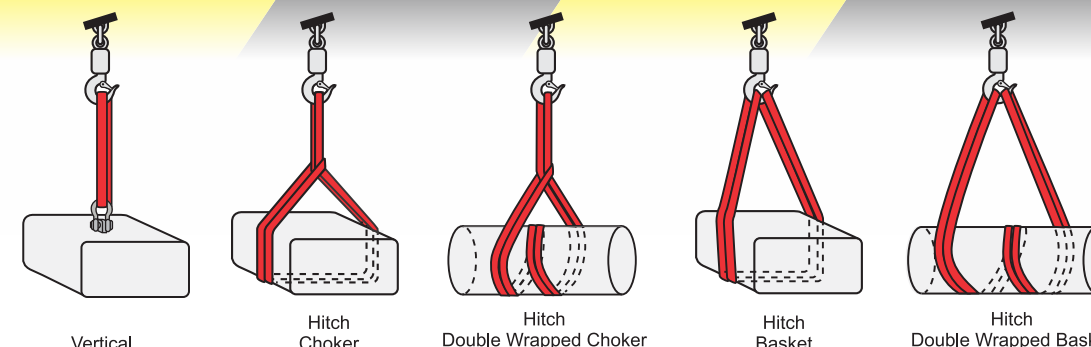
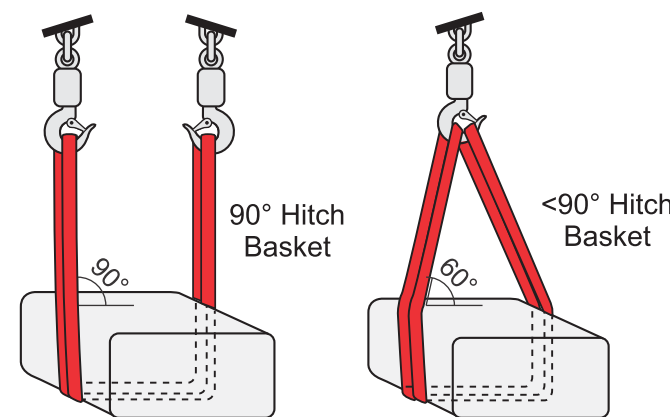


ROUND SLINGS

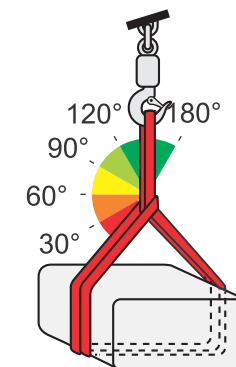
WORKING LOAD LIMITS



Sling Tension: Rated capacities are affected by angle of lift (sling-to-load) measured from the horizontal when used with multi-legged slings or choker/basket hitches. To determine the actual sling capacity at a given angle of lift, multiply the original sling rating by the appropriate loss factor determined from the table to the right.



Choker Hitches: For round slings used in a choker hitch, rated capacities in tables are for an angle of choke of 120° or greater for the angle formed in the web sling body as it passes through the choking eye.



Capacity Reduction		Sling Tension	
Angle/Deg	Loss Factor	Angle/Deg	Loss Factor
Horizontal		Horizontal	
90	1.000	90	1.000
80	0.985	80	1.015
70	0.940	70	1.064
60	0.866	60	1.155
50	0.766	50	1.305
45	0.707	45	1.414
35	0.574	35	1.742
30	0.500	30	2.000

Choker Hitches	
Angle of Choke (degrees)	Sling rated capacity factor as percentage of single leg choker hitch capacity
120-180	100 %
90-120	87 %
60-89	74 %
30-59	62 %
0-29	49 %

INSPECTION & REMOVAL CRITERIA - ANSI B30.9

SLING SHALL BE REMOVED FROM SERVICE IF ANY DEFECTS SUCH AS THE FOLLOWING ARE VISIBLE

1. Acid or Alkali damage.
2. Melting, charring or weld splatter of any part of the sling.
3. Holes, tears, cuts, abrasive wear or snags that expose the load carrying yarns.
4. Broken or worn stitching in cover.
5. Fittings when permanently attached to the sling are damaged, stretched or distorted in any way.
6. Knots in any part of the sling.
7. Any apparent defects which cause doubt in the strength of the sling.
8. If sling identification tag is missing or unreadable.

