken
- Cuts on the face or edge of webbing
- Holes, tears, snags or crushed web
- Signs of excessive abrasive wear
- Broken or worn threads in the stitch patterns
- Any other visible damage which causes doubt about the sling's strength



Most of the damage shown here would cause immediate catastrophic failure of the sling. Not all of the damage you will see will be this obvious or extreme, but will still require removal from use.



**Inspection Record  
Forms**



## Synthetic Sling Record

Manufacturer \_\_\_\_\_

Size \_\_\_\_\_ Reach \_\_\_\_\_ Type \_\_\_\_\_ Serial No. \_\_\_\_\_


Working Load Limit \_\_\_\_\_ Attachments \_\_\_\_\_

Date placed in service \_\_\_\_\_ Date of discard \_\_\_\_\_

Repaired (date)	Reason and nature of repairs	Date returned to service

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*Front*



## Synthetic Sling Inspection Record

Date	By	Condition and Disposition	Date	By	Condition and Disposition

Synthetic slings should be inspected daily. Remove from service if any of the following are present:

- Capacity tag is missing or illegible
- Red core warning yarns are visible
- Sling shows signs of melting, charring or chemical damage
- Signs of excessive abrasive wear
- Any other visible damage that raises doubt as to its strength

- End fittings are excessively pitted, corroded, distorted, cracked or broken
- Cuts on the face or edge of webbing
- Holes, tears, snags or crushed web
- Broken or worn threads in the stitch patterns

*Back*