KWRS POWER LIFT ROUND SLINGS

Round slings are fabricated with high quality, high strength 100% polyester fibers. These fibers are encased in a seamless, double-walled polyester jacket, providing maximum protection to the inner load-bearing fibers. These slings provide an exceptionally flexible rigging tool that grips the load without marring the load surface.

Round Sling Features:

- Max working temp: 194° F
- No loss of strength when wet
- Seamless with double jacket
- Resists most acids
- Lightweight - easy to use, handle and store
- Only 3% elongation
- Endless construction rotates wear points
- Color coded

Sling Selection Consideration:

Some notable polyester round sling characteristics include the following:

- Lightweight, flexible, and easy to handle and rig
- Polyester round sling elongation at rated capacity is approximately 3%—less than that of comparable nylon or polyester web slings
- Wear points can be easily rotated to extend sling life
- Polyester round sling are easy to inspect
- Polyester round slings are less damaging on contacting load surfaced than metal type slings
- The exterior cover aids in protecting the load bearing core yarn
- Additional permanent or removable wear resistant coverings can be purchased for additional protection

Sling Inspection:

How to Inspect Slings

To detect possible damage, you should perform a visual inspection of the entire sling, and also feel along its entire length, as some damage may be feltmore than seen. You should look and feel for any of the types of conditions seen on page 28.

What to Do If You Identify Damage In a Sling

If you identify **ANY** of these types of damage in a sling, remove it from service immediately even if the damage you feel or see is not as extensive as shown in the pictures on page 28. Slings that are removed from service must be destroyed and rendered completely unusable.

ASME B30.9-5.9 - Frequency of Inspection

A 3 stage procedure is recommended to help ensure that round slings are inspected with appropriate frequency.

1. **Initial Inspection -** Slings must be inspected by a designated person as soon as they are recieved. This ensures that the correct round sling has been received, is undamaged, and meets the requirements for its intended use.

2. **Frequent Inspection -** When round slings are being used where they are not being exposed to any severe service conditions, the frequency of this sling inspection interval may be reduced to once each day or shift, done prior to sling use. A qualified person must be monitoring the application to verify that the slings are not being exposed to any conditions that could cause a rapid rate of sling degradation during the work shift.

3. **Periodic Inspection -** Every sling must be inspected “periodically” by a qualified and designated person. The frequency of periodic inspections is based on the sling’s actual or expected frequency of use, severity of service conditions, and the nature of the work performed with the sling.

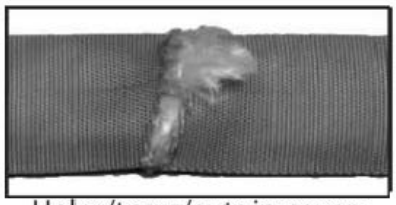
REMOVAL CRITERIA

ASME B30.9-5.9 - Possible Defects

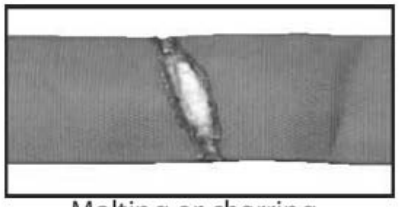
A sling shall be removed from service if any defects such as the following are visible:

- Holes, tears, cuts, embedded particles, excessive abrasive wear or snags that expose the core fibers of the round sling
- If round sling identification tag is missing or not readable
- If round sling has been tied into one or more knots or has been joined by knotting
- Melting, charring or weld spatter oN any part of the round sling
- Acid or alkali burns of the round sling
- Broken or worn stitching in the cover that exposes the core fibers
- Distortion, excessive pitting, corrosion or other damage to fitting(s)
- Any evidence of a broken core yarn(s) present in the form of a substantial reduction of core yarn within any area of the round sling and/or by a substantial accumulation of core yarn bundle within any section of the round sling
- Any conditions which cause doubt as to the strength of the round sling

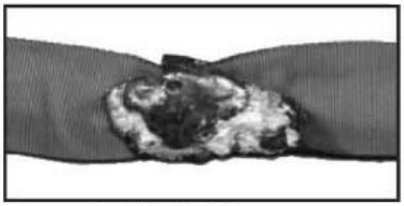
TYPES OF DAMAGE



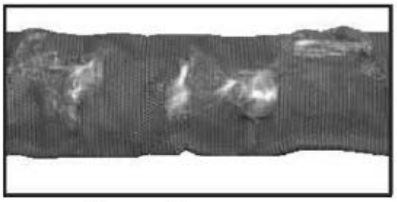
Holes/tears/cuts in cover; exposed/damaged yarns