Code Number	Color	Vertical	Choker 120°	90° Basket	60° Basket	45° Basket	Approx. Diameter Inches	Approx. Weight/Ft. in Pounds	Min Pin Diameter Vertical / Choker	Min Pin Diameter Basket
SL-30	PURPLE	3,000	2,400	6,000	5,200	4,200	0.75	0.25	0.50	0.62
SL-40	BLACK	4,000	3,200	8,000	6,900	5,600	0.80	0.35	0.50	0.62
SL-60	GREEN	6,000	4,800	12,000	10,300	8,400	0.90	0.40	0.62	0.88
SL-90	YELLOW	9,000	7,200	18,000	15,500	12,600	1.00	0.50	0.75	1.00
SL-120	TAN	12,000	9,600	24,000	20,600	16,800	1.25	0.75	0.88	1.25
SL-140	RED	14,000	11,200	28,000	24,100	19,600	1.30	0.85	1.00	1.38
SL-170	ORANGE	17,000	13,600	34,000	29,300	23,800	1.60	0.95	1.12	1.62
SL-230	BLUE	23,000	18,400	46,000	39,500	32,200	1.65	1.25	1.25	1.75
SL-260	ORANGE	26,000	20,800	52,000	44,700	36,400	1.75	1.45	1.38	1.88
SL-320	GREY	32,000	25,600	64,000	55,000	44,800	2.15	1.75	1.50	2.00
SL-400	ORANGE	40,000	32,000	80,000	68,800	56,000	2.45	2.25	1.62	2.38
SL-540	BROWN	54,000	43,200	108,000	92,900	75,600	3.00	2.75	1.88	2.75
SL-680	OLIVE	68,000	54,400	136,000	117,000	95,200	3.25	3.60	2.12	3.00
SL-900	BLACK	90,000	72,000	180,000	155,000	126,000	3.75	4.10	2.50	3.50

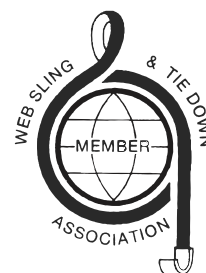
WARNING!

NEVER EXCEED THE WORKING LOAD LIMIT. ALWAYS CHECK THE IDENTIFICATION TAG TO DETERMINE IF THE SLINGS RATED CAPACITY IS APPROPRIATE FOR THE LIFT. RATINGS LISTED ARE FOR NEW SLINGS ONLY AND APPLY ONLY TO SUPER SLINGS PRODUCTS. ALWAYS INSPECT THE SLING BEFORE USE.

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ROUND SLING WARNINGS & USAGE



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This bulletin contains important safety information about the use of synthetic round slings. However, it **DOES NOT** contain all the information you need to know about handling, lifting and manipulating materials and loads safely. Sling use is one part of the lifting system and it is your responsibility to consider all risk factors prior to using and rigging device or product. Failure to do this may result in severe **INJURY** or **DEATH** due to sling failure and/or loss of load.

- The following six points briefly summarize some important safety issues:
- 1 All users must be trained** in sling selection, use and inspection, cautions to personnel, environmental effects and rigging practices.
 - 2 Inspect sling for damage** regularly, if the sling is damaged, remove it from service.
 - 3 Protect sling from damage.** ALWAYS protect slings in contact with edges, corners, protrusions, or abrasive surfaces with materials of sufficient strength, thickness and construction to prevent damage.
 - 4 Do not exceed a sling's rated capacity.** Always consider the effect of sling angle and tension on the slings rated capacity.
 - 5 Do not stand on, under or near a load** with the sling under tension. All personnel should be alert to dangers of falling and/or uncontrolled loads, sling tension and the potential for snagging.
 - 6 Maintain and store slings properly.** Slings should be protected from mechanical, chemical and environmental damage.

1. All Sling Users Must Be Trained and Knowledgeable

All web sling users must be trained on the proper use of round slings. The American Society of Mechanical Engineers, Safety Standard for Slings (ASME B30.9) States:

"Synthetic round sling users shall be trained in the selection, inspection, cautions to personnel, effects of the environment and rigging practices as covered" by Chapter 9-5

It is important that all sling users be knowledgeable about the safe and proper use and application of slings and be thoroughly familiar with the manufacturer's recommendations and safety materials provided with each product. In addition, all sling users need to be aware of their responsibilities as outlined in all applicable standards and regulations.

If you are unsure whether you are properly trained and knowledgeable, or if you are unsure of what the standards and regulations require of you, ask your employer for information and/or training – **DO NOT** use round slings until you are absolutely sure of what you are doing. Remember, when it comes to using web slings, lack of skill, knowledge and care can result in severe **INJURY** or **DEATH** to you and others.

2. Slings Must Be Regularly and Properly Inspected

Even seemingly "minor" damage to a round sling can significantly reduce its capacity to hold or lift objects and increases the chance that the sling will fail during use. Therefore, it is very important that web slings are regularly and properly inspected. If you are not sure whether a sling is damaged, **DO NOT USE IT.**

2a. How to inspect slings

Generally, damage to round slings can be detected visually. In some instances, internal load yarn damage can occur and not be visible. To detect possible damage, you should feel along its entire length, as some damages may be felt more than seen. You should look and feel for any of the types of conditions listed in **Table 1**. **Table 2** show examples of some of these types of damage, but note that they are relatively extreme examples provided for the purposes of illustration only.

2b. 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 in **Table 2**. Slings that are removed from service must be destroyed and rendered completely unusable unless they can be repaired and proof-tested by the slings's manufacturer or other qualified person. You should never ignore sling damage or attempt to perform temporary field repairs of damaged slings (e.g. tie knots in the sling, etc.)

Table 1. Round sling removal from service criteria

<p>The entire Round sling must be inspected regularly and it shall be removed from service if ANY of the following are detected:</p> <ul style="list-style-type: none"> • If sling identification tag is missing or not readable. • Holes, tears, cuts, snags, or embedded materials, excessive abrasive wear, or snags that expose the core yarn of the round sling. • Broken or worn damaged core yarn. • Knots in any part of the round sling. • Acid or Alkali burns • Melting, charring or weld spatter on any part of the round sling. • Distortion, excessive pitting, corrosion or other damage to fitting(s). • Broken or worn stitching in the cover which exposes the core yarn. • If provided, exposed red core yarn. However if damage is present and red yarns are not exposed DO NOT USE the sling. • Any Conditions which cause doubt as to the strength of the round sling.

2c. How often to inspect slings

A three-stage procedure is recommended to help ensure that round slings are inspected with appropriate frequency;

Initial Inspection - Whenever a sling is initially received, it must be inspected by a designated person to help ensure that the correct round sling has been received and is undamaged and that the round sling meets applicable requirements for its intended use.

Frequent Inspections - The entire sling must be **inspected before each shift or day in Normal service and before each use in severe service applications.**

Periodic Inspection - Every sling must be inspected "periodically" by a qualified and designated person. In order to validate the frequent level of inspection, the inspection should be performed by someone other than the individual(s) who most commonly performs the frequent inspection. The frequency of periodic inspections is based on the sling's actual expected frequency of use, severity of service conditions, the nature of work performed with the sling and experience gained during inspection of other slings used in similar circumstances.

General Guidelines for the frequency of periodic inspections are:

- Normal Service - Yearly
- Severe Service - Monthly to Quarterly
- Special Service - As recommended by a qualified person

Periodic inspection intervals must not exceed one year

Written records are not required for frequent inspections, but WSTDA WS-1 or ASME B30.9 require that a written record of the most recent periodic inspection be maintained. See WSTDA WS-1 or ASME B30.9 for more information about definitions of Normal, Severe, or Special service conditions.

3. Slings Must Be Adequately Protected from Damage

3a. Avoid actions that cause damage to slings

You should always avoid any action that causes the types of damage identified in the previous section of this safety bulletin, including (but not limited to):

- Dropping or dragging slings on the ground, floor or over abrasive surface.
- Pulling slings from under loads when the load is resting on the sling - place blocks under the load if feasible.
- Shortening or adjusting the sling using methods not approved by the sling manufacturer or qualified person.
- Twisting, kinking, or knotting the sling.
- Exposing slings to damaging acids or alkalis.
- Exposing the slings to sources of heat damage or weld spatter.
- Using slings or allowing exposure to temperatures above 194° F (90°C) or below -40°F (-40°C)
- "Tip Loading" a sling on a hook instead of centering it in the base or "bowl" of the hook.
- Using hooks, shackles or other hardware that have edges or surfaces that could damage the sling.
- Running/driving over slings with a vehicle or other equipment

Synthetic Slings are affected by some chemicals ranging from little to total degradation. Time, temperature and concentration factors affect the degradation. For specific applications, consult the manufacturer.