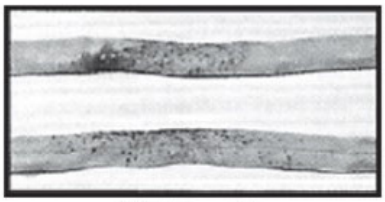
Melting or charring



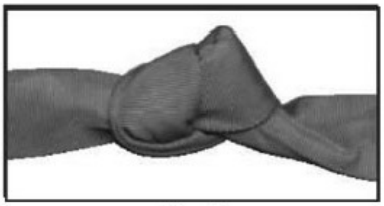
Acid/alkali burns



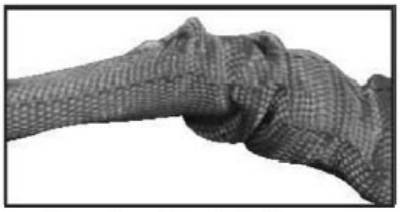
Snags/punctures



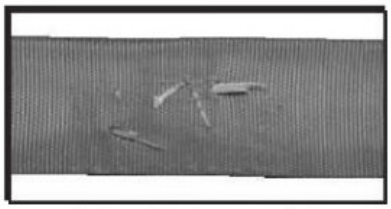
Weld spatter



External knots



Bunched/wadded yarns



Embedded materials

⚠ WARNING ⚠

Failure to follow the care, use, and inspection instructions of a sling could result in severe personal injury or death.

Do NOT exceed rated capacities.

PROTECTING SLINGS FROM DAMAGE

Mechanical Considerations

Round slings in contact with edges, corners, or protrusions **MUST ALWAYS** be protected with materials of sufficient strength, thickness, and construction to prevent sling damage.

- Round slings should be protected from abrasive surfaces.
- Determine the weight of the load. Round slings shall not be loaded in excess of the rated capacity. Consideration shall be given to the sling angle, which affects rated capacity.
- Select round slings that have suitable characteristics for the type of load, hitch and environment.
- Round slings with fittings that are used in a choker hitch shall be of sufficient length to ensure that the choking action is on the round sling and never on the fitting or sling tag.
- The openings in fittings shall be the proper shape and size to ensure that the fittings will seat properly on the round sling, crane hook, or other attachments.
- Round slings should not be dragged on the floor or over an abrasive surface.
- A half twist (up to 180°) may be applied to any round sling to facilitate its attachment. However, round slings must not be twisted further or be tied into knots to shorten their length or be joined to another round sling by knotting them together. Round slings shall be shortened, lengthened, or adjusted only by methods approved by the manufacturer.
- Round slings should not be pulled from under loads when the load is resting on the round sling. Place blocks under load prior to setting down the load to allow removal of the sling, if applicable.
- Round slings shall not be used to pull against stuck, snagged, or restrained objects.
- Do not drop round slings equipped with metal fittings.
- Round slings that are damaged shall not be used.
- Round slings shall be hitched in a manner providing control of the load. Round slings used in a basket hitch shall have the load balanced to prevent slippage.
- Shock loading shall be avoided.

continued

- Load applied to a hook shall be centered in the bowl of the hook to prevent point loading.
- During use, personnel shall be alert for possible snagging of the load or round sling.
- When using a basket hitch, round sling legs (branches) shall contain or support the load from the sides above the center of gravity.
- Tags and labels should be kept away from the load, hook, and point of choke.
- Round slings should not be constricted or bunched between the ears of a clevis or shackle or in a hook. When a round sling is used with a shackle, it is recommended that it be used (rigged) in the bow of the shackle. When this is not possible, protect the sling connection areas from damage.
- For lifts using multiple slings, or multiple-leg bridle slings, on non-symmetrical loads, an analysis by a qualified person should be performed to prevent overloading of any leg.
- Do not use hooks, shackles, or other hardware that have edges or surfaces that could damage the sling.
- Do not run or drive over slings with a vehicle or other equipment.