3c. Safeguard slings with sufficient protection

Synthetic round slings can be damaged, abraded or cut as tension and compression between the sling, the connection points and the load develops. Surfaces in contact with the sling do not have to be very abrasive or have "razor" sharp edges in order to create conditions for sling failure. Therefore, round slings must **ALWAYS be protected from being cut or damaged by corners, edges, protrusions or abrasive surfaces with protection sufficient for the intended purpose.**

There are a variety of types of ways to protect slings from such damage. A qualified person might select and use appropriate engineered protectors/softeners - commercially available products (e.g., sleeves, wear pads, edge wraps, body wraps, corner protectors, etc.) specifically designed to protect slings from damage. A qualified person might also design and construct their own methods of protection so long as the sling is adequately protected from and/or kept off the damaging edge surface.

Regardless of the particular method chosen, the goal is to ensure that the sling, under tension, maintains its ability to securely lift the load while avoiding contact with damaging or abrasive surfaces under tension. A qualified person must carefully consider the most appropriate means to accomplish this goal. The protection used should not be makeshift (i.e., selecting and using cardboard, work gloves or other such items based solely on convenience or availability).

Regardless of the approach taken, a qualified person must ensure that the protection method chosen is appropriate for the types of damage to which the slings will be exposed. For instance, some protection provides abrasion resistance, but offers virtually no protection against cuts. Several "test" lifts, done in a non-consequence setting, may be necessary to determine the suitability of the protection device(s). After each "test" lift, the protection device(s) and slings(s) need to be inspected for damaged and suitability. You should keep in mind that no protection is "Cut-Proof" and you should always operate within the specified limits of the sling and its accessories (e.g., fixtures, hardware, protection).

Round slings must always be protected from coming into direct contact with any edges unless the contacting edges meet both of the following criteria:

- The edges must be smooth and well-rounded. Edges that are chamfered or flattened at an angle do not meet this criteria.
- The size of the edge radii must be adequately large. The minimum edge radii for contact with unprotected polyester round slings are shown later in this chapter in the sling load charts.

One way to measure an edge radius is to measure the distance between the leading edge of the radius that is being measured (Point A) and the point where the radius initiates from the bottom edge of the surface (Point B) (see Figure 1)

In order to protect the round sling, it is also necessary to select and use proper connection hardware. Connection hardware should be selected so that either:

- it conforms to the size requirements for vertical and choker hitches
- the *bearing stress* value at the connection does not exceed 7,000 lbs./in² during sling loading

ROUND SLING WARNINGS & USAGE



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4. Always Use Slings Properly

When lifting loads, a trained, qualified and knowledgeable user must take into account the factors and issues addressed in this bulletin, as well as considering any other relevant factors not addressed herein (see **table 6**). Among the factors related specifically to web slings, users must perform several activities, including (but not limited to) those discussed in the following subsections.

4a. Assess the load

Determine the weight of the load and make sure it does not exceed the sling's rated capacity or the capacity of any of the components of the rigging system. Users must also determine the load's center of gravity (CG) to make sure the rigging system used will be able to retain and control the load once lifted.

4b. Select an appropriate sling/configuration

Select a sling having suitable characteristics for the type, size and weight of the load, the type of hitch (see **table 7**) and the environment. The sling must be securely attached to the load and rigged in a manner to provide for load control to prevent slipping, sliding and/or loss of the load. A trained, qualified or knowledgeable user must determine the most appropriate method of rigging to help ensure a safe lift and control of the load.

Another important consideration is the sling-to-load angle formed between a horizontal line and the sling leg or body. This angle is very important and can have a dramatic effect on the rated capacity of the sling. When the sling-to-load angle decreases, the load on each leg increases. 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-legged bridle sling is used. **Table 8** provides information about increased tension as a function of sling-to-load angle (assuming equally loaded sling legs). Sling angles of less than 30 degrees are not recommended.

Similarly, when the angle of choke is less than 120 degrees, the sling choker hitch capacity decreases. To determine the actual sling capacity at a given angle multiply the sling capacity rating (**for a choker hitch**) by the appropriate reduction factor determined from **Table 9**.

4c. Do not misuse the sling

Avoid accelerating or decelerating the load too quickly (i.e. "shock loading"). Do not use slings to pull on stuck or snagged objects and do not use slings for towing purposes. A round sling should be used for only lifting loads.

5. Make Sure All Personnel are Clear of Loads and Alert to Risks

Even if you account for all of the factors/issues discussed in this Safety Bulletin, things can still go wrong. Therefore, all personnel must stand clear of lifted loads and never be under, on or near suspended loads.

When using slings, no part of the body should be placed between the sling and load or between the sling and lifting hook. In addition, personnel must be alert to the potential for the sling to become snagged during a lift. Never use a round sling to pull on objects in a snagged or constrained condition.

6. Properly Store and Maintain Slings

In order to prevent damage to slings when not in use, you should store slings in a cool, dry and dark location. Slings should be stored in an area free from environmental or mechanical sources of damage, such as weld spatter, splinters from grinding or machining, heat sources, chemical exposure, etc. Also, keep slings clean and free of dirt grime and foreign materials.

If slings are cleaned, use only a mild soap or water. Rinse sling thoroughly and let it dry completely before placing it back into storage or use. **DO NOT machine** wash slings, machine washing results in significant loss of sling strength.

Figure 1: Corner Radius Measurement

The radii values apply to round slings that are fully tensioned to their rated capacity regardless of the hitch. When round slings are tensioned to lower force values, the minimum radius values will reduce accordingly.

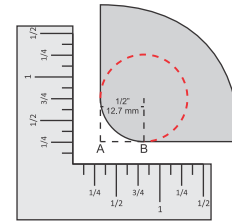
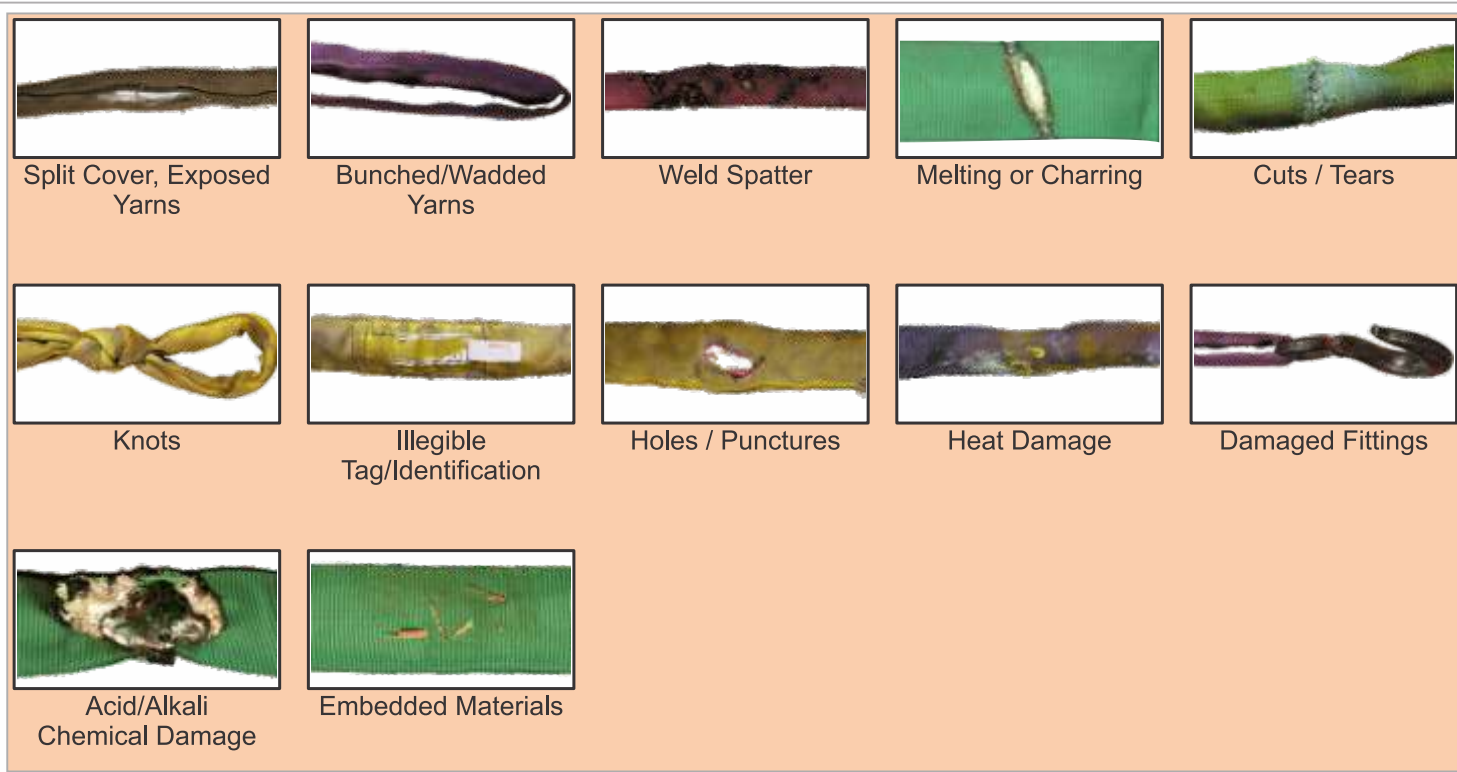


Table 2. Types of damage you should look and feel for in Round Slings



1. Missing Identification

The sling identification must contain the manufacturer's name or trademark, code or stock number, rated load for the type of hitch used and angle upon which it is based, core material and cover material if different, and number of legs if more than one.