Environmental Considerations

Environmental factors, such as an exposure to sunlight, dirt, or gritty-type matter and cyclical changes in temperature and humidity, can result in an accelerated deterioration of round slings. The rate of this deterioration will vary with the level of exposure to these conditions.

Temperature Limits – Do note expose round slings to sources of heat damage or weld splatter.

- Polyester round slings shall not be used in contact with objects or in environments at temperatures in excess of 194° F (90° C), or at temperatures below minus 40° F (-40° C).
- For short term, single exposure applications at temperatures elevated slightly higher than the above values, sling users may consult with the sling manufacturer and seek written approval to allow this practice.

Chemical Environment – Do not expose slings to damaging chemicals. Chemically active environments can affect the strength of round slings in varying degrees ranging from little to total degradation. The round sling manufacturer or a qualified person should be consulted before round slings are used in a chemically active environment. Each chemical application shall be evaluated, taking into consideration the following:

- Type of chemical, such as acid or alkalis
- Exposure conditions, i.e., liquid, vapor, mist
- Concentration
- Temperature
- Duration of exposure

Round slings incorporating aluminum fittings shall not be used where fumes, vapors, sprays, mists, or liquids of alkalis and/or acids are present, unless the compatibility of these material is verified.

Electrical Environment – Do not expose round slings to an electrically active environment or use them as an electrical insulator in an energized electrical environment unless a qualified person has determined the insulation requirements necessary for the application and has established that use of a particular sling will meet the requirements for their purpose. Otherwise, severe injury or death can result from shock, burns, or electrocution. Consideration shall also be given to the effect of other environmental factors, including humidity, on the sling's capability for this purpose.

Sling Storage and Maintenance

Round slings should be stored in a cool, dry, and dark place to prevent loss of strength when not in use. Round slings shall not be stored in chemically active areas.

There shall be no repairs of load bearing fibers. Repairs to the protective covers shall be done only by the original manufacturer or their appointed agent. When slings are repaired by someone other than the original manufacturer, the sling should be tagged to identify the repair agent.

Only round slings which can be identified from the information on the identification tag shall be repaired.

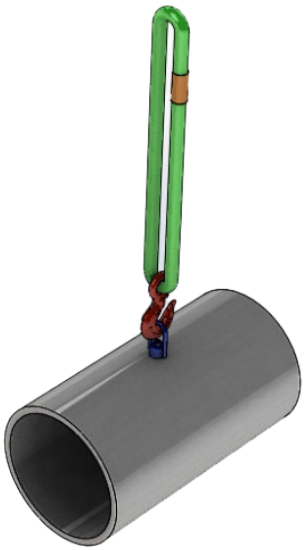
All repaired round slings shall be proof tested to a minimum of 2 times the rated capacity before being put back into service. Certification of proof test should be provided.

continued

PROPER HITCHING METHODS FOR ROUND SLINGS

Vertical Hitch:

A method of rigging in which the load is attached to one end of the sling, such as by means of a hook or shackle, and the other end of the sling is attached to the lifting device. This hitch is sometimes also called a straight-line hitch.



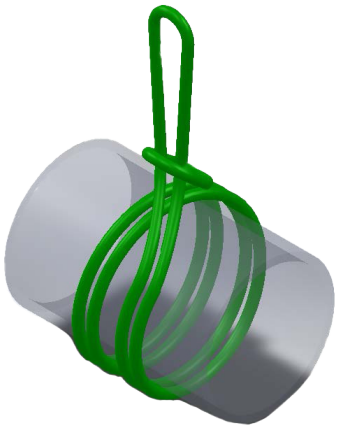
Choker Hitch:

A method of rigging in which the sling is passed around the load and then through itself and then attached to the lifting device.

Double Wrapped Choker Hitch:

A method of rigging in which the sling is passed around the load twice and then through itself and then attached to the lifting device. The double wrap hitch or the double wrap choker hitch provides full 360 degree contact with the load.

WARNING: When using a double-wrap hitch, avoid overlapping slings, as it can lead to uneven load distribution, sling damage, and compromised safety.



Basket Hitch:

A method of rigging in which the sling is passed around the load and both ends are attached to the lifting device.

Double Wrapped Basket Hitch:

A method of rigging similar to the basket hitch except that the sling is passed around the load twice.

WARNING: When using a double-wrap hitch, avoid overlapping slings, as it can lead to uneven load distribution, sling damage, and compromised safety.

Bridle (Multi-leg) Hitch:

A method of rigging as a 2-leg bridle, in which the load is attached to the legs of a bridle assembly. 2-, 3- and 4-leg slings are commonly used types of bridle slings.

Length Tolerances For New Round Slings

Round Sling Size / Vertical Capacity Range	**Tolerance***
30,000 lbs. or Less	**± (1” + 1% of sling length)**
Higher than 30,000 lbs., up to 90,000 lbs.	**± (2.0” + 1% of sling length)**
Higher than 90,000 lbs., up to 175,000 lbs.	**± (3.0” + 1% of sling length)**

For matching length slings, please contact a salesperson.

SELECTION OF PROPER CONNECTION HARDWARE

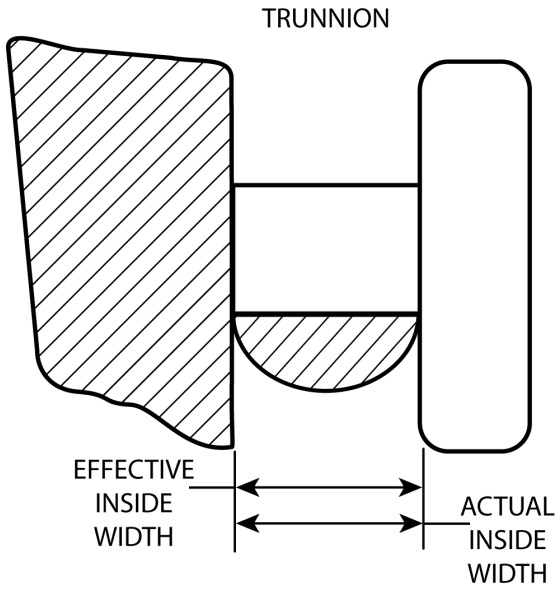
Effective Contact Width between the Sling and Connection Hardware

Connection to Flat-Bottom Surfaced Hardware: Such hardware connections include pins, bolts, and trunnions. The value of the effective contact width is equal to the opening width or spread of the sling at the connection area. Please note, however, that the effective contact width will never exceed the natural flattening width of the sling.

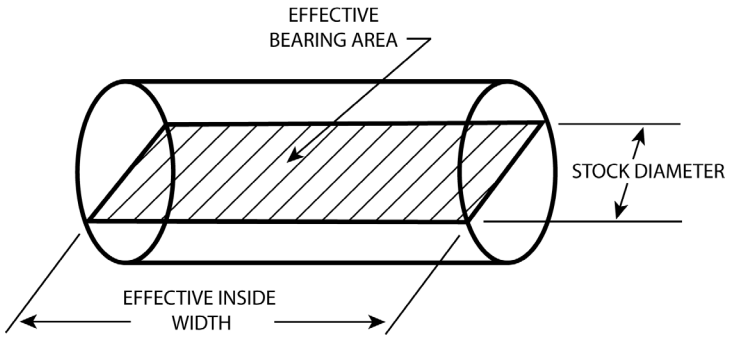
Connection to Round-Bottom (curved) Surfaced Hardware: Such hardware connections include links, hooks, or the bow ends of shackles. To determine the value of the effective contact width, multiply the inside opening width of the hardware by a factor of 0.75. For connections to the base of hooks, multiply the value of the radius at the hook base by a factor of 1.5 to determine the effective contact width. Please note, however, that the effective contact width will never exceed the natural flattening width of the sling.

Effective Contact Width = (.75) x (Shackle Inside Width)