2. Acid or Caustic Burns

Cover or core yarn material degraded by chemicals.

3. Evidence of Heat Damage

Material damage due to high heat exposure, such as furnace, flame, or loads whose temperatures exceed – for polyester slings, 194°F; 90°C – or for high performance/HP yarns, 158°F, 70°C.

4. Punctures and Holes

Cover separation that exposes core yarns and often passes completely through the sling body

5. Cuts and Tears

Lacerated or torn areas in the cover that create a breach, exposing the core yarns.

6. Abrasive Wear

Surface scrubbing of the cover. Rejection of the sling is required due to a breach in the cover which exposes core yarns to the surface and/or associated heat damage.



7. Broken or Damaged Core Yarns

Core yarn that is noticeably separated across its axis. The yarn typically recoils resulting in a backlash.

8. Weld Splatter

Hot droplets of weld slag burns the cover and core yarns

9. Knotted

A fused, seated and/or non-removable knot, which encompasses the sling body (not to be confused with the internal core "knot" this is the core yarn termination and will be taped. Also, the tail ends of the internal termination will be taped).

10. Fitting Damage

Any integrated hardware which displays deformation, pitting and severe corrosion or significant metal loss. Refer to ASME B30.9, 10, and 26 for more specific criteria.

11. Illegible Identification

Missing data and/or information as required by identification requirements (see #1)

12. Impacted Particles

Impacted abrasive or sharp particles, such as sand or small metal shavings, permanently trapped inside the sling.

13. Other Conditions

Conditions that may cause doubt as to the continued use of the sling may include, but are not limited to crushed yarns, severe sling distortion, unusual stiffness in the yarn and cover and broken stitching in the cover splice.

Care and Use of FIRST Synthetic Round Slings

- Protect slings from damage using abrasion or cut resistant/proof material of sufficient construction, strength and thickness as necessary.
- Slings can be damaged when contacting rough surfaces on the load, crane hooks or rigging hardware, and load edges.
- Store slings in a cool, dark and dry place to prevent damage from chemicals, mechanical devices, extreme temperatures or ultraviolet light.
- Slings may not be repaired in the field, only by the manufacturer.
- Only connect the sling to hardware that allows proper seating based on size and shape.
- Synthetic slings shall not be used to support personnel nor as the dedicated rigging for a suspended personnel platform.
- Do not stand or pass under a suspended load.
- Personnel should not stand in-line with or next to a sling that is tensioned.
- No portion of the human body will come between the sling and load, and sling and hoisting hook.
- Know the weight of the load and ensure the sling(s) has sufficient rated capacity for handling the load in the prescribed rigging method and at the anticipated angle from horizontal.
- Do not expose slings to temperatures below -40°F (-40°C) or above 194°F (90°C) for polyester; or below -40°F (-40°C) or above 158°F (70°C) for high performance/HP yarns. The sling manufacturer should be consulted

- about exposing slings to temperatures beyond these ranges.
 - Avoid shock loading slings, and do not land a load on the slings.
 - Do not use slings for lifting when they are knotted or twisted.
 - Rig the load so it is controlled, and avoid sling sliding while it is under tension.
 - Prevent lose slings from snagging on obstructions.
 - Carry or cart slings, and avoid dragging them over rough surfaces.
 - When using choker hitches, do not choke on a fitting, and beware of capacity reduction due to the angle of choke.
 - Prevent damage to the sling by not constructing, bunching or pinching the sling when it contacts the load, crane hook or fitting.
 - The sling manufacturer should be consulted before slings are used in chemically active environments.
- Notice: Become familiar with the instructions and regulations about the care, use and inspection of synthetic roundslings as addressed by Federal OSHA, State or Provincial requirements and ASME B30.9 SLINGS. Consult the inspectable roundsling manufacturer for additional guidance. Inspectable Roundsling Removal Criteria Wall Poster available.