Straight Bearing Surface



EFFECTIVE INSIDE WIDTH EQUALS 100% OF THE ACTUAL INSIDE WIDTH



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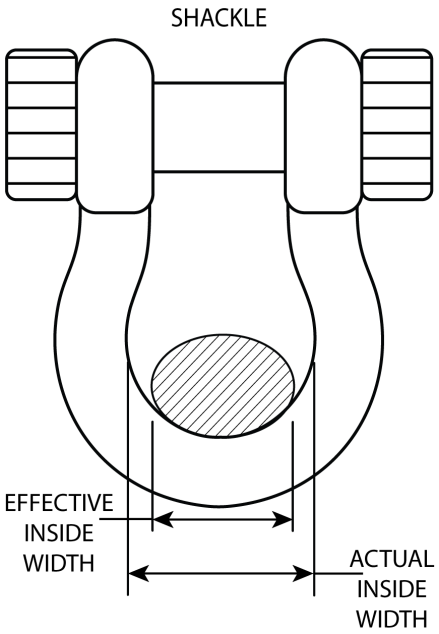
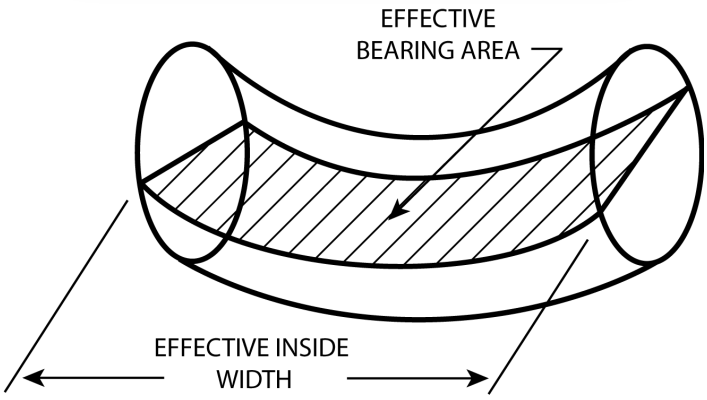
Curved Bearing Surface



EFFECTIVE INSIDE WIDTH EQUALS 75% OF THE ACTUAL INSIDE WIDTH



NOTE: Round sling strength is affected by the size of the connection hardware. For special applications wherein a retained design factor of 5 is required to be maintained, contact the sling manufacturer, as a capacity reduction of 20% may be appropriate in order to satisfy this criteria.

Load Bearing Area at the Hardware Connection:

The load bearing area at the hardware connection is determined by multiplying the thickness or stock diameter of the hardware by the effective contact width at the connection.

Load Bearing Area = (Hardware Thickness or Stock Diameter)
x
(Effective Contact Width)

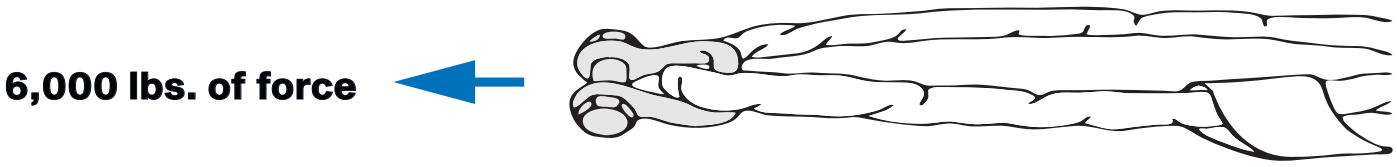
Calculating Bearing Stress Values at the Hardware Connection:

The bearing stress value is determined by dividing the amount of loading on the sling by the load bearing area at the hardware connection.

$$\text{Bearing Stress} = \frac{\text{Sling Load Value (lbs.)}}{\text{Load Bearing Area}}$$

continued

Example: A size 3 polyester round sling, rated at 8,400 lbs. in a vertical hitch, is connected using the rounded bow end of a shackle that is smaller in size to that listed in Table 4-6. The shackle has a stock diameter of only .62 inch, and an inside opening width of 2 inches. However, a force of only 6,000 lbs. is applied, noticeably less that the rated capacity of the sling (see figure). Is this use of the selected shackle acceptable?



Answer: Since the shackle size is smaller than recommended for a size 3 round sling, we need to establish that the bearing stress value does not exceed 7,000 Lbs. /in² during use. Since the shackle bearing surface is rounded, multiply the width by .75 to determine the effective contact width.

Effective Contact Width = (.75) x (The shackle inside width)
=(.75) x (2 in.) = **1.5 in.**

And

Load Bearing Area = (The shackle inside width) x (The effective contact width)
= (.62 in.) x (1.5 in.) = **.93 in.²**

Bearing Stress Value = (The applied force) / (Load bearing area)
= (6,000 lbs.) / (.93 in.²)
= **6,641 lbs. / in.²**

Therefore, since the bearing stress value is less than 7,000 Lbs./in2 during use, **the selected shackle size is suitable for use.